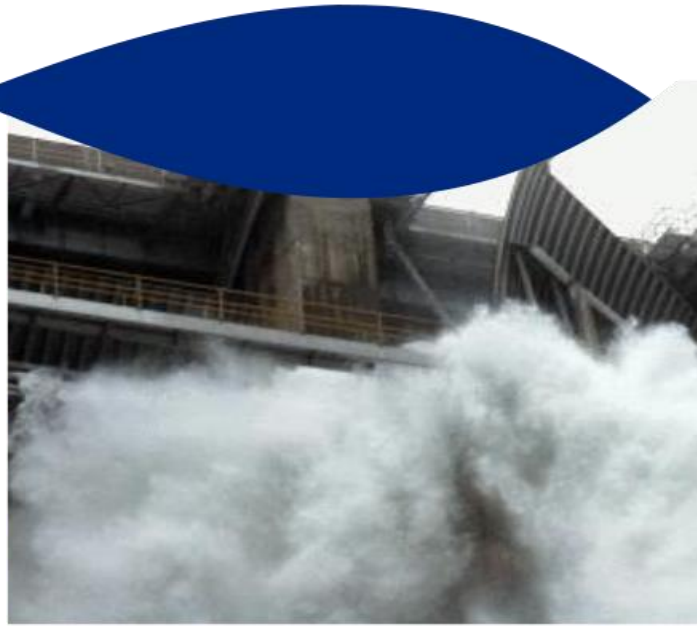
2016 Sacramento Countywide Local Hazard Mitigation Plan Update

December 2016



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Executive Summary

Sacramento County prepared this Local Hazard Mitigation Plan (LHMP) to guide hazard mitigation planning to better protect the people and property of the County and participating jurisdictions from the effects of natural disasters and hazard events. This plan demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed in order for the County and participating jurisdictions to be eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) Program, and the Flood Mitigation Assistance (FMA) Program.

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated. The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards

The Sacramento County LHMP is a multi-jurisdictional plan that geographically covers the entire area within Sacramento County's jurisdictional boundaries (hereinafter referred to as the planning area). While many more local jurisdictions participated in the development of this LHMP, the following jurisdictions participated in the planning process and are seeking approval of this LHMP plan:

- Sacramento County*
- Brannan Andrus Levee Maintenance District (RDs 317, 407, 2067)
- City of Citrus Heights*
- City of Elk Grove*
- City of Folsom*
- City of Galt*
- City of Isleton
- City of Rancho Cordova*
- City of Sacramento*
- Cosumnes Community Services District Fire Department*
- Los Rios Community College*
- Reclamation District 3
- Reclamation District 341*
- Reclamation District 369
- Reclamation District 551
- Reclamation District 554
- Reclamation District 556
- Reclamation District 563
- Reclamation District 800*
- Reclamation District 1000*
- Reclamation District 1002
- Reclamation District 1601

- Reclamation District 2111
- Sacramento Area Sewer District
- Sacramento Metro Fire District
- Sacramento Regional County Sanitation District*
- Southgate Recreation and Park District*
- Twin Rivers School District*

* Participated in 2010 Plan

LHMP Plan Development Process

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. This plan documents the hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the County and participating jurisdictions will use to decrease vulnerability and increase resiliency and sustainability in the community.

This LHMP was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. The County and participating jurisdictions followed a planning process prescribed by FEMA as detailed in Table ES-1.

Table ES-1 Local Hazard Mitigation Planning Process

DMA Process	Modified CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan

The planning process began with the organizational phase to establish the hazard mitigation planning committee (HMPC) comprised of key County and City representatives, and other local and regional stakeholders; to involve the public; and to coordinate with other departments and agencies. A detailed risk assessment was then conducted followed by the development of a focused mitigation strategy for the

Sacramento County planning area. Once approved by Cal OES and FEMA, this plan will be adopted and implemented by Sacramento County and the participating jurisdictions over the next five years.

Risk Assessment

The HMPC conducted a risk assessment that identified and profiled hazards that pose a risk to the Sacramento County planning area, assessed the vulnerability of the planning area to these hazards, and examined the existing capabilities to mitigate them.

The County is vulnerable to numerous hazards that are identified, profiled, and analyzed in this plan. Floods, levee failures, drought, wildfires, and other severe weather events are among the hazards that can have a significant impact on the Sacramento County planning area. Table ES-2 details the hazards identified for the Sacramento County LHMP.

Table ES-2 Sacramento County Hazard Identification Assessment

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards	Significant	Highly Likely	Critical	Medium	Medium
Bird Strike	Limited	Highly Likely	Critical	Medium	Low
Climate Change	Extensive	Highly Likely	Critical	High	–
Dam Failure	Significant	Unlikely	Catastrophic	Medium	High
Drought and Water Shortage	Extensive	Likely	Limited	High	High
Earthquake	Limited	Occasional	Critical	Medium	None
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium	None
Flood: 100/200/500-year	Significant	Occasional/Unlikely	Catastrophic	High	High
Flood: Localized Stormwater Flooding	Limited	Highly Likely	Limited	Medium	High
Landslides	Limited	Unlikely	Negligible	Low	Medium
Levee Failure	Significant	Occasional	Catastrophic	High	High
River/Stream/Creek Bank Erosion	Limited	Highly Likely	Limited	Medium	High
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Low	High
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Critical	High	High
Severe Weather: Fog	Extensive	Highly Likely	Limited	Low	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Critical	Medium	High
Severe Weather: Wind and Tornadoes	Limited	Highly Likely	Limited	Low	Medium
Subsidence	Significant	Highly Likely	Limited	Low	Medium
Volcano	Limited	Unlikely	Limited	Low	None
Wildfire:(Burn Area/Smoke)	Significant	Highly Likely	Limited	Medium	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Mitigation Strategy

Based on the results of the risk assessment, the HMPC developed a mitigation strategy for reducing the Sacramento County planning area's risk and vulnerability to hazards. The resulting Mitigation Strategy for the Sacramento County planning area is comprised of LHMP goals and objectives and a mitigation action plan which includes a series of mitigation action projects and implementation measures.

The goals and objectives of this Sacramento County LHMP are:

Mission Statement: This Local Hazard Mitigation Plan assesses natural hazards of concern to the Sacramento community; evaluates risk to life safety, public health, property, and the environment; and evaluates mitigation measures to reduce these risks and vulnerabilities, minimize losses, and increase community resilience.

GOAL 1: Minimize risk and vulnerability of the Sacramento County community to the impacts of natural hazards and protect lives and reduce damages and losses to property, public health, economy, and the environment.

Objectives:

- Protect, preserve, and promote public health and safety, livability, and the environment
- Assure long term protection and resiliency of existing and future development (including infill areas) from natural hazards
- Protect critical facilities from natural hazards and minimize interruption of essential infrastructure, utilities, and services
- Protect natural resources; Protect and enhance water quality and supply, critical aquatic resources and habitat for beneficial uses.
- Maintain/enhance the flood mitigation program to provide 100/200/500 year flood protection
- Minimize risk of levee breach, overtopping or other failures
- Mitigate Repetitive Loss Properties
- Continued enhancement of CRS programs
- Address localized drainage issues
- Reduce the potential of wildfire in Sacramento County and protect the community
- from adverse effects of wildfire, including secondary impacts such as air quality
- Protect vulnerable populations from the threat of natural hazards
- Address climate change influence in project design and development
- Promote hazard mitigation as an integrated public policy and as a standard business practice

GOAL 2: Improve public outreach, awareness, education, and preparedness for all hazards to minimize hazard related losses

Objectives:

- Increase outreach, communication and awareness of natural hazards and reduce exposure to all hazard related losses, including climate change
- Improve the communities' understanding of natural hazards and how to effectively be prepared and take action to mitigate the impacts of hazard events
- Develop and target outreach and education for each hazard type and risk area

- Increase access to natural hazard information via enhanced web and mobile applications before, during, and after a disaster
- Enhance public outreach programs to target all vulnerable populations, including multi-language communications and multi-mode delivery
- Continued promotion of flood insurance

GOAL 3: Improve the capabilities of the community to mitigate losses and to be prepared for, respond to, and recover from a disaster event

Objectives:

- Promote interagency coordination of mitigation planning and implementation efforts
- Minimize hazard-related damage in order to maintain current service levels
- Continued enhancements to emergency services capabilities, integrating new technologies to reduce losses and save lives
- Promote intergovernmental and interagency coordination, planning, training, exercising and communication to ensure effective community preparedness, response, and recover
- Increase the use of coordinated, shared resources between agencies
- Promote public/private partnerships in hazard mitigation and preparedness programs
- Identify, coordinate, and implement countywide evacuation and shelter in place planning for all populations and increase community awareness of these activities

GOAL 4: Assure conformance to Federal and State Hazard Mitigation Initiatives and Maximize Potential for Mitigation Implementation

Objectives:

- Maintain FEMA Eligibility/Position Jurisdictions for Grant Funding
- Maintain good standing with FEMA and State hazard mitigation programs, regulations and requirements
- Develop an overall mitigation funding strategy to prioritize and pursue mitigation projects in an equitable manner to benefit all populations
- Maximize funding opportunities through identification and tracking of all types of Federal and state grant programs to implement identified mitigation projects

Actions to support these goals are shown on Table ES-1.

Table ES-3 Sacramento County Planning Area Mitigation Actions

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Sacramento County						
Multi-Hazard Actions						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	1, 2, 3, 4	2011 Action	X	X	X	Public Information Emergency Services
Increase pedestrian and bicycle evacuation routes by constructing regional bike/pedestrian trail infrastructure, and expanding connection to neighborhoods (particularly in vulnerable areas)	1, 2, 3, 4	New Action	X	X		Emergency Services
Community Rating System (CRS) Program for Public Information (PPI)	1, 2, 3, 4	2011 Action	X	X	X	Prevention Public Information
Flood Insurance Assessment, Awareness, and Promotion	1, 2, 3, 4	New Action	X	X	X	Prevention Public Information
Public Outreach Mailers	1, 2, 3, 4	2011 Action	X	X	X	Public Information
Toxic Substance Release	1, 2, 3, 4	New Action	X	X	X	Natural Resource Protection Property Protection
Climate Change Actions						
Increase average fuel efficiency and reduce GHG emissions from the County Fleet and Fuels	1, 2, 3, 4	New action	X	X		Prevention Natural Resource Protection
Reduce Sacramento County's vulnerability to Climate Change by reducing GHG emissions in the commercial and residential sectors by making energy efficiency a priority through building code improvements	1, 2, 3, 4	New action	X	X		Prevention Natural Resource Protection

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Mitigate Climate Change impacts by integrating climate change research and adaptation planning into County operations and services	1, 2, 3, 4	New action	X	X		Prevention
Reduce Sacramento County's vulnerability to extreme heat events and associated hazards by Increase tree planting/canopy preservation/enhancement	1, 2, 3, 4	New action	X	X		Prevention Natural Resource Protection
Drought Actions						
Implement Water Supply CIP	1, 2, 3, 4	New Action	X	X		Prevention Property Protection Natural Resource Protection Structural
Flood, Levee Failure, and Localized Flood Actions						
Keep the PPI current	1, 2, 3, 4	New action	X	X	X	Public Outreach
Alder Creek flood control	1, 2, 3, 4	New action	X	X	X	Property Protection Structural
Alder Creek flood mitigation (dam)	1, 2, 3, 4	New action	X	X	X	Structural
Alder Creek miners reservoir, property owned by the City of Folsom	1, 2, 3, 4	New action	X	X	X	Structural
Delta Small Communities flood protection - structural and nonstructural mitigation	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Gum Ranch flood control - joint use basin	1, 2, 3, 4	New action	X	X	X	Structural
Implement Storm Drain CIP	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Laguna Creek at Triangle Aggregate flood control -joint use basins	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Laguna Creek mitigate flood hazard south of Jackson Highway	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Model Sacramento River levee breach (LAMP) south of Freeport	1, 2, 3, 4	New action	X	X	X	Emergency Services Property Protection Natural Resource Protection Structural
Morrison Creek Miners Reach Flood Insurance Study	1, 2, 3, 4	New action	X	X	X	Prevention
Morrison Creek Miners Reach levee improvements	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Outreach stormwatch guide (ALERT, Stormready, weather radio)	1, 2, 3, 4	New action	X	X	X	Emergency Services Public Information
Peak flow floodplain mitigation Arcade Creek near Auburn Blvd	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Risk Map (flood frequency, depth, velocity)	1, 2, 3, 4	New action	X	X	X	Prevention Emergency Services
Elevation & Acquisition Projects (to Mitigate Flood Risk)	1, 2, 3, 4	2011 Action	X	X	X	Property Protection
Repetitive Loss Properties (to Mitigate Flood Risk)	1, 2, 3, 4	2011 action	X	X	X	Property Protection
Five-Year Capital Improvement Plan – Drainage Projects	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Arcade Creek Corridor Plan	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Elevate Homes on Long Island (Grand Island Road, Sacramento River)	1, 2, 3, 4	New action	X	X	X	Property Protection
Repetitive Loss Church Building on Dry Creek	1, 2, 3, 4	New action	X	X	X	Property Protection
South Branch Arcade Creek – Gum Ranch Basin (with Fair Oaks Park District) and Kenneth Avenue Bridge Improvements (with Sacramento County Department of Transportation)	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Dry Creek Flood Hazard Mitigation Acquisitions with County Regional Park Department	1, 2, 3, 4	New action	X	X	X	Property Protection
Arcade Creek at Evergreen Estates Floodwall Improvements	1, 2, 3, 4	New action	X	X	X	Structural
Linda Creek Peak Flow Mitigation	1, 2, 3, 4	New action	X	X	X	Property Protection Structural
Flood Preparation in the American River Parkway	1, 2, 3, 4	New action	X	X	X	Emergency Services Prevention
Improve County ALERT (Automated Local Evaluation in Real Time) System of Stream and Rain Gauges	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Update County Hydrology Standards	1, 2, 3, 4	New action	X	X	X	Prevention
Woodside Condominiums Repetitive Flood Loss Property	1, 2, 3, 4	New action	X	X	X	Property Protection Structural
Bridge Replacement on Elk Grove Florin Road at Elder Creek	1, 2, 3, 4	New action	X	X	X	Structural
Michigan Bar Bridge Replacement at the Cosumnes River	1, 2, 3, 4	New action	X	X	X	Structural
El Camino Avenue Phase 2 Road Improvements	1, 2, 3, 4	New action	X	X	X	Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Improve Flood Protection and/or Evacuation Planning for Mobile Home/RV Park at Manzanita/Auburn. Alternatively, the Park Should Establish Flood Warning and evacuation procedures.	1, 2, 3, 4	2011 action	X	X	X	Emergency Services Property Protection Structural
Hydromodification and Stormwater Quality Countywide	1, 2, 3, 4	2011 action	X	X	X	Property Protection Structural
Evacuation Mapping	1, 2, 3, 4	New Action	X	X	X	Emergency Services
Regional Flood Management Plan Projects	1, 2, 3, 4	New Action	X	X	X	Prevention Natural Resource Protection Property Protection Structural
River/Stream/Creek Bank Erosion						
Erosion Site Repairs	1, 2, 3	New action	X	X	X	Structural
Wildfire Actions						
Wildfire Suppression	1, 2, 3, 4	New Action	X	X		Property Protection
Wildfire Fighting - Support	1, 2, 3, 4	New Action	X	X		Emergency Services
Wildfire Suppression – Regional Parks and Open Space (urban interface)	1, 2, 3, 4	New Action	X	X		Property Protection Natural Resource Protection
City of Citrus Heights						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan, as well as other Local Planning Efforts	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Rinconada Flood Wall	1, 2, 3, 4	2011 Action	X	X	X	Structural
Drainage Project Implementation	1, 2, 3, 4	New Action	X	X	X	Property Protection Structural
City of Elk Grove						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan, as well as other Local Planning Efforts	1, 2, 3, 4	2011 Action	X	X	X	Prevention

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Mutual Aid Agreements	1, 2, 3, 4	New action	X	X		Prevention Emergency Sevices
Elk Grove Green Street Project: Repurposing Urban Runoff with Green Instructure Technologies	1, 2, 3	New action	X	X		Property Protection Structural
Hazard Education and Risk Awareness	1, 2, 3, 4	New action	X	X	X	Public Information
City of Elk Grove's Storm Drainage Master Plan (SDMP)	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
City of Folsom						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan, as well as other Local Planning Efforts	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Stormwater Basin Maintenance and Operation Project	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Alder Creek Watershed Council	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Drainage System Maintenance Tax Assessment	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Floodplain Mapping	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Redevelopment Area Drainage Improvements	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Stormwater Basin Maintenance and Operation Project	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Heating and Cooling Centers	1, 2, 3, 4	2011 Action	X	X		Emergency Services
Public Education/Outreach Extreme Weather	1, 2, 3, 4	2011 Action	X	X	X	Public Information
Weed Abatement Program	1, 2, 3, 4	New Action	X	X		Prevention

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Arson Prevention and Control Outreach	1, 2, 3, 4	2011 Action	X	X		Prevention
Wildfire Hazard Identification	1, 2, 3, 4	2011 Action	X	X		Prevention
Ignition Resistant Building Construction Upgrades	1, 2, 3, 4	2011 Action	X	X		Property Protection
Wildfire Prevention Outreach	1, 2, 3, 4	2011 Action	X	X		Public Information
City of Galt						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan, as well as other Local Planning Efforts	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Increase Redundancy/Functionality of Water Wells and Sewer Lift Stations	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Drain Inlet Retrofit Capital Improvement Plan (CIP)	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Creek/Streams Vegetation Management Plan	1, 2, 3, 4	2011 Action	X	X		Natural Resource Protection
Increase Data Capacity of Emergency Frequencies	1, 2, 3, 4	2011 Action	X	X		Emergency Services
City of Isleton*						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	New Action	X	X		Prevention
Storm Water Runoff Rehabilitation Project	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Wastewater Treatment Plant Pond Levee Elevation Raise to 200-year Flood Standard	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
City of Rancho Cordova						

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Sunrise Boulevard Widening Kiefer to Jackson	1, 2, 3	2011 Action	X	X		Property Protection Natural Resource Protection Structural
City of Rancho Cordova Disaster Debris Management Plan	1, 2, 3, 4	New Action	X	X		Emergency Services
Transportation Interconnectivity	1, 2, 3, 4	New Action	X	X		Emergency Services
Intergovernmental Agreement between the County of Sacramento and the City of Rancho Cordova	1, 2, 3	New Action	X	X		Emergency Services
Land Use (Long range)	1, 2, 3, 4	New Action	X	X		Prevention
Post disaster training for staff	1, 2, 3, 4	New Action	X	X		Emergency Services
Update/Maintain Emergency Operation Plans (EOPs)	1, 2, 3, 4	New Action	X	X	X	Emergency Services
Increase Everbridge Enrollment	1, 2, 3, 4	New Action	X	X	X	Emergency Services Public Information
Developing and maintaining a database to track community vulnerability.	1, 2, 3, 4	New Action	X	X		Prevention Public Information
City Website HMP and City Website, Press Notification, and Social Media Emergency Information	1, 2, 3	New Action	X	X	X	Emergency Services Public Information
Building & Safety Division Disaster Inspector Training	1, 2, 3, 4	New Action	X	X		Prevention
Landscape and Irrigation Requirements/Retro	1, 2, 3, 4	New Action	X	X		Prevention
Landscape Ordinance	1, 2, 3	New Action	X	X		Prevention
Impervious surface	1, 3, 4	New Action	X	X	X	Property Protection
Porous pavement and vegetative buffers	1, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Storm Water Pump Station Infrastructure Upgrades	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
SB-5 Urban Level of Flood Protection	1, 2, 3, 4	New Action	X	X	X	Prevention Property Protection Structural
Channel Vegetation Management and Erosion Control	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection
Adoption of Hydromodification and Low Impact Development (LID) Standards	1, 2, 3, 4	New Action	X	X	X	Prevention Property Protection
Stormwater Capital Improvement Program Master Plan	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Sunrise Blvd. & Monier Circle Drainage Improvements	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Roundabouts	1, 2, 3, 4	New Action	X	X	X	Property Protection
City of Sacramento						
Multi-Hazard Actions						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	2011 action	X	X	X	Prevention
Coordination with Relevant Organizations and Agencies to Consider the Impacts of Urbanization and Climate Change on Long-Term Natural Hazard Safety	1, 2, 3, 4	New action	X	X		Prevention
Maintain and Identify Changes in Critical Facilities GIS Layer to Support Emergency Management Efforts	1, 2, 3, 4	New action	X	X	X	Emergency Services

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Community Outreach on Multi-Hazard Preparation & Pre-mitigation	1, 2, 3, 4	New action	X	X	X	Public Information
Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Retrofit of Repetitive Loss Properties	1, 2, 3, 4	2011 Action	X	X	X	Property Protection
Safeguard Essential Communication Services	1, 2, 3, 4	New action	X	X		Emergency Services
Multi-lingual Disaster Education	1, 2, 3, 4	New action	X	X		Emergency Services Public Information
Cal OES Safety Assessment Program Evaluators	1, 2, 3, 4	New action	X	X		Emergency Services
National Flood Insurance Program & Community Rating System Continuation	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection Natural Resource Protection Structural Public Information
Coordinate with Sacramento Area Flood Control Agency on Completion of South Sacramento Streams Group Projects	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Develop a Master Generation Plan for Pump Stations	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection
Develop a Disaster Housing Plan	1, 2, 3, 4	New action	X	X	X	Emergency Services
Disaster Resistant Business Program	1, 2, 3, 4	New action	X	X	X	Prevention
Develop Enhanced Emergency Planning for Special Needs Populations in the City of Sacramento Emergency Operations Plan and Other Planning Documents	1, 2, 3, 4	New action	X	X	X	Emergency Services Public Information
Establish a Post-Disaster Action Plan	1, 2, 3, 4	New action	X	X	X	Emergency Services
Flood Recovery Plan	1, 2, 3, 4	New action	X	X	X	Emergency Services
Public Information Flood Response Plan	1, 2, 3, 4	New action	X	X	X	Public Information

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Construction of a new Emergency Operation Center (EOC)	1, 2, 3, 4	New action	X	X	X	Emergency Services
Emergency Operation Center (EOC) Expansion and Information Technology Upgrade	1, 2, 3, 4	New Action	X	X		Emergency Services
Protection of Transportation Infrastructure	1, 2, 3, 4	New action	X	X	X	Emergency Services Property Protection Structural
Public Education Campaign for Everbridge System	1, 2, 3, 4	New action	X	X	X	Emergency Services Public Information
Regional Emergency and Disaster Preparedness Exercises to Test Operational & Emergency Plans	1, 2, 3, 4	New action	X	X	X	Emergency Services
Special Needs and Critical Facilities Database and Advanced Warning System	1, 2, 3, 4	New action	X	X	X	Emergency Services Public Information
Assets Inventory	1, 2, 3, 4	New Action	X	X		Prevention Property Protection
Protection of City Assets from Cyber Terrorism	1, 2, 3	New Action	X	X		Property Protection
Protection of City Information Technology Infrastructure	1, 2, 3, 4	New Action	X	X		Property Protection
Cell Booster	1, 2, 3	New Action	X	X		Emergency Services
Travel Time Model for Lower American and Sacramento Rivers and their Major Tributaries	1, 2, 3	New Action	X	X		Emergency Services Prevention
Watershed Spill Contamination to Drinking Water Quality: Preparedness for Events and Recovery	1, 2, 3	New Action	X	X		Emergency Services Prevention
Purchase Drones for Use in Disaster Preparedness, Mitigation, and Response	1, 2, 3	New Action	X	X		Emergency Services Prevention
Climate Change Actions						
Map and Assess Vulnerability to Sea Level Rise	1, 2, 3, 4	New action	X	X	X	Prevention
Emission Study of City Sump and Pump Stations	1, 2, 3	New Action	X	X		Prevention
Climate Change Mitigation Actions/Climate Change Adaptation Plan for Drinking Water Quality	1, 2, 3	New Action	X	X		Prevention

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Harmful Algal Bloom (HAB) Surveillance and Response Planning	1, 2, 3	New Action	X	X		Prevention
Drought and Water Shortage Actions						
Aquifer Storage	1, 2, 3, 4	New action	X	X	X	Structural
Perform a Groundwater Recharge Feasibility Study	1, 2, 3, 4	New action	X	X	X	Prevention
Earthquake Actions						
Map and Assess Community Vulnerability to Earthquakes	1, 2, 3, 4	New action	X	X	X	Prevention
Seismic Vulnerability Assessment on Sacramento Levees, Infrastructure & Buildings	1, 2, 3, 4	New action	X	X	X	Property Protection Structural
Retrofit Historical Buildings	1, 2, 3, 4	New action	X	X		Property Protection
Extreme Cold and Heat Actions						
Heating Centers in High Priority Locations	1, 2, 3, 4	New action	X	X		Prevention Emergency Services
Cooling Centers in High Priority Locations	1, 2, 3, 4	New action	X	X		Prevention Emergency Services
Extreme Weather Outreach Strategy	1, 2, 3, 4	New action	X	X	X	Prevention
Severe Weather Action Plan	1, 2, 3, 4	New Action	X	X		Prevention Emergency Services
Flood, Localized Flood, and Levee Failure Actions						
Coordinate with Stakeholder on Proposed Flood Control Project on Magpie Creek	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural Public Information
Adopt Additional Floodplain Development Standards	1, 2, 3, 4	2011 action	X	X	X	Prevention
Drainage Projects for Repetitive Loss Properties	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Emergency Notification and Evacuation Planning	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Historic Magpie Creek	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Natomas Internal Drainage Canals/Levees	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Drainage Projects from the City's Priority Drainage Project List	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Projects Identified in the Combined Sewer System Improvement Plan Update	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Easements for Open Land Along Levees	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection Natural Resource Protection
Emergency Management Planning and Levee Security	1, 2, 3, 4	New action	X	X	X	Emergency Services
Flood Fighting Equipment	1, 2, 3, 4	New Action	X	X	X	Emergency Services
Flood Management Land Use Planning and Development	1, 2, 3, 4	New Action	X	X	X	Prevention Property Protection Natural Resource Protection
Florin Creek Pump at Pomegranate Avenue	1, 2, 3, 4	New Action	X	X	X	Property Protection
Internal Drainage System Improvements	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Levee and Structural Flood Management Improvements	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Master planning to identify facilities needed to prevent 10-year event street flooding and 100-year event structure flooding	1, 2, 3, 4	New Action	X	X	X	Prevention Property Protection Natural Resource Protection Structural
Retrofit Pumping Plants with Discharge Monitoring Devices	1, 2, 3, 4	New Action	X	X	X	Property Protection
Risk Communication and NFIP/CRS Projects	1, 2, 3, 4	New Action	X	X	X	Public Information
Steamers and Rio City Café Floodwalls	1, 2, 3, 4	New Action	X	X	X	Structural
Trash Racks and Debris Cages	1, 2, 3, 4	New Action	X	X	X	Property Protection
Multi-Jurisdictional Modeling for Drainage Watersheds Greater Than 10 Square Miles	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection
Post-Flood Water Treatment Facility Recovery	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection
Wind and Tornado Actions						
Tree Trimming & Debris Removal	1, 2, 3, 4	New action	X	X		Property Protection
Upgrading Overhead Utility Lines & Burying Critical Power Lines	1, 2, 3, 4	New action	X	X		Property Protection
Install Redundancies and Loop Feeds for Power Lines & Infrastructure	1, 2, 3, 4	New Action	X	X		Property Protection
Erosion Actions						
Stabilization of Erosion Hazard Areas	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Wildfire Actions						

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Implement a Fire Education and Information Program	1, 2, 3, 4	New action	X	X		Public Information
Fuels Reduction on the American River Parkway	1, 2, 3, 4	2011 Action	X	X		Property Protection Natural Resource Protection
Outreach on the Effects of Smoke on Air Quality	1, 2, 3, 4	New Action	X	X		Public Information
Cosumnes Community Services District						
Flood Response Equipment	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Flood Response Training	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Los Rios Community College						
District Wide Roofing Renovations	1, 2, 3	2011 Action	X	X		Property Protection
ARC Drainage at Arcade Creek	1, 2, 3	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Protect District Property	1, 2, 3	New Action	X	X		Property Protection
Metro Fire District						
Relocate the essential facilities in the 200-year flood plain	1, 2, 3, 4	New Action	X	X	X	Emergency Services Property Protection Structural
Perform seismic study of all district facilities and identify those facilities at greatest risk for earthquake damage.	1, 3, 4	New Action	X	X		Prevention
Implement a Wildland Urban Interface (WUI) Building/Fire Code	1, 3, 4	New Action	X	X		Prevention
Develop and Implement a comprehensive WUI fuels management program.	1, 2, 3, 4	New Action	X	X		Prevention Property Protection Natural Resource Protection
Deploy 2 remote automated weather stations (RAWS) in Metro Fire jurisdiction	1, 2, 3, 4	New Action	X	X		Emergency Services

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Defensible space ordinance	1, 2, 3, 4	New Action	X	X		Prevention
Brannan Andrus Levee Maintenance District						
Implement Bioengineered Bank Stabilization techniques	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Development of Dredge Stockpile Site	1, 2, 3, 4	New Action	X	X		Property Protection Natural Resource Protection
Georgiana Slough Waterside Erosion Repair	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Hydrographic surveys and data collection	1, 2, 3, 4	New Action	X	X	X	Prevention
Mokelumne River Crown Raising	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
San Joaquin River Waterside Erosion Repair	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Sevenmile Slough French Drain and Seepage Berm	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Reclamation District #3*						
Levee Improvements	1, 3	New Action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Reclamation District #341*						
San Joaquin River Setback Levee/Habitat Bench Multi-Benefit Project, Phase 1	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Complete Projects from Regional Flood Management Plan	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
RD 551*						
Levee Improvements	1, 3	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Reclamation District #554*						
Apply for a Letter of Map Revision (LOMR) to bring the District back into Zone X. (outside of the 100-year flood zone)	1, 2, 3, 4	New Action	X	X	X	Prevention
Fill Abandoned Slough	1, 2, 3, 4	New Action	X	X		Property Protection Natural Resource Protection
Geotechnical Investigation	1, 2, 3, 4	New Action	X	X	X	Prevention
Snodgrass Slough Levee Improvements	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Reclamation District #556*						
Flood Response Activities, Georgiana Slough Weir	1, 2, 3, 4	New Action	X	X	X	Emergency Services
Georgiana Slough Vegetation Management	1, 2, 3	New Action	X	X	X	Natural Resource Protection

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Georgiana Slough Waterside Erosion Repair	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Topographic and Hydrographic Surveys and Data Collection	1, 2, 3, 4	New Action	X	X	X	Prevetnion
Reclamation District #563*						
Rock Slope Protection Project	1, 3	New action	X	X		Property Protection Structural projects Natural resource protection
HMP and PL-8499 Levee Improvement Projects	1, 3	New action	X	X	X	Property Protection Structural projects Natural resource protection
Reclamation District #800						
Erosion Repair	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Emergency Supplies	1, 2, 3, 4	New action	X	X		Emergency Services
Reclamation District #1000						
River Berm and Levee Erosion	1, 2, 3, 4	2011 action	X	X	X	Property Protection Natural Resource Protection Structural
Erosion Protection Canal Banks	1, 2, 3, 4	2011 action	X	X	X	Property Protection Natural Resource Protection Structural
Implement Security Measures at Key Facilities	1, 2, 3, 4	2011 action	X	X	X	Emergency Services

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
2014 Capital Improvement Plan	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Implement Supervisory Control and Acquisition Data system (SCADA) on District canals and pump stations	1, 2, 3	New Action	X	X	X	Prevention
Public Outreach and Education	1, 2, 3, 4	New action	X	X	X	Public Information
Stockpile and pre-stage flood emergency response materials	1, 2, 3, 4	New action	X	X	X	Emergency Services
Emergency response improvements including radios for communications	1, 2, 3, 4	New action	X	X	X	Emergency Services
Emergency Back-up Generator for pump stations	1, 2, 3, 4	New action	X	X	X	Emergency Services
Reclamation District #1002*						
Geotechnical Investigation	1, 2, 3	New Action	X	X		Prevention
Snodgrass Slough Levee Improvements	1, 2, 3	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Snodgrass Slough Vegetation Management	1, 2, 3	New Action	X	X	X	Property Protection Natural Resource Protection
Reclamation District #1601*						
Levee Improvement Project	1, 3	New action	X	X	X	Property Protection Structural projects Natural resource protection
Reclamation District #2111*						
Rock Slope Protection Project	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
HMP and PL-8499 Levee Improvement Projects	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Sacramento Regional County Sanitation District						
South River Pump Station Flood Protection Project	1, 2, 3, 4	2011 action	X	X	X	Property Protection Protection Structural
Reduction of Fire Hazard SRCSD Bufferlands	1, 2, 3, 4	2011 action	X	X		Property Protection
Sacramento Area Sewer District						
MOU for Dedicated Cell Phone Tower and Cell Phone Pack	1, 2, 3	New Action	X	X		Emergency Services
Southgate Recreation and Park District						
Drought Mitigation Actions/Drought Contingency Plan	1, 2, 3, 4	2011 Action	X	X		Prevention
Flood Mitigation Actions/Land Acquisition	1, 2, 3, 4	2011 Action	X	X	X	Prevention Property Protection Natural Resource Protection Structural
Conservation Easements	1, 2, 3, 4	2011 Action	X	X		Prevention
Multi-jurisdictional Cooperation within Watersheds	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Storm Water Management Practices – Implement Storm Water Management Practices as identified in Stormwater Quality Design Manual	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection
Severe Weather: Heavy Rains and Storms Mitigation Actions/Tree Management	1, 2, 3, 4	2011 Action	X	X		Property Protection Natural Resource Protection
Twin Rivers School District						

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
New drainage plans to sites within the flood areas including, site drainage, storm drain upgrades and re-grading fields to shed water (on-site) away from buildings	1, 2, 3, 4	2011 action	X	X	X	Property Protection Natural Resource Protection Structural
Work with City/County/Water departments to create defensible spaces at sites where nearby creeks are prone to flooding. Build-up earthen berms (off-site) to shed water away from critically located schools.	1, 2, 3, 4	2011 action	X	X	X	Prevention Property Protection
Working with the Department of the State Architect (DSA) on Earthquake Retrofit Plan on all sites.	1, 2, 3, 4	2011 action	X	X		Property Protection
Revise and update district-wide Storm Water Prevention Plan	1, 2, 3, 4	2011 action	X	X	X	Prevention Property Protection Natural Resource Protection Structural
Create defensible perimeter space – for fire areas. Trees trimmed and vegetation removed to minimize impact during fire season.	1, 2, 3, 4	2011 action	X	X		Property Protection Natural Resource Protection

Table of Contents

Chapters

Annexes

Annex A: City of Citrus Heights

Annex B: City of Elk Grove

Annex C: City of Folsom

Annex D: City of Galt

Annex E: City of Rancho Cordova

Annex F: City of Sacramento

Annex G: Delta Annex

Delta Annex Chapter 1 – City of Isleton

Delta Annex Chapter 2 – Brannan Andrus Levee Maintenance District (including Reclamation Districts 317, 407, and 2067)

Delta Annex Chapter 3 – Reclamation District 3

Delta Annex Chapter 4 – Reclamation District 341

Delta Annex Chapter 5 – Reclamation District 369

Delta Annex Chapter 6 – Reclamation District 551

Delta Annex Chapter 7 – Reclamation District 554

Delta Annex Chapter 8 – Reclamation District 556

Delta Annex Chapter 9 – Reclamation District 563

Delta Annex Chapter 10 – Reclamation District 1002

Delta Annex Chapter 11 – Reclamation District 1601

Delta Annex Chapter 12 – Reclamation District 2111

Annex H: Cosumnes Community Services District Fire Department

Annex I: Los Rios Community College

Annex J: Metro Fire District

Annex K: Reclamation District 800

Annex L: Reclamation District 1000

Annex M: Sacramento Regional County Sanitation District

Annex N: Sacramento Area Sewer District

Annex O: Southgate Recreation and Park District

Annex P: Twin Rivers School District

Appendices

Appendix A: Planning Process

Appendix B: References

Appendix C: Mitigation Strategy

Appendix D: Adoption Resolution

Appendix E: Critical Facilities

Appendix F: Public Survey

Appendix G: Repetitive Loss Area Analysis

Appendix H: Watershed Master Plan

Abbreviations and Acronyms

Acronym	Definition
AB	Assembly Bill
AGL	Above Ground Level
AHPS	Advanced Hydrologic Prediction Service
ALB	Asian Longhorned Beetles
ALERT	Automated Local Evaluation in Real Time
APG	California Adaptation Planning Guide
BAM	Best Available Map
BDCP	Bay Delta Conservation Plan
BLM	Bureau of Land Management
BMP	Best Management Practices
CA	California
CA-DWR	California Department of Water Resources
CAP	Climate Adaptation Plan
CAS	Climate Adaptation Strategy
CDAA	California Disaster Assistance Act
CDEC	California Data Exchange Center
CDFA	California Department of Food & Agriculture
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERT	Community Emergency Response Training
CFR	Code of Federal Regulations
CGS	California Geologic Survey
CHP	California Highway Patrol
CIP	Capital Improvements Plan
CLEMARS	California Law Enforcement Mutual Aid Radio System
CLOMR	Conditional Letter of Map Revision
CNPS	California Native Plant Society
CNRA	California Natural Resource Agency
County DWR	Sacramento County Department of Water Resources
CRS	(National Flood Insurance Program's) Community Rating System
CVFPB	Central Valley Flood Protection Board
CVFMP	Central Valley Flood Management Plan
CWPP	Community Wildfire Protection Plan
DCB	Delta Conservancy Board

Acronym	Definition
DGS	Department of General Services
DMA	Disaster Mitigation Act of 2000
DOT	Department of Transportation
DPC	Delta Protection Commission
DRMS	Delta Risk Management Strategy
DSC	Delta Stewardship Council
DSOD	Division of Safety of Dams
Cal DWR	Sacramento County Department of Water Resources
EAS	Emergency Alert System
EDIS	Emergency Digital Information System
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
ESP	Emergency Safety Plan
F72	Franklin Field
FAA	Federal Aviation Agency
FEMA	Federal Emergency Management Agency
FIA	Flood Insurance Assessment
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance Program
FWS	US Fish and Wildlife Service
GHG	Greenhouse Gases
GIS	Geographic Information Systems
GRR	General Reevaluation Report
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HMGP	Hazard Mitigation Grant Program
HI	Heat Index
HLB	Huanglongbing
HVAC	Heating, Ventilation, and Air Conditioning
IBC	International Business Code
IPCC	Intergovernmental Panel on Climate Change
IRC	International Residential Code
JFP	Joint Federal Project
LFPZ	Levee Flood Protection Zone
LHMP	Local Hazard Mitigation Plan
LOMA	Letter of Map Amendment

Acronym	Definition
LOMR	Letter of Map Revision
MHDP	Multi Hazard Demonstration Project
MHR	Sacramento Mather Airport
MMI	Modified Mercalli Scale
MSL	Mean Sea Level
NASA	National Aerospace and Science Agency
NAVD 88	North America Vertical Datum 1988
NCDC	National Climactic Data Center
NDMC	National Drought Mitigation Center
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NGVD 29	National Geodetic Vertical Datum 1929
NIDIS	National Integrated Drought Information System
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NWS	National Weather Service
OHP	Office of Historic Preservation
PAL	Provisionally Accredited Levee
PDM	Pre-Disaster Mitigation Program
PG&E	Pacific Gas & Electric
PMR	Physical Map Revision
PPI	Program for Public Information
PRP	Preferred Risk Policy
QPF	Quantitative Precipitation Forecasts
RAWS	Remote Automated Weather Stations
RD	Reclamation District
RFMP	Regional Flood Management Plan
RL	Repetitive Loss
RLA	Repetitive Loss Area
RLAA	Repetitive Loss Area Analysis
SAC	Sacramento Executive Airport
SAFCA	Sacramento Area Flood Control Agency
SB	Senate Bill
SBA	Small Business Administration
SCADA	Supervisory Control and Acquisition Data system
SFHA	Special Flood Hazard Area
SGMA	Sustainable Groundwater Management Act

Acronym	Definition
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMF	Sacramento International Airport
SMSA	Sacramento Metropolitan Statistical Area
SMUD	Sacramento Municipal Utility District
SRFCS	Sacramento River Flood Control System
SRL	Severe Repetitive Loss
SSHCP	South Sacramento Habitat Conservation Plan
SSSG	South Sacramento Streams Group
SUALRP	Sacramento Urban Area Levee Reconstruction Project
TMDL	Total Maximum Daily Loads
UCERF	Uniform California Earthquake Rupture Forecast
UDA	Urban Development Area
UHI	Urban Heat Island
ULDC	Urban Levee Design Criteria
ULOP	Urban Level of Protection Criteria
USACE	US Army Corp of Engineers
USGS	United States Geologic Survey
USDA	United States Department of Agriculture
WMP	Wildlife Hazard Management Plan
WRCC	Western Regional Climate Center
WUI	Wildland Urban Interface

Chapter 1 Introduction

1.1 Purpose

Sacramento County and 27 other jurisdictions prepared this Local Hazard Mitigation Plan (LHMP) update to the 2011 Federal Emergency Management Agency (FEMA) approved Sacramento County Local Hazard Mitigation Plan. The purpose of this Plan Update is to guide hazard mitigation planning to better protect the people and property of the County from the effects of hazard events. This plan demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This plan was also developed, among other things, to ensure Sacramento County and participating jurisdictions' continued eligibility for certain federal disaster assistance: specifically, the FEMA Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program (PDM), and the Flood Mitigation Assistance Program (FMA). Completion also earns credits for the National Flood Insurance Program's Community Rating System (CRS) which provides for lower flood insurance premiums in CRS communities.

1.2 Background and Scope

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses incurred by insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be reduced or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of $4 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005).

Hazard mitigation planning is the process through which hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. This plan documents Sacramento County's hazard mitigation planning process and identifies relevant hazards and vulnerabilities and strategies the County and participating jurisdictions will use to decrease vulnerability and increase resiliency and sustainability in the community.

The Sacramento County Local Hazard Mitigation Plan (LHMP) Update is a multi-jurisdictional plan that geographically covers the entire area within Sacramento County's jurisdictional boundaries (hereinafter referred to as the planning area). The following jurisdictions participated in the planning process and are seeking approval of the LHMP Plan Update:

- Sacramento County*
- Brannan Andrus Levee Maintenance District (Reclamation Districts 317, 407, 2067)
- City of Citrus Heights*
- City of Elk Grove*
- City of Folsom*
- City of Galt*
- City of Isleton
- City of Rancho Cordova*
- City of Sacramento*
- Cosumnes Community Services District Fire Department*
- Los Rios Community College*
- Reclamation District 3
- Reclamation District 341*
- Reclamation District 369
- Reclamation District 551
- Reclamation District 554
- Reclamation District 556
- Reclamation District 563
- Reclamation District 800*
- Reclamation District 1000*
- Reclamation District 1002
- Reclamation District 1601
- Reclamation District 2111
- Sacramento Area Sewer District
- Sacramento Metro Fire District
- Sacramento Regional County Sanitation District*
- Southgate Recreation and Park District*
- Twin Rivers School District*

* Participated in 2010 Plan

3 jurisdictions that were approved for the 2011 LHMP, but are not seeking approval for this Plan Update include:

- Arcade Creek Recreation and Park District
- Fair Oaks Recreation and Park District
- SAFCA

This Plan Update was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act (DMA) or DMA 2000.) While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). This planning effort also follows FEMA's 2013 Plan Preparation Guidance. Because the Sacramento County Planning Area is subject to many kinds of hazards, access to these programs is vital.

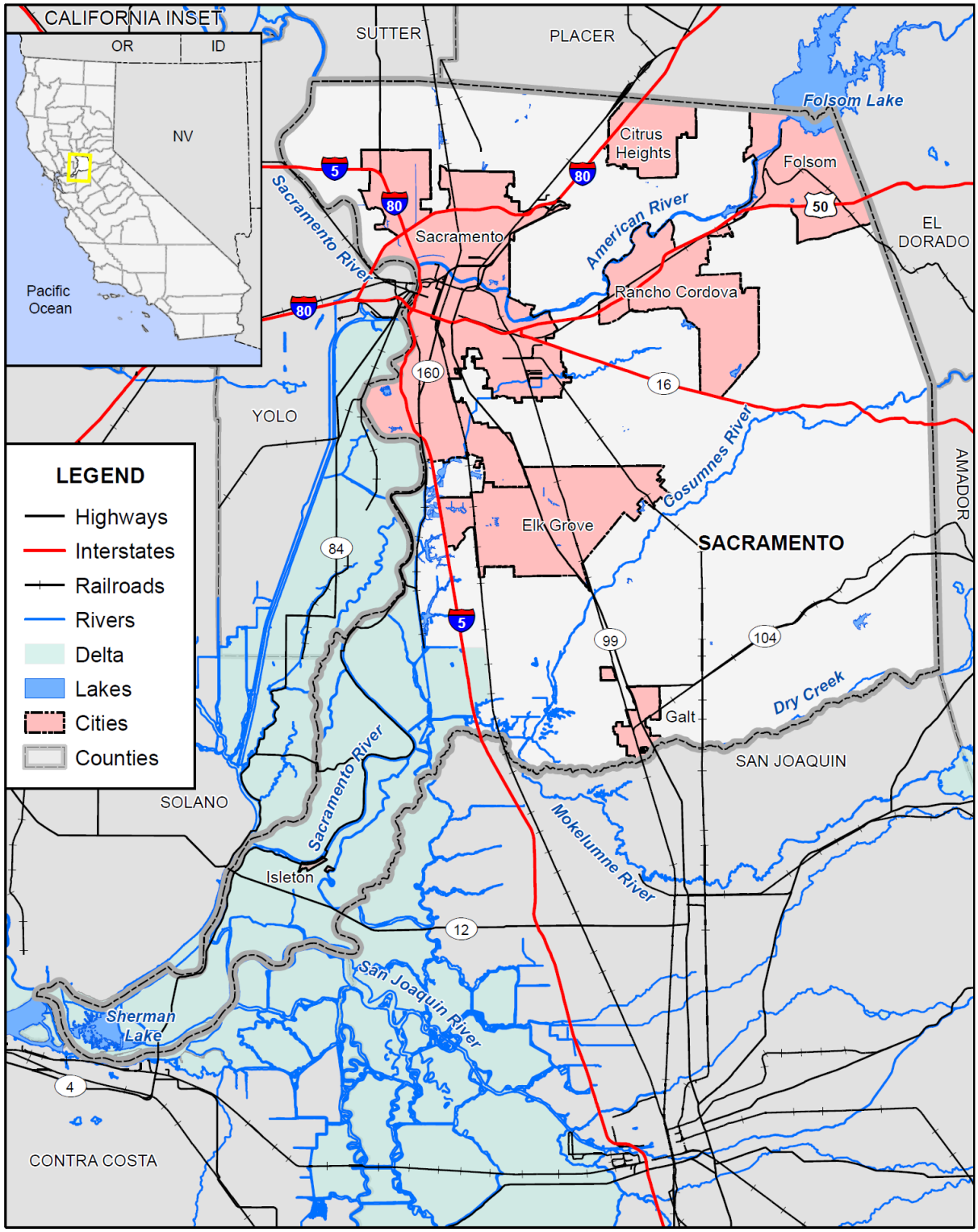
Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. The Planning Area has been affected by hazards in the past and is thus committed to reducing future impacts from hazard events and maintaining eligibility for mitigation-related federal funding.

1.3 Community Profile

Sacramento County lies within the Central Valley of California, and is the County seat of the state capitol of Sacramento. The County has a history as a center of government, trade, transportation and agriculture, and as a consequence the City of Sacramento is a major transportation hub. Interstates 80 and 5; U.S. Highway 50; and State Highways 99, 16 and 160 all extend from the outer edges of the County and converge in downtown Sacramento. Similarly, all of the rail lines in the County converge in Sacramento at the site of the old Sacramento Rail Yard. Airports include Sacramento International, Sacramento Executive, Mather Air Force Base, McClellan Air Force Base and other smaller airports. Each of these major transportation corridors or locations impacts the land uses in the vicinity.

The County is divided into 25 community areas, seven of which are incorporated cities. Most of these communities are in the urbanized core in the western, northwestern or northern portion of the County. The southwestern, eastern and southern portions of the County are more agricultural and rural residential. Many portions of the developed County are within the historic floodplains of the three major rivers (Sacramento, American, and Cosumnes Rivers) and are protected by a system of levees. A map of the County is shown in Figure 1.1.

Figure 1-1 Sacramento County



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

1.3.1. History

Early Spanish explorers and the Franciscan and Jesuit missionaries who followed them were the first Europeans to reach northern California. The interior of the Sacramento Valley, away from the easily defended and more accessible chain of coastal missions and pueblos, was left largely untouched by the Spanish and "Californios." Established settlement of the Sacramento area did not begin until the late 1830s and early 1840s, when resourceful and independent individuals such as Sutter and Jared Sheldon obtained land grants from the Mexican government, usually in exchange for an agreement to protect Mexican interest in these remote interior regions.

With the initial Euro-American settlement of Sacramento County by John Sutter in 1839 at what would become Sutter's Fort, the established outpost brought with it an increase in Euro-American trappers, hunters and settlers to the area. After the arrival of Sutter, several individuals obtained large Mexican Land Grants in the area. As a result of the Mexican War (1847-1848), California became part of the territory of the United States. In 1848, gold was discovered at Sutter's Mill in Coloma. With the discovery of gold in 1848, a torrent of settlers from the east flooded into the Sacramento region. As the population increased and easily found gold decreased, newcomers who decided to stay turned to alternative vocations, particularly agriculture. Many found land comparatively plentiful and cheap. Raising grain, livestock, and produce to sell to the thousands of miners heading to the gold fields proved a profitable venture. These combined events hastened the settlement of the area and the development of Sacramento as an economic and transportation center. The designation of Sacramento as the state capital, in 1854, also resulted in the area's increase in socio-political importance.

The County is the major component of the Sacramento Metropolitan Statistical Area (SMSA) which includes Sacramento, El Dorado and Placer Counties. The County Charter was established in 1933 and is still used today. The official County Seal was adopted by the Board of Supervisors on January 18, 1961, following a contest for an appropriate design.

1.3.2. Geography and Climate

Sacramento County lies just north of the center of California's Central Valley. The confluence of two of the state's major rivers, the Sacramento and the American, occurs within the County. The southwestern panhandle of the county extends far into the Sacramento-San Joaquin Delta, to the point just north of Antioch, where nearly all waters of the Central Valley converge. To the south, San Joaquin County is primarily agricultural. The wooded foothills of the Sierra Nevada rise to the east in Amador and El Dorado Counties. On the north, Placer County has experienced dramatic growth over the past decade, and much of the grasslands adjacent to the northern Sacramento County boundary have been converted to residential uses. Yolo and Sutter Counties to the northwest and west have experienced growth as well, though agricultural uses remain.

The County is divided into 25 community areas, seven of which are incorporated cities. Most of these communities are in the urbanized core in the western, northwestern or northern portion of the County. The southwestern, eastern and southern portions of the County are more agricultural and rural residential. Many portions of the developed County are within the historic floodplains of the three major rivers (Sacramento,

American, and Cosumnes Rivers) and are protected by a system of levees. The California Department of Finance estimated the total population of the County to be 1,470,912 in 2015.

In general, topography in Sacramento County is characterized by a broad band of very flat valley floor land in the western sector, a transition zone of gently sloping alluvial plains in the central sector, and a low foothill region in the eastern sector. Elevations range from below sea level in the delta island area in the Southwest corner of the County to approximately 800 feet in the foothill region. Much of Sacramento County is low and flat. Some areas of the county are so flat that they have essentially no slope at all. Natural drainageways in these areas are usually poorly defined, and drainage of storm waters is slow. Most of these areas lie in the western and southern portions of the County. The general drainage pattern in Sacramento County is from northeast to southwest. As previously noted, all drainage is ultimately conveyed out of the county by the Sacramento and San Joaquin Rivers.

Sacramento County is characterized by a mild climate, with year-round sunshine. The summers are warm, with dry days and mild nights. During the winter "rainy season" (November through February), over half the total annual precipitation falls, yet rain in measurable amounts occurs only about ten days monthly during the winter. Mountains surround the Sacramento Valley to the west, north and east. Because of the shielding influence of the high mountains, winter storms reach the valley in a modified form. However, torrential rain and heavy snow frequently fall on the Western Sierra Slopes, the Southern Cascades, and to a lesser extent, the Coastal Range. As a result, flood conditions occasionally occur along the Sacramento River and its tributaries.

1.3.3. Population and Demographics

The California Department of Finance 2015 estimates for population of the County and its jurisdictions are shown in Table 1-1.

Table 1-1 Sacramento County Population by Jurisdiction

Jurisdiction	Total Population
Citrus Heights	85,147
Elk Grove	162,899
Folsom	74,909
Galt	24,607
Isleton	820
Rancho Cordova	69,112
Sacramento	480,105
Unincorporated County	573,313
Total	**1,470,912**

Source: California Department of Finance, 2015 E-1 Report

Select social and economic information for the County and participating jurisdictions are shown in Table 1-2.

Table 1-2 Sacramento County – Select Social and Economic Statistics

Statistic	Number
Populations	
Population under 5	7.1%
Population over 65	11.2%
Median Age	34.8
Racial Makeup	
White	57.5
Black or African American	10.4
American Indian or Alaska Native	1.0
Asian	14.3
Native Hawaiian or Pacific Islander	1.0
Two or more races	6.6
Income and Poverty	
Median income	$55,615
Mean Income	$73,456
Poverty rate	
All families	13.7%
All people	18.1%
Unemployment Rate (September 2016)	5.2%

Source: 2010 US Census, Bureau of Labor Statistics

1.4 Economy and Tax Base

Sacramento County has a diverse economy. US Census estimate show economic characteristics for the County. These are shown in Table 1-3.

Table 1-3 Sacramento County Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	4,858	0.8%
Construction	39,046	6.3%
Manufacturing	34,750	5.6%
Wholesale trade	15,725	2.5%
Retail trade	70,392	11.4%
Transportation and warehousing, and utilities	28,369	4.6%
Information	13,453	2.2%
Finance and insurance, and real estate and rental and leasing	45,950	7.4%

Industry	Estimated Employment	Percent
Professional, scientific, and management, and administrative and waste management services	71,867	11.6%
Educational services, and health care and social assistance	136,652	22.1%
Arts, entertainment, and recreation, and accommodation and food services	56,996	9.2%
Other services, except public administration	32,546	5.3%
Public administration	68,442	11.1%

Source: US Census Bureau American Community Survey 2010-2014 Estimates

Fortunately for Sacramento County, many large industries are located in Sacramento County. Major employers in the County are shown in Table 1-4. In addition, the County is home to the Port of Sacramento, which allows for agricultural commodities to be shipped worldwide.

Table 1-4 Major Employers in Sacramento County

Employer Name	Location	Industry
Aerojet-Rocketdyne Holdings	Rancho Cordova	Aerospace Industries (Mfrs.)
Air Resources Board	Sacramento	State Government-Environmental Programs
AMPAC Fine Chemicals LLC	Rancho Cordova	Chemicals-Manufacturers
California Prison Industry Authority	Folsom	State Govt.-Correctional Institutions
California State University	Sacramento	Schools-Universities & Colleges Academic
Corrections Dept.	Sacramento	State Govt.-Correctional Institutions
Delta Dental	Rancho Cordova	Insurance
Disabled American Veterans	Sacramento	Veterans' & Military Organizations
Employment Development Dept.	Sacramento	Government-Job Training/Voc. Rehab Services
Environmental Protection Agency	Sacramento	State Government-Environmental Programs
Exposition & Fair	Sacramento	Government Offices - State
Intel Corp	Folsom	Computer & Equipment Dealers
Mercy General Hospital	Sacramento	Hospitals
Mercy San Juan Medical Ctr.	Carmichael	Hospitals
Municipal Services Agency	Sacramento	Grading Contractors
Sacramento Bee	Sacramento	Newspapers (Publishers/Mfrs.)
Sacramento Regional Transit	Sacramento	Bus Lines
Sacramento State	Sacramento	Schools-Universities & Colleges Academic
SMUD Customer Service Center	Sacramento	Electric Companies
Sutter Memorial Hospital	Sacramento	Hospitals

Employer Name	Location	Industry
UC Davis Medical Center	Sacramento	Hospitals
Water Resource Dept	Sacramento	State Government-Environmental Programs

Source: America's Labor Market Information System (ALMIS) Employer Database, 2016 1st Edition.

The County has a wide and varied tax base. Tax base information is tracked and maintained by the Sacramento County Assessor's Office. The following tables show the tax base for the County as well as for the incorporated jurisdictions. Table 1-5 shows the secured real property value by property type for the entire County. Table 1-6 shows the secured real property value by jurisdiction. Table 1-7 breaks out the jurisdictions by land use.

Table 1-5 2016-2017 Sacramento County Planning Area Distribution of Value by Property Use

Property Use	Assessments	2015-16 Value ($)	2016-2017 Value ($)	Ratio of Total Value to Prior Value
Single Family Residential	380,907	85,511,262,266	90, 146,646,411	1.054
Mobile Homes	7,856	372,879,553	380,928,297	1.028
Multi-Family Residential	21,209	12,544,846,078	12,938,650,086	1.037
Vacant Residential Land	15,035	1,348,538,827	1,555,324,881	1.301
Commercial	13,026	22,075, 156,589	24,043,815,805	1.092
Vacant Commercial Land	2,062	612,388, 949	677,822,995	1.183
Industrial	4,619	5,283,794, 161	5,549,247,547	1.066
Vacant Industrial Land	1,415	364,217,201	318,917,406	0.993
Vacant and Improved Rural	5,680	1,867,233,067	1,956,212,388	1.053
Unrestricted Rural	1,209	712, 115,252	712,712,592	1.042
Restricted Rural	1,444	583,934,662	610,240,481	1.075
Oil, Gas, Mineral Rights	139	92,623,784	61,557,947	0.665
Other*	21,306	1,174,140,141	1,214,259,905	1.040
Totals**	**475,907**	**132,543,130,530**	**140,166,336,741**	**1.062**

Source: Sacramento County Assessor's Office

*Churches, miscellaneous vacant land

**Gross totals, before Exemptions, less Secured Fixtures and Personal Property

Table 1-6 Local Assessment Roll Totals by Jurisdiction

Jurisdiction	2015-16 Value ($)	2016-17 Value ($)	Current Year Change	Percent of Current Roll*
Citrus Heights	6,172,005,395	6,451, 760,362	4%	4
Elk Grove	17,412,867,028	18,541,918,216	6%	13
Folsom	11,973,366,059	12,576,166,745	5%	9
Galt	1,738,795,750	1,855,626,958	6%	1
Isleton	50,114,828	50,790,458	1%	0

Jurisdiction	2015-16 Value ($)	2016-17 Value ($)	Current Year Change	Percent of Current Roll*
Rancho Cordova	7,313,825,493	7,793,218,613	6%	5
Sacramento City	44,417,867,548 2	47,118,444,96	6%	32
Unincorporated Area	51,612,441,745	53,664,479,099	4%	36
Total Value (Gross)	**140,691,283,846**	**148,052,405,413**	**5%**	**100**

Source: Sacramento County Assessor's Office

*Percentages rounded to the nearest whole number

Table 1-7 Summary of Property Uses by Jurisdiction

Jurisdiction	Single Family with HEX*	Single Family Without HEX*	Multi-Family Residential	Vacant Land	Commercial	Agricultural	Mobile Homes	Other	Total
Citrus Heights	12,849	9,741	1,428	472	622	0	1,918	355	27,835
Elk Grove	27, 135	20,779	349	2,743	984	28	248	735	53,001
Folsom	13,296	7,792	317	1,744	755	17	854	574	25,349
Galt	3,661	2,884:	193	527	204	3	361	128	7,961
Isleton	82	143	19	155	83	1	44	39	566
Rancho Cordova	9,113	8,036	921	1,539	1,324	25	1,350	329	22,637
Sacramento City	61,522	59,451	8,548	8,961	7,217	8	3,230	4,449	153,386
Unincorporated Area	85,078	64,852	7,482	7,966	6,015	2,571	7,801	3,857	185,622
Total Value (Gross)	**212,736**	**173,678**	**19,257**	**24,107**	**17,204**	**2,653**	**15,806**	**10,466**	**475,907**

Source: Sacramento County Assessor's Office

*Homeowners' Exemption

1.5 Plan Organization

This Sacramento County 2016 LHMP Update is a multi-jurisdictional plan that geographically covers the entire area within Sacramento County's jurisdictional boundaries (i.e., the Planning Area). Participating jurisdictions within the Sacramento County Planning Area include: Unincorporated Sacramento County, the seven incorporated communities, and 20 special districts.

- Chapter 2: What's New
- Chapter 3: Planning Process
- Chapter 4: Risk Assessment
- Chapter 5: Mitigation Strategy
- Chapter 6: Plan Adoption
- Chapter 7: Plan Implementation and Maintenance
- Jurisdictional Annexes
- Appendices

The Sacramento County Local Hazard Mitigation Plan update is organized as follows:

The **Base Plan** provides the overall framework for this multi-jurisdictional LHMP. It is the umbrella document that includes the planning process, methodologies, and procedural requirements for all participating jurisdictions (i.e., unincorporated County and all Jurisdictional Annexes). As such, Chapters 1-7 of the Base Plan apply to the unincorporated County, the seven incorporated communities and all 20 special districts as participants to this LHMP update seeking FEMA approval of the plan. Because this is a multi-jurisdictional plan, the Base Plan addresses the LHMP hazard mitigation planning elements for all participating jurisdictions and includes data, information, and analysis specific to: The Sacramento County Planning Area (which includes all participating jurisdictions and the entire geographic boundary of Sacramento County) and Unincorporated Sacramento County.

The **Jurisdictional Annexes (and Delta chapters)** detail the hazard mitigation planning elements specific to each participating jurisdiction to this 2016 Sacramento County LHMP Update. Each Annex is not intended to be a standalone document, but appends to, supplements, and incorporates by reference the information contained in the Base Plan document. As such, all Chapters 1-7 of the Base Plan, including the planning process and other procedural requirements and planning elements apply to and were met by each participating jurisdiction. The Annexes provide additional information specific to each participating jurisdiction, with a focus on providing additional details on the risk assessment and mitigation strategy.

As part of these Jurisdictional Annexes, a **Delta Annex** was created which provides an umbrella base document specific to the Delta Area, which then contains the Annexes (or Chapters) for the participating jurisdictions (City of Isleton and Reclamation Districts) located within the Delta Region.

The **Appendices** provide additional information, data, and planning process documentation that applies to all participating jurisdictions (i.e., Unincorporated County and all Jurisdictional Annexes) to this Sacramento County 2016 LHMP Update.

Chapter 2 What's New

Requirements §201.6(d)(3): A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

The 2011 Sacramento County Local Hazard Mitigation Plan contained a detailed description of the planning process, a risk assessment of identified hazards for the Sacramento County Planning Area and an overall mitigation strategy for reducing the risk and vulnerability from these hazards. Since approval of the plan by FEMA, much progress has been made by Sacramento County and the participating communities on implementation of the mitigation strategy. As part of this 2016 LHMP Update, a thorough review and update of the 2011 plan was conducted to ensure that this update reflects current community conditions and priorities in order to realign the overall mitigation strategy for the next five-year planning period. This section of the plan includes the following:

- **What's New in the Plan Update**. This section provides an overview of the approach to updating the plan and identifies new analyses, data and information included in this Plan Update to reflect current community conditions. This includes a summary of new hazard and risk assessment data as it relates to the Sacramento County Planning Area as well as information on current and future development trends affecting community vulnerability and related issues. The actual updated data, discussions, and associated analyses are contained in their respected sections within this 2016 LHMP Update.
- **Summary of Significant Changes to Current Conditions and Hazard Mitigation Program Priorities**. This section provides a summary of significant changes in current conditions, changes in vulnerability, and any resulting modifications to the community's mitigation program priorities.
- **2011 Mitigation Strategy Status and Successes**. This section provides a description of the status of mitigation actions from the 2011 plan and also indicates whether a project is no longer relevant or is recommended for inclusion in the updated 2016 mitigation strategy. This section also highlights key mitigation success stories of the County and participating jurisdictions since the 2011 LHMP.

This What's New section provides documentation of Sacramento County Planning Area's progress or changes in their risk and vulnerability to hazards and their overall hazard mitigation program. Completion of this 2016 LHMP Update further provides documentation of the Sacramento County community's continued commitment and engagement in the mitigation planning process

2.1 What's New in the Plan Update

This LHMP Update involved a comprehensive review and update of each section of the 2011 plan and includes an assessment of the success of the participating communities in evaluating, monitoring, and implementing the mitigation strategy outlined in the initial plan. Only the information and data still valid from the 2011 plan was carried forward as applicable into this LHMP Update.

Also to be noted, Chapter 7 Implementation and Maintenance of this plan update identifies key requirements for updating future plans:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to inventories; and
- Incorporate new action recommendations or changes in action prioritization.

These requirements and others as detailed throughout this plan were addressed during this Plan Update process.

As part of its comprehensive review and update of each section of the plan, Sacramento County and participating jurisdictions recognized that updated data, if available, would enhance the analysis presented in the risk assessment and utilized in the development of the updated mitigation strategy. Highlights of new data used for this Plan Update is identified below in this Section and is also sourced in context within Chapter 4, Risk Assessment. Specific data used is sourced throughout this plan document. This new data and associated analysis provided valuable input for the development of the mitigation strategy presented in Chapter 5 of this plan.

Highlights of new information and analyses contained in this Plan Update includes the following:

- A new assessment of updated hazards affecting the Sacramento County Planning Area was completed. No existing hazards were eliminated from this update.
- The agriculture hazard was expanded upon to better capture the weather related impacts to this industry in addition to the impacts associated with insects and pests.
- The drought hazard was expanded to include water shortage impacts to the County, to better align with the State of California Hazard Mitigation Plan and to reflect the significant issues related to drought conditions resulting from the current and ongoing drought within the County and State of California.
- The wind hazard was separated out from the heavy rains and storms hazard and included with the tornado hazard to better reflect those high wind events that occur outside of thunderstorm events.
- Climate Change has been addressed both as a standalone hazard and within the hazard profiles of each identified hazard to assist the County in considering climate change issues when identifying future mitigation actions for the Planning Area.
- An entire rework of the risk assessment for each identified hazard. This included reworking the hazard profile and adding new hazard event occurrences; redoing the entire vulnerability analysis to add items identified below and updating the vulnerability assessment based on more recent hazard data as well as using the most current parcel and assessor data for the existing built environment.
- An update of the flood hazard analysis to include an updated analysis of the 100-year flood, an analysis of the 500-year and 200-year flood events and an analysis of the localized/stormwater flooding problems affecting the Planning Area, including the use the new Digital Flood Insurance Rate Map (DFIRMs) dated June 16, 2015) developed by FEMA for the County, the Best Available Maps (BAM) compiled by the state, and input from the County. An analysis of flooded acres in the Planning Area based on new DFIRMs was also conducted.

- New dam data provided by Cal OES was used for the Dam inventory and analysis. This data included an updated hazard classification for identified dams.
- An analysis of the Repetitive Loss (RL) properties within the planning area was completed for this update based on updated Repetitive Loss Area Analysis (RLAA) reports developed by the County and City of Sacramento.
- Utilizing updated critical facility GIS mapping for the City of Sacramento, combined with the critical facility data developed for the 2011 plan, to provide an updated inventory of critical facilities by jurisdiction and a GIS analysis of critical facilities vulnerable to priority hazards.
- An enhanced vulnerability assessment which added an updated GIS analysis of future development areas in the Planning Area and specific to each of the mapped hazards.
- Incorporation and analysis of the new 2010 Census data was utilized for this LHMP update.
- Also, as required by current FEMA planning guidance, an analysis of each jurisdictions' ongoing and continued compliance with the NFIP.
- For the CRS communities of Sacramento County and the City of Sacramento, this plan was developed to maximize CRS credits for CRS Activity 510, Floodplain Management Planning.
- As part of the CRS Activity 510 requirements, a greater emphasis was placed on public involvement and outreach of this LHMP Update as well as Agency coordination and input.

2.2 Summary of Significant Changes to Current Conditions, Planning Area Vulnerability, and Hazard Mitigation Priorities

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Agricultural Hazards			X

- Recent drought conditions stressed crops making them more susceptible to insect infestation
- Reduced water supply resulted in land being left out of production reducing overall crop yields
- Noxious weeds are more drought tolerant – better able to compete for water over local crops
- Drought increased the tree mortality in the County further impacting the wildfire hazard.
- Large sell-off of cattle/animals due to drought conditions resulting in economic impacts

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Bird Strike	X		

- Possibly attributed to climate change, the warmer weather (and lack of planted rice fields) altered the normal migration patterns of area birds.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Climate Change			X

- Although the last couple of years have been more normal in temperatures, generally the planning area has seen an increase in warmer weather.
- Other weather related conditions include the recent drought, reduced snowpack; some of which my reduce regional flood conditions.
- Climate change conditions increase vulnerability in multiple hazard areas. Other impacts include, impacts to food sources and food-related diseases, eco-system changes, public health issues, etc.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Dam Failure	X		

- Folsom Dam Improvement projects are near completion that will allow releases at a lower flood stage so the Dam can hold more water for enhanced flood control. This decreases the overall vulnerability in the Folsom Dam inundation areas.
- Jurisdictional dams generally have no change in vulnerability as they are highly regulated. However, with more people moving into dam inundation areas, the vulnerability increases due to an increase in potentially affected population, but not due to an increased risk of dam failure.
- Non-jurisdictional dams pose the biggest risk and, over time with little regular maintenance and often located in remote areas with little security, result in an increase in vulnerability to Sacramento.
- The Dam at Mather AFB is under construction to upsize the spillway. This structural project will reduce the risk and vulnerability associated with this dam.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Drought and Water Shortage			X

- Since the 2011 planning process, current drought conditions, including water supply issues, have had a significant impact on the Sacramento County Planning Area and California. As a result the drought hazard has become a significant priority for mitigation planning.
- As previously mentioned, the drought has contributed to an increase in vulnerability of the County due to increase tree mortality issues and general increase in wildfire conditions.
- Water Supply has been adversely affected as noted by recent modifications made to the Sacramento Water Treatment Plant to improve distribution, intakes, and other improvements.
- Water quality issues have been more significant with less flows in streams, combined with drawing down the water table. Saltwater intrusion is a concern. Economic impacts associated with new NPDES permits.
- Over the last few years, the drought has had a significant economic impact on recreation in the County, with rivers running substantially lower, less people have been vacationing and undertaking water dependent recreational activities, such as boating.
- In California, SBA funds were made available for those business' in the Salmon Industry due to loss of revenue associated with less salmon in the streams.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Earthquakes and Earthquake Liquefaction		X	

- The primary factor that might change the earthquake vulnerability, is additional development and more people moving to the area.
- Lake County had a 5.2 earthquake on a previously unknown fault. Napa had recent damaging earthquakes. There is the potential for effects from earthquake activity from adjacent and nearby counties.
- A primary vulnerability to earthquake is to the Delta and potential impacts to the water supply.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Floods:100-/200-/500-year		X	

- Overall, the net increase or decrease in vulnerability depends on the location within the Planning Area.
- With the most recent FEMA flood maps, flood depths have been established in some areas and the regulatory Special Flood Hazard Area has changed. With these changes, flood mitigation projects, including flood insurance promotion and continued participation in the NFIP's CRS program, is a priority.
- Although the FEMA mapped floodplains have changed based on new data, the risk and vulnerability of 100/200/500-year flood remains somewhat constant. Ongoing implementation of regional flood control projects and effective land use planning and adherence to development requirements in identified floodplains have minimized additional exposure to this hazard in the County.
- The 200-year requirements for urbanizing areas are reducing vulnerability.
- Notable recent levee improvement projects include those in Natomas, the South Streams Group and other planned and in process projects.
- The Folsom Dam project has changed the risk and vulnerability, allowing for increased flood flows and enhanced levels flood of protection.
- Enhanced technologies provide earlier and more accurate storm predictions that provide advanced notice to residents
- Emergency Action Planning that includes elements of evacuation planning improves flood fighting, reduces loss of life, etc.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Floods: Localized Flooding		X	

- Increased development in unmapped flood hazard areas could result in a net increase in vulnerability should these areas experience increased stormwater/localized flooding. However, development requirements that require mitigation of stormwater runoff effectively mitigates this hazard.
- Climate change issues may result in more localized flooding as the climate warms and the wetter storms create more runoff.
- CRS Activity 450, Watershed Management Plan, developed on a regional basis, better manages localized flooding issues.

- Educational efforts of Stormwater.org also contributes to better stormwater management to the County.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Landslide and Debris Flows		X	

- Over the last couple of years, with the severe drought, much of the vegetation along slopes areas is failing to thrive, thus there is a lack of vegetation to hold soil contributing to the landslide/mudslide potential. However, due to the relative flat topography of the Planning Area, landslide risk and vulnerability remains limited.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Levee Failure	X	X	

- Similar to flood, the net increase or decrease in vulnerability depends on the location within the Planning Area.
- Levee vulnerability for the urbanizing areas has seen some improvements, with new structural flood control projects and the development of new development requirements reflected in updated General Plans and Flood Management Ordinances.
- Levee vulnerability for non -urbanizing areas, such as the Delta, mostly remain unchanged with a variety of structural and non-structural flood projects under consideration.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
River/Stream/Creek Bank Erosion		X	

- Drought conditions have increase the occurrence of stream bank erosion, with soils drying out and becoming more friable, they tend to slough off the banks causing increased areas of erosion.
- Erosion of levees remains the most significant issue.
- However, stormwater hydro-modification projects are being assessed by area jurisdictions that will limit flows thus reducing erosion impacts in some local streams.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Extreme Temperatures - Heat			X

- Climate change issues create the potential for additional heat related impacts in the future
- While the first few years since the 2011 planning effort saw an increase in area temperatures, the last couple of years have been near normal.
- The heat, combined with drought conditions, has increased the potential for wildfires.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Extreme Temperatures- Cold and Freeze		X	

- Over the last five years of mild winters, there has been a notable decrease in vulnerability of Sacramento County to freeze and severe winter storms.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Fog		X	

- This low priority hazard has not changed over the last five years.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Heavy Rains and Storms		X	

- The HMPC estimated that each year there are 2-3 high intensity storms; although the last five years have been on the mild side.
- However, climate change brings renewed concern moving forward for heavy rains, storms and associated issues to the County.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Winds and Tornadoes		X	

- This hazard has not changed in the Planning Area over the last five years.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Subsidence		X	

- Drought conditions have contributed to increased subsidence statewide. In Sacramento County, this is likely more of a Delta issue where subsidence concerns have actually decreased with the implementation of better farming practices over the years.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Volcano		X	

- This low priority hazard has not changed over the last five years.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Wildfire			X

- Compounded by current drought conditions, the wildfire hazard has substantially increased and is no longer just a seasonal issue. The wildfire season, including the potential for a catastrophic wildfire, is now a year around concern.
- The vulnerability of Sacramento County to increased occurrence of a devastating wildfire has increased as exacerbated by the recent drought, increases in tree mortality, and overall increase in wildfire conditions.
- The increased development in WUI areas within the County also contributes to an increase in vulnerability.
- With large wildfires occurring throughout California, the Planning Area has seen a significant change in air quality from smoke resulting in more recorded bad air days.

2.3 2011 LHMP Mitigation Strategy Successes and Status

Sacramento County and participating jurisdictions have been very successful in implementing actions identified in the 2011 LHMP Mitigation Strategy, thus, working diligently towards meeting their 2011 goals and objectives of:

Goal 1: Minimize the loss of life, injury, and property damage from natural hazards (reduce the risk and vulnerability of the community to hazards through mitigation efforts)

- Objective 1.1 Assure long term protection of existing and future development from natural hazards
- Objective 1.2 Protect critical facilities from natural hazards
- Objective 1.3 Protect the environment from natural hazards
  - ✓ 1.3.1 Protect and enhance water quality, critical aquatic resources and habitat for beneficial uses.
- Objective 1.4 Maintain/enhance the flood mitigation program to provide 100/200/500 year flood protection
  - ✓ 1.4.1 Protect, create, and restore flood control facilities and waterways to convey flood waters and to provide flood control services to surrounding areas.
  - ✓ 1.4.2 Mitigate Repetitive Loss Properties.
  - ✓ 1.4.3 Flood mitigation efforts should include considerations for protecting water supply from contamination.
- Objective 1.5 Minimize risk of levee breach, overtopping or other failures
  - ✓ 1.5.1Maintain levees to standards described by state and federal regulations suitable for risk reduction.
  - ✓ 1.5.2 Address levee seepage and erosion issues on a proactive, ongoing basis.
  - ✓ 1.5.3 Obtain funding for identified levee improvement projects.
- Objective 1.6 Reduce the potential of wildfire incidents next to developed communities

- ✓ 1.6.1 Fuels reduction and maintenance of defensible space in the High and Very High Fire Hazard Severity Zones, including the Rollingwood, American River Parkway, Fair Oaks, and Orangevale areas.
- ✓ 1.6.2 Secure funding for staffing Fire Station #33 during red flag conditions.

GOAL 2: Enhance public awareness of the affects of natural hazards and public understanding of disaster preparedness

- Objective 2.1 Reduce exposure to hazard related losses
  - ✓ 2.1.1 Fire fuel reduction and defensible space
  - ✓ 2.1.2 Flood hazard awareness and mitigation
  - ✓ 2.1.3 Insurance is the last but certain defense
- Objective 2.2 Implement outreach/education programs pre- and post-disaster
  - ✓ 2.2.1 Target outreach and education for each hazard type and risk area.
- Objective 2.3 Develop, enhance, and integrate disaster response planning and training
  - ✓ 2.3.1 Encourage at risk populations to develop and practice emergency plans, including procedures for evacuation and shelter-in-place.
    - 2.3.1.1 Consider utilizing a neighborhood approach to evacuation planning and disaster response to assist first responders.

GOAL 3: Improve the capabilities of the community to mitigate or reduce losses from natural hazards

- Objective 3.1 Minimize hazard-related damage in order to maintain current service levels
- Objective 3.2 Maximize resources to provide mitigation from natural hazards
  - ✓ 3.2.1 Coordinate jurisdictional responsibilities to various hazards through City and Community Disaster/Emergency Response Plans and Exercises.
- Objective 3.3 Increase the use of shared resources between agencies
  - ✓ 3.3.1 GIS, Lidar, DFIRM
  - ✓ 3.3.2 Water Supply
- Objective 3.4 Strengthen Intergovernmental and Interagency partnerships
  - ✓ 3.4.1 Transportation, waste disposal, fire districts
- Objective 3.5 Promote public/private partnerships in hazard mitigation and education programs
- Objective 3.6 Increase coordination and communication among federal, state and local agencies
  - ✓ 3.6.1 Identify and implement mitigation projects that are mutually beneficial

GOAL 4: Position Jurisdictions for Federal and State Grant Funding

- Objective 4.1 Maintain good standing with FEMA and State hazard mitigation programs, regulations and requirements
- Objective 4.2 Maximize funding opportunities through identification and tracking of all types of Federal and state grant programs
  - ✓ 4.2.1 Monitor and communicate to all communities: available grant programs, timelines, and processes

Where possible, Sacramento County and the participating jurisdictions used existing plans and programs to implement the 2011 mitigation strategy. Examples include implementation of wildfire mitigation actions

through Fire Safe Alliances and existing community wildfire protection plans (CWPPs), implementation of flood mitigation actions through County programs including existing plans, studies, and projects, and implementation of a variety of projects through the County's Capital Improvement Program.

2.3.1. Success Stories

Sacramento County and all participating jurisdictions have been successful in completing actions from the previous plan. Some of these success stories are highlighted below.

County Flood Reduction Projects

Sacramento County continues to implement various flood reduction projects on an annual basis. Recently completed projects include:

- El Camino Avenue drainage improvements – this project involved adding larger storm drain pipes and extended drain inlets to improve collection of neighborhood storm drain run-off.
- Vineyard Road at Laguna Creek Bridge Replacement – this project raised the bridge by several feet over the creek to reduce flooding during heavy rains.
- Freedom Park Drive – this project involved adding drainage swales to absorb runoff into landscaped area before going into storm drain pipes with the goal of reducing peak flows into creeks. The reduced runoff lessens flooding concerns in the area.
- Acquisitions – property acquisition in the South County has added acres into the NVS Preserve to secure and maintain flood storage capacity as development expands.
- Emergency Action Plan for the Delta communities has been completed.

City of Sacramento – South Sacramento Streams Group (SSSG)

On May 12, 2014, approximately 3,000 properties within the South Sacramento Streams Group were remapped by the Federal Emergency Management Agency. The new floodplain designation removed a large area from the Special Flood Hazard Area and allowed residents and businesses to be eligible for lower-cost Preferred Risk Policy Flood Insurance.

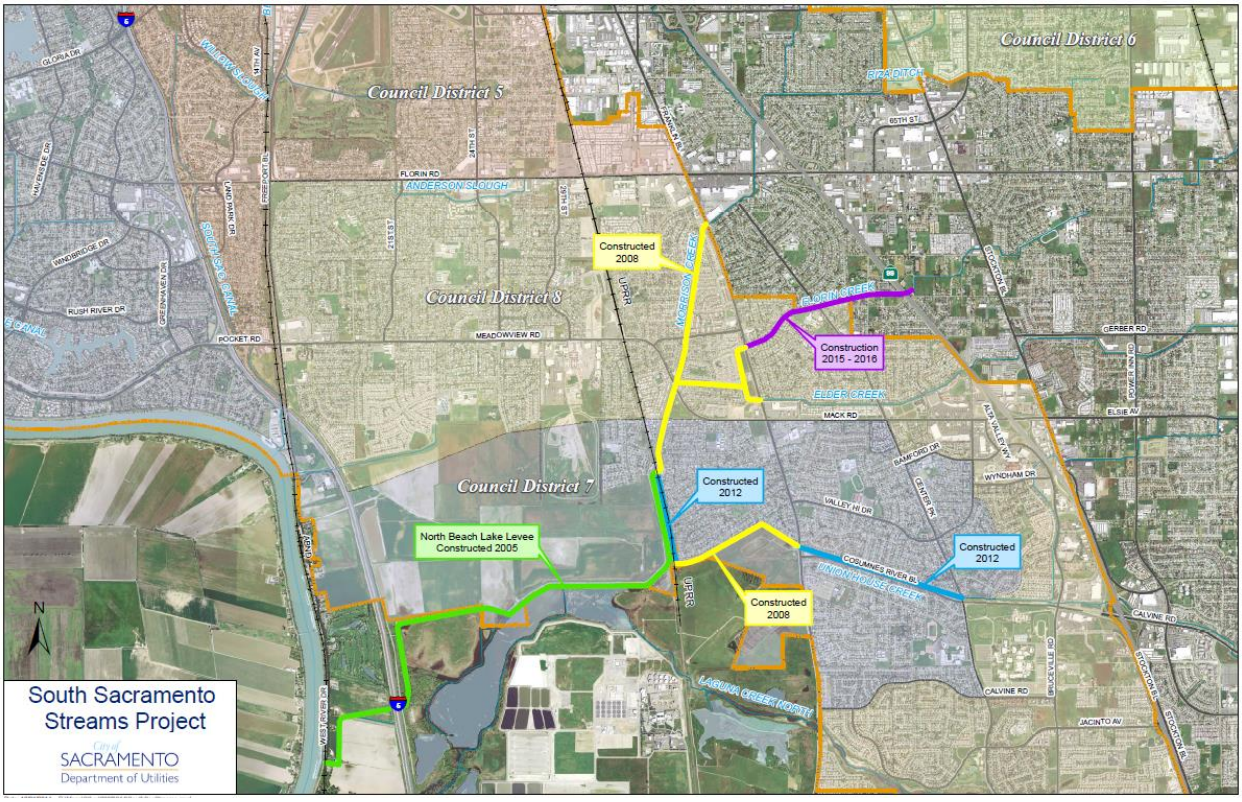
Morrison Creek Levee System

The existing levee system along Morrison Creek and its major tributaries was found to have insufficient capacity to carry a 100-year flood event. The decrease in flood protection provided by the system is based on: (1) increased water surface elevations projected in the Delta; and (2) higher flows coming through the system from the upper reaches of the watershed. The problem could be further exacerbated as new development occurs upstream, unless the additional run-off is either detained upstream or the downstream channel capacity is increased.

The US Army Corp of Engineers (USACE), in cooperation with the Sacramento Area Flood Control Agency (SAFCA) and the City and County of Sacramento, completed a study of alternatives, including both upstream detention and modifications to the downstream levee system. Results of the study supported work to be done to the existing Morrison Creek levees as well as to the Unionhouse, Florin, and Elder Creek levees. The County is also collecting development impact fees from upstream developers, which will be

used to build detention basins to hold the additional run-off generated as new development occurs. A map of the affected area is shown in Figure 2-1 below.

Figure 2-1 Areas Benefited by Improvements to the Morrison Creek, Unionhouse, Florin, and Elder Creek Levees



Source: DOU

In 2005, USACE completed construction of nearly four miles of levee from Freeport Boulevard/Sacramento River Levee on the west to the Union Pacific Railroad to the east, raising the existing levee system to protect against a 200-year storm.

USACE constructed floodwalls along the four creeks (Elder, Unionhouse, Florin, and Morrison) up to Franklin Boulevard. At the end of 2012, a piece of the Morrison Creek project downstream of Franklin was completed. A 3,300-ft floodwall was constructed along the Union Pacific Railroad tracks on the east bank. The cost of this floodwall was $5.9 million.

Unionhouse Creek Channel Improvements

In 2012, SAFCA, in partnership with the City of Sacramento and Sacramento County Department of Water Resources (DWR), improved over a mile and a half of Unionhouse Creek between Franklin Blvd. and Bruceville Road. The project increased the amount of water that can be contained in the channel, resulting in 100-year flood protection. The cost of the construction project was a little under $2.5 million.

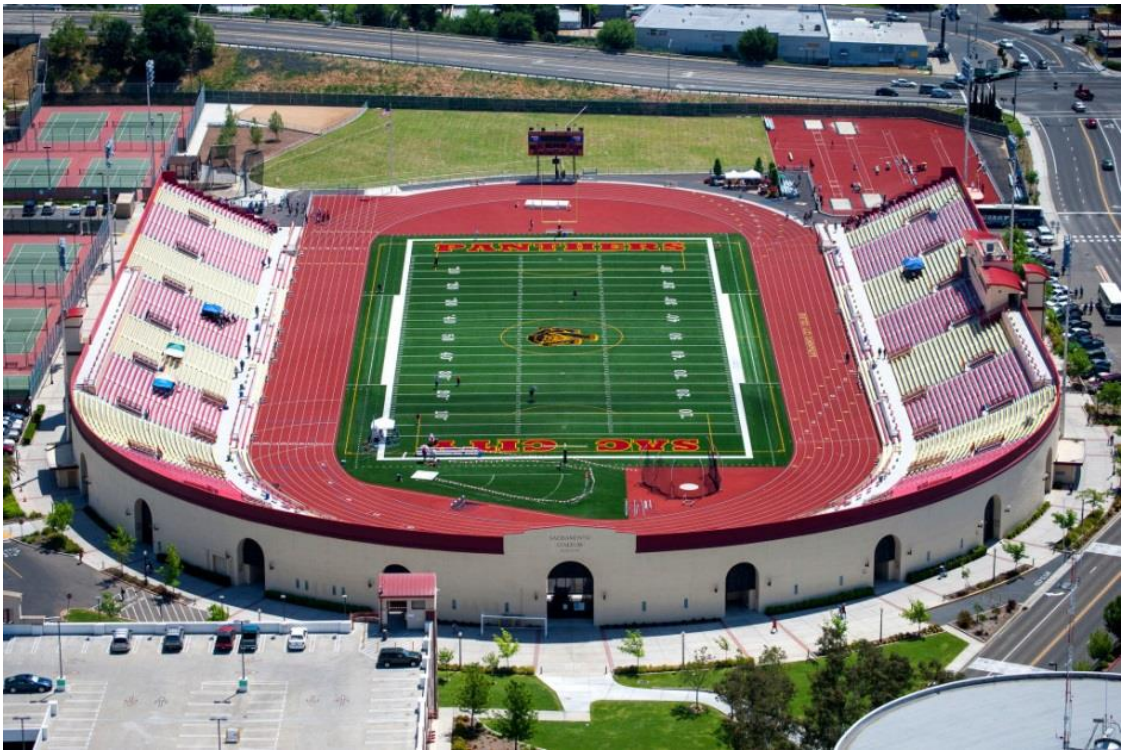
Florin Creek Improvements

SAFCA, in partnership with the City of Sacramento and DWR, is constructing a detention basin along Florin Creek near Persimmon Avenue which, in conjunction with channel improvements completed in 2016 by USACE in cooperation with the Central Valley Flood Protection Board (CVFPB) and SAFCA, will provide FEMA level of flood protection along much of Florin Creek from Highway 99 downstream to Franklin Blvd.

Los Rios Community College

In 2012 Los Rios Community College District completed seismic and structural deficiency repairs and upgrades to Hughes Stadium. Originally built in 1928, the stadium underwent various cosmetic, structural and utility upgrades over time. However, in recent years, the facility experienced a great deal of water intrusion through the stadium decking which affected its structural integrity. In order to bring the facility up to current seismic and building code requirements, as well as to provide new support spaces, a new track, a new synthetic grass field, and numerous ADA improvements, the District completed a $12 million dollar renovation and upgrade. The project was successfully completed on schedule and mitigated our exposure to loss of life, injury and property damage. The improved Hughes Stadium, a 21,000 seat venue which re-opened in October 2012 for Sacramento City College athletic teams, football bowls, high school playoff games, and commencement events also experienced an increase in the use and rental of the facility.

Figure 2-2 Hughes Stadium



Source: Los Rios Community College

2.3.2. 2011 Mitigation Strategy Update

The 2011 mitigation strategy contained 158 separate mitigation actions benefiting one or more communities within the Sacramento County Planning Area. Of these 158 actions, 21 have been completed, 15 are completed but are still ongoing, 91 are ongoing, 3 are ongoing but not yet started, and 28 have not been started. Because many of these projects, such as the various fuels management projects, are implemented on an annual or other continuous basis and some of the projects have yet to be funded or have otherwise not been initiated, 43 2011 projects have been identified for inclusion in this Plan Update.

Table 2-1 provides a status summary of the mitigation action projects from the 2011 LHMP. Following the table is a description of the status of each project.

Table 2-1 Sacramento County's 2011 LHMP Update: Mitigation Action Status Summary

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Multi-Hazard Mitigation Actions					
Enhance Public Awareness of the Affects of Natural Hazards and Public Understanding of Disaster Preparedness	Sacramento County		X		N
CRS Public Information Pilot Program	Sacramento County, City of Sacramento	X (City)	X (County)		N
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Sacramento County City of Citrus Heights City of Elk Grove City of Folsom City of Galt City of Rancho Cordova City of Sacramento	X (Sacramento County) X (City of Galt) X (City of Sacramento)	X (City of Citrus Heights) X (City of Rancho Cordova)		Y (County)
Flood Insurance Promotion	Sacramento County		X		N
Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas	Sacramento County		X (Sacramento County) X (City of Sacramento)		N
Finalize and Implement the Actions of the South Sacrament Habitat Conservation Plan	Sacramento County City of Elk Grove City of Galt City of Rancho Cordova Sacramento Regional County Sanitation District Sacramento County Water Agency Southeastern Connector	X			N
SAFELY OUT™ Evacuation Preparedness	Sacramento County Citizen Voice			X	N

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Public Education Program	City of Elk Grove		X		N
Alerts and Warning System	City of Elk Grove		X		N
Emergency Operation Center (EOC)	City of Elk Grove		X		N
Critical Facilities Database Development and Data Maintenance Processes	City of Elk Grove		X		N
Increase Redundancy/ Functionality of Water Wells and Sewer Lift Stations	City of Galt		X		Y
Increase Data Capacity of Emergency Frequencies	City of Galt			X	Y
Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas	City of Sacramento		X		N
Data Center Disaster Recovery Improvement	Los Rios Community College District	X			N
Community Emergency Response Training (CERT)	Los Rios Community College District			X	N
Update the critical facilities identified during this DMA planning effort with the City's GIS technical group to support emergency management efforts.	City of Sacramento	X			N
Bird Strike Mitigation Actions					
Wildlife Hazard Management Plan	Sacramento County Airport System	X			N
Dam Failure Mitigation Actions					
Mather Dam Improvements	Sacramento County		X		N
Alder Creek Miners Dam	Sacramento County			X	N
Improved Flood Inundation and Evacuation Plan for Probable maximum flow from New Spillway at Folsom Dam	Sacramento County		X		N
Folsom Dam Joint Federal Project	SAFCA		X		N
Folsom Dam Raise	SAFCA		X		N
Drought Mitigation Actions					
Drought Contingency Plan	Southgate Park & Recreation District		X		Y
Earthquake Mitigation Actions					
Hughes Stadium Renovation at Sacramento City College	Los Rios Community College District	X			N
Flood Mitigation Actions					

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Improve County ALERT (Automated Local Evaluation in Real Time) system of stream and rain gages	Sacramento County		X		N
Elevation Projects to Mitigate Flood Risk	Sacramento County		X		N
Arcade Creek Corridor Plan	Sacramento County		X		N
Elevate up to Three Homes on Long Island (Grand Island Road, Sacramento River)	Sacramento County		X		N
Mitigation Projects for Repetitive Loss Structures/Areas	Sacramento County		X		N
Improve Strawberry Creek Basins at East Stockton Blvd	Sacramento County	X	X		N
Triangle Detention Basin	Sacramento County		X		N
Unionhouse Detention Basin Upstream of East Stockton Blvd Partnering with Park District and SAFCA	Sacramento County		X		N
Unionhouse Creek Joint Use Detention Basins – Park Active or Passive Joint Use	Sacramento County		X		N
South Sacramento Stream Group Detention Basins	Sacramento County		X		N
Elder and Gerber Creek	Sacramento County		X		N
Florin Creek Basins –Florin Vineyard Drainage Master Plan	Sacramento County		X		N
Joint Use Detention-Park Basins on Laguna Creek	Sacramento County	X	X		N
Pasa Robles Drive - Concrete Channel Lining Rehabilitation	Sacramento County			X	N
Chicken Ranch Slough - Concrete Channel Lining Rehabilitation	Sacramento County		X		N
Morrison Creek - Concrete Channel Lining Rehabilitation	Sacramento County			X	N
Mayhew Slough - Concrete Channel Lining Rehabilitation	Sacramento County			X	N
Strong Ranch Slough - Concrete Channel Lining Rehabilitation	Sacramento County			X	N
Keep Watershed Management Plan Current CRS Activity 450 (county and cities)	Sacramento County		X		N
Woodside Condominiums Repetitive Flood Loss Property	Sacramento County			X	N

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Conversion to NAVD88 vertical datum (from NGVD29)	Sacramento County		X		N
Mitigation projects to reduce flood risk to critical facilities.	Sacramento County		X		N
Hydrologic and Hydraulic Modeling in Compliance with 2012 Central Valley Flood Protection Plan	Sacramento County		X		N
Delta Area Fire Station Needs to be Elevated or Flood Proofed to Protect Against Levee Breach Flooding to Assure Function in that Disaster Event.	Sacramento County			X	N
Update and Adopt Floodplain Management Ordinance in Light of Levee De-accreditation	Sacramento County	X	X		N
Mitigate Peak Flow on Dry Creek and Tributaries (including Sacramento County and City of Roseville)	Sacramento County		X		N
Repetitive Loss Church Building on Dry Creek	Sacramento County		X		N
Determine Cause and Mitigate Mercury and Methyl Mercury Coming from Tributaries of American River	Sacramento County		X		N
Pump Stations	Sacramento County	X	X		N
Public Outreach Mailers	Sacramento County		X		Y
Drainage improvements to reduce flooding on key evacuation routes	Sacramento County		X		N
South Branch Arcade Creek – Gum Ranch Basin (with Fair Oaks Park District)	Sacramento County			X	N
Dry Creek Flood Hazard Mitigation Acquisitions with County Park Dept	Sacramento County			X	N
Arcade Creek at Evergreen Estates Floodwall improvements	Sacramento County		X		N
Linda Creek Peak Flow Mitigation	Sacramento County		X		N
Improve flood protection and/or Evacuation Planning for Mobile Home/RV Park at Manzanita/Auburn. Alternatively, the park Should Establish Flood Warning and Evacuation Procedures.	Sacramento County		X	X	N

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Capital Improvement Projects – Pipelines (2012-13)	Sacramento County	X	X		N
Capital Improvement Projects – Pipelines (2014-15)	Sacramento County	X	X		N
New City Sump 90 Operation Plan	Sacramento County		X	X	N
Land Acquisition	Southgate Park & Recreation District		X		Y
Conservation Easements	Southgate Park & Recreation District		X		Y
Multi-jurisdictional Cooperation within Watersheds	Southgate Park & Recreation District		X		Y
South Sacramento Streams Group	SAFCA		X		N
American River Common Features	SAFCA		X		N
CVFPP - Flood Emergency Plan	City of Sacramento		X		N
Adopt Additional Floodplain Development Standards	City of Sacramento		X		Y
Update the General Plan to include the requirements of the CVFPP	City of Sacramento	X			N
Historic Magpie Creek Study	City of Sacramento	X	X		Y
South Sacramento Streams Project: Union Pacific Railroad Flood Wall	City of Sacramento	X			N
Natomas Levee Improvement Project (NLIP)	City of Sacramento	X	X		Y
Retrofit of Repetitive Loss Properties	City of Sacramento	X	X		Y
Preferred Risk Policy (PRP) Outreach Campaign	City of Sacramento		X		N
Drainage Projects for Repetitive Loss Properties	City of Sacramento	X	X		Y
Unionhouse Creek Existing Conditions LOMR and Channel Improvements	City of Sacramento	X			N
Emergency Notification and Evacuation Planning	City of Sacramento	X			Y
Drainage Projects from the City's Priority Drainage Project List	City of Sacramento	X	X		Y
Riconada Flood Wall	City of Citrus Heights		X		N
Storm Debris Removal	City of Elk Grove		X		N
Drainage and Flood Control Programs	City of Elk Grove		X		N
LID Rain Garden Plaza	City of Elk Grove	X	X		N

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
School Street Alley Drainage Improvements	City of Elk Grove	X			N
Elk Grove Creek Outfalls	City of Elk Grove	X			N
Elk Grove Creek Restoration	City of Elk Grove	X			N
Waterman Road Culvert Repair and Replacement	City of Elk Grove	X			N
Waterman Road Culvert Replacement	City of Elk Grove	X			N
Elk Grove Creek Flood Protection and Clean Water	City of Elk Grove		X		N
Elk Grove Watershed Recommended Improvements	City of Elk Grove	X			N
Multi-Functional Drainage Corridor for Shed C	City of Elk Grove		X		N
9816 Sheldon Road – Enlarge Culverts	City of Elk Grove	X			N
Sheldon Road Drainage Project	City of Elk Grove	X			N
Sleepy Hollow Detention Basin Retrofit	City of Elk Grove		X		N
Sleepy Hollow Lane Drainage Improvements	City of Elk Grove			X	N
East Elk Grove Area/ Rural Region Improvements	City of Elk Grove			X	N
Sheldon Road Ditch Improvements and Multi-Use Trails	City of Elk Grove			X	N
Laguna Creek Watershed Improvements (New Pipeline and Enlarge Existing Pipelines)	City of Elk Grove	X			N
Deer Creek Watershed Improvements (New Detention Basins)	City of Elk Grove			X	N
SCADA System for the Stormwater Pump Stations	City of Elk Grove		X		N
Dry Well Installation at Kent Street and St. Anthony Court	City of Elk Grove	X			N
Elk Crest Drive Pipes	City of Elk Grove	X			N
Strawberry Creek Detention Basin Retrofit	City of Elk Grove		X		N
Laguna Creek and Whitehouse Creek Multi-Functional Corridor Enhancement	City of Elk Grove		X		N
Whitehouse Creek Watershed Improvements	City of Elk Grove		X		N

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Grant Line Channel Improvements (Pump Station and Enlarge Pipes)	City of Elk Grove			X	N
Alder Creek Watershed Council	City of Folsom		X		Y
Redevelopment Area Drainage Improvements	City of Folsom		X		Y
Drainage System Maintenance Tax Assessment	City of Folsom		X		Y
Floodplain Mapping	City of Folsom	X			Y
Drain Inlet Retrofit Capital Improvement Plan (CIP)	City of Galt			X	Y
Creek/Streams Vegetation Management Plan	City of Galt			X	Y
Sunrise Boulevard Widening Kiefer to Jackson	City of Rancho Cordova		X		Y
Flood Response Equipment	Cosumnes Community Services District Fire Department		X		Y
Flood Response Training	Cosumnes Community Services District Fire Department		X		Y
Coordinate with SAFCA, CA-DWR, USACE, and Sacramento County on Proposed Flood Control projects on Magpie Creek	City of Sacramento			X	N
Storm Water Management Practices - Implement Storm Water Management Practices as identified in Stormwater Quality Design Manual	Southgate Park & Recreation District		X		Y
Main Drainage Canal Bank Stabilization and Sediment Removal	Reclamation District #1000			X	N
Security of District Facilities	Reclamation District #1000		X		Y
South River Pump Station Flood Protection Project	Sacramento Regional County Sanitation District		X		Y
SRCSD Critical Facilities Flood Study (Planning)	Sacramento Regional County Sanitation District			X	N
Levee Failure Mitigation Actions					
Hydromodification and Stormwater Quality countywide	Sacramento County			X	N
Ring Levees to Protect Delta Historic Villages	Sacramento County			X	N

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Levee Breach Scenario, Inundation, Evacuation, and Recovery Planning for Rural Areas South of Freeport	Sacramento County		X		N
Improved Flood Inundation and Evacuation Plan for Structural Flood Control System Failure Scenarios in Urban Areas	Sacramento County		X		N
Human Vertical Evacuation Structures in Areas of Widespread Flood Hazard	Sacramento County		X		N
Livestock Vertical Evacuation Mounds in Areas of Widespread Flood Hazard	Sacramento County		X	X	N
Implement the Recommended Actions of the Sherman Island Five Year Plan	Reclamation District #341		X		N
Highway 16 Levee Rehabilitation Project	Reclamation District #800			X	N
Bank and Levee erosion	Reclamation District #1000		X		Y
Severe Weather: Heavy Rains and Storms Mitigation Actions					
Public Education/Outreach Extreme Weather	City of Folsom		X		Y
Heating and Cooling Centers for Extreme Weather	City of Folsom		X		Y
District Wide Roofing Renovations	Los Rios Community College District		X		Y
Tree Management	Southgate Park & Recreation District		X		Y
Wildfire Mitigation Actions					
Fuels Reduction in the American River Parkway	City of Sacramento/Sacramento Metropolitan Fire District	X	X		N
Coordinate with the County and State to Create defensible space to protect vital infrastructure located in the American River Parkway from wildfires (from 2005 Plan)	City of Sacramento		X		N
Fuel Reduction and Modification	City of Folsom		X		N
Wildfire Prevention Outreach	City of Folsom		X		Y
Wildfire Hazard Identification	City of Folsom		X		Y
Arson Prevention & Control Outreach	City of Folsom		X		Y

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Ignition Resistant Building Construction Upgrades	City of Folsom		X		Y
Reduction of Fire Hazard SRCSD Bufferlands	Sacramento Regional County Sanitation District		X		Y
Twin Rivers School District Annex*					
Reduce Risk to Flooding of Northern Area Schools	Twin Rivers School District			X	N
New drainage plans to sites within the flood areas including, site drainage, storm drain upgrades and re-grading fields to shed water (on-site) away from buildings	Twin Rivers School District		X		Y
Work with City/County/Water departments to create defensible spaces at sites where nearby creeks are prone to flooding. Build-up earthen berms (off-site) to shed water away from critically located schools.	Twin Rivers School District		X		Y
Update the Emergency Preparedness Plan and the Emergency Operations Plan so that in event of emergency or disastrous event, personnel and procedures are in place and streamlined. This will include purchase of new equipment not reliant on typical system power; including communications equipment, emergency housing and supplies.	Twin Rivers School District		X		N
Working with the Department of the State Architect (DSA) on Earthquake Retrofit Plan on all sites.	Twin Rivers School District		X		Y
Revise and update district-wide Storm Water Prevention Plan	Twin Rivers School District		X		Y
Create email notification system for families for emergency situations.	Twin Rivers School District		X		N
Incorporate new rules for M&O department to keep drains clear, trees trimmed and vegetation removed to minimize impact during heavy rains.	Twin Rivers School District		X		N
Create defensible perimeter space – for fire areas. Trees trimmed and vegetation removed to minimize impact during fire season.	Twin Rivers School District		X		Y

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Updating Evacuation Plans.	Twin Rivers School District		X		N
Updating District Policy for new Construction.	Twin Rivers School District		X		N
Updating Evacuation Plans for Excessive Heat	Twin Rivers School District		X		N
Updating Evacuation Plans for Streambank Erosion	Twin Rivers School District			X	N
Updating Evacuation Plans for Fog	Twin Rivers School District			X	N

*The Twin Rivers School District was a participant in the 2011 Plan Update after the fact. As such, their mitigation actions were arranged in their 2011 annex in this order, and not by hazard.

Multi-Hazard Mitigation Actions

Enhance Public Awareness of the Effects of Natural Hazards and Public Understanding of Disaster Preparedness

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?):

Cal OES has developed a website for multi-agency initiatives and projects such as California Flood Preparedness Week; County Water Resources will include the link on its website and in its outreach campaigns. A multi-agency committee has been established to plan, develop and manage an annual campaign to educate California residents about their flood risk and how to prepare for potential flooding. The outreach components include:

- Preparing brochures and flyers to be handed out to the public at events,
- Developing consistent messages for individual agency websites
- Preparing radio messages for earned media and paid advertising utilizing a variety of social media tools to reach various populations including people with disabilities and those with access and functional needs

The County continues to develop methods to communicate with the community including Internet, direct mail, traditional media, and social media. Every year Water Resources works with public information professionals to improve messaging in the hope of helping County residents understand the risk of natural hazards, particularly flood, but also drought conditions.

CRS Public Information Pilot Program

Lead jurisdiction: Sacramento County, City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?):

- City of Sacramento – The City completed a Program for Public Information (PPI) in February 2015 as part of the Comprehensive Flood Management Plan. The City Council will be adopting the PPI in the fall of 2015.
- Sacramento County – This is no longer a pilot program. The Program for Public Information is now within the 2013 Coordinator's Manual for the CRS program in Activity 330. County Water Resources continues and improves its outreach efforts and will be looking to develop the Program for Public Information in the coming year. Working with the County office of emergency services and the levee maintaining agencies, there will be additional outreach efforts as required under the flood emergency action planning activity. The County is encouraged by Central Valley flood protection laws and by the NFIP Community Rating System to outreach levee and dam breach disaster scenario information to the potentially affected public. The County with the City of Sacramento and the levee maintaining agencies is establishing updated flood emergency action protocols and will outreach information to the public over coming months.

Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Lead jurisdiction: Sacramento County, City of Citrus Heights, City of Elk Grove, City of Folsom, City of Galt, City of Rancho Cordova, City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?):

- City of Citrus Heights – The General Plan and Zoning Code have been updated to mitigate most of the hazards identified in the LHMP as well as new state regulations. The General Plan and Zoning Code have a new flood hazard map showing an updated floodplain (August 2012) and known flooding areas. The General Plan and Zoning Code provide very stringent code to prevent future development within the flood hazards of the city. As much as possible, hazard mapping is updated yearly within the City's website and Geographical Information System. The GIS mapping site has updated General Plan Layers, topographic LIDAR data and over 1000 FEMA elevation certificates. The result of the intergration of the LHMP into the General Plan has resulted in no reclamation of flood hazard property, less dense development near a flood hazard and a greater setback from the flood hazard. Furthermore, the Rinconanda Flood Wall indentified in the prior LHMP has been replaced with an improved drainage project. This project is over 50% complete and should be completed in 2017.
- City of Elk Grove – Language integrating the LHMP into the Safety Element of the General Plan is expected to be completed during the General Plan update anticipated to be completed by the summer of 2017.
- City of Folsom – The LHMP was implemented into General Plan update to be adopted in November 2017. The LHMP was also implemented into the Stormwater Basin Plan, Emergency Operations Plan, and various Capital Improvement Projects. The implementation helped in reducing risk. Implementation provided for loss avoidance.
- City of Galt – The LHMP wasn't incorporated into our Safety Element of the City's General Plan as it has not been updated since 2009. It will be incorporated in the General Plan when it is revised.
- City of Rancho Cordova - LHMP will be incorporated in next GP update.
- City of Sacramento – The LHMP was incorporated into our Safety Element of the City's General Plan in 2007. It will remain in the General Plan in future revisions.
- Sacramento County – Complete. References to the Local Hazard Mitigation Plan (aka Multi-Hazard Mitigation Plan) were incorporated into the Safety Element of the General Plan amendment adopted on November 9, 2011. In addition to references on pages 3 and 10, the Multi-Hazard Mitigation Plan is the topic of Policy SA-32, in the Section on "Emergency Response": "SA-32 The County will implement the Multi-Hazard Mitigation Plan in the planning and operations of the County to achieve the goals, objectives, and actions of the County's Multi-Hazard Mitigation Plan." The Multi-Hazard Mitigation Plan was adopted by the Board independent of the General Plan. It would seem that compliance with the requirement is fully met, even though the Hazard Mitigation Plan is not "adopted" in the Safety Element.

Flood Insurance Promotion

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This is an on-going activity that is approached in several ways throughout the year. Extensive flood insurance outreach was conducted in conjunction with the digital flood insurance rate map (DFIRM) program and the levee decertification in the south Sacramento

county Delta areas. Several public meetings helped to inform residents of the importance of obtaining flood insurance. Direct mail newsletters were sent out to all residents impacted by a map change. Newsletters were posted in public areas and flood insurance rate maps and flood insurance materials were placed in public libraries.

In light of the National Flood Insurance Program (NFIP) reform eliminating subsidies and grandfathering rule that were enjoyed by many County property owners, there will be much effort to outreach to the public in the coming months.

It will become increasingly important for owners of buildings that were constructed prior to Mach 15, 1979 (enjoying 'pre-FIRM' subsidized flood insurance rates) to obtain elevation certificates. Several private engineers and surveyors are equipped to perform this service and the County Department of Water Resources offers this service for a fee.

Water Resources stays apprised of news related to NFIP reform and will work on effective messaging to the public. We continue outreach to the public pursuant to Activity 300 of the CRS program. Status: The flood insurance reform act of 2012 was revised in 2014 and subsequently FEMA has been working to understand the requirements moving forward. In that light, Water Resources floodplain management staff has been working to outreach the message to the public. For example, it was recently learned there is potential penalty to those property owners who do not carry flood insurance in areas recently mapped from Zone X to Zone AE. The deadline to acquire insurance is (within one year of the re-map?), for eligibility to 'grandfather' in at lower rates.. Further, upon transfer, a new owner must take over the existing flood insurance policy t o maintainthe 'grandfathered' status. (ref. WYO Bulletin 14053). As the details of the 2014 NFIP reform are fleshed out, it is important to communicate with our public.

Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?):

- City of Sacramento – Much work has been accomplished to map critical facilities and to assess risks in the LHMP. Further analysis of critical facilities was accomplished in early 2014 with the CRS reverification process. The list is currently being updated again as part of the City's new Emergency Action Plan.
- Sacramento County – Sacramento City, American River Flood Protection District, Reclamation District 1000 and Sacramento County are developing a Comprehensive Flood ? Plan for the American and Sacramento Rivers, a standardized Emergency Safety Plan (ESP) for all four jurisdictions and both the ty and County are installing new river flow gauges on both rivers. Sacramento Metropolitan Fire District is developing an emergency rescue response plan for the American River utilizing the up dated river data. These actions will unify the response to flooding and or levee emergencies with a shared language and operational plan for the two rivers. The County received grants from the CA Dept of Water Resources to financially assist levee maintaining agencies and for the City and County to develop levee breach flood evacuation and emergency action plans. This work is scheduled to be completed in 2016.

Finalize and Implement the Actions of the South Sacrament Habitat Conservation Plan

Lead jurisdiction: Sacramento County, City of Elk Grove, City of Galt, City of Rancho Cordova, Sacramento Regional County Sanitation District, Sacramento County Water Agency, Southeastern Connector

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?):). The South Sacramento Habitat Conservation Plan and Aquatic Resources Plan documents were competed in the summer of 2015. Final adoption of the SSHCP is expected in Summer/Fall of 2016.

SAFELY OUT™ Evacuation Preparedness

Lead jurisdiction: Sacramento County, Citizen Voice

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort was not deemed to be as effective as some other outreach activities, so it is on hold.

Public Education Program

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The Public Education Program will continually be implemented to help reduce risk and help the City's residents be prepared for all types of hazards, preparedness and mitigation measures, and responses during hazard events.

Alerts and Warning System

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The City's reverse 911 program has been implemented and will help reduce all types of hazardous risks.

Lead jurisdiction: City of Elk Grove

Emergency Operation Center (EOC)

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is still ongoing.

Critical Facilities Database Development and Data Maintenance Processes

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?):

The critical facilities database was developed and is being updated as needed. This will help reduce risks by identifying the locations of critical facilities.

Increase Redundancy/ Functionality of Water Wells and Sewer Lift Stations

Lead jurisdiction: City of Galt

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The mitigation has been implemented within the CIP. Some water wells were rehabilitated. Some Sewer Lift Stations were rebuilt and/or rehabilitated. No evidence of risk reduction or loss avoidance.

Increase Data Capacity of Emergency Frequencies

Lead jurisdiction: City of Galt

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): No money has been budgeted nor grants found to implement mitigation.

Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?):

Data Center Disaster Recovery Improvement

Lead jurisdiction: Los Rios Community College District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project completed successfully and was funded by District funds.

Community Emergency Response Training (CERT)

Lead jurisdiction: Los Rios Community College District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Funding was not available for this project and it will not be pursued in the future. We continue to train employees on Campus Community Emergency Response Training (CCERT)

Update the critical facilities identified during this DMA planning effort with the City's GIS technical group to support emergency management efforts.

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Critical facilities list will be updated by City OES and Utilities with the current efforts on the Emergency Action Plan grant. It should be completed in late 2015.

Bird Strike Mitigation Actions

Wildlife Hazard Management Plan

Lead jurisdiction: Sacramento County Airport System

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The Wildlife Hazard Management Plan (WHMP) for Sacramento International Airport (SMF) was approved by the Federal Aviation Administration (FAA) on April 8, 2013.

Dam Failure Mitigation Actions

Mather Dam Improvements

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): On December 11, 2012, County Board of Supervisors approved a Cooperative Agreement with the US Air Force to provide up to $5,350,000 to fund the study, design, and construction of dam improvements to bring the dam into compliance with Division of Safety of Dams (DSOD) requirements. The US Air Force transferred ownership of the dam to Sacramento County in May 2013. County Water Resources, with design consultant AECOM, continue to coordinate the study and design of dam improvements with DSOD.

As of 2015, hydrology & hydraulic analysis, environmental surveys, and permit investigations occurred over the past year. Design work continues to progress.

Alder Creek Miners Dam

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): It was noted in 2012 that this site is in the City of Folsom, on the Aerojet property, in Alder Creek within the drainage area of the Glenborough planning area. The Developer, Gencorp, is working with the City of Folsom and the County Dept of Water Resources to determine what should be done to assure safety of the dam. The Division of Dam Safety has stated, in an April 22, 2010 email to the County Water Resources that the dam is not of a size that requires certification through their office (being 21' high and 35AF volume). Nevertheless, catastrophic failure could cause some short term flooding of Folsom Blvd and Hwy 50, possibly of greater interest is the many feet of sediment that has accumulated in the reservoir.

As of late 2014, there is no news on this subject; this should be addressed, with the City of Folsom as the Aerojet redevelopment proceeds. 2015 again noted no change. The Glenborough project consultant is working to respond to questions from FEMA regarding the functionality of the dam. The reservoir is property owned by the City of Folsom, while the ramifications could affect the County.

Improved Flood Inundation and Evacuation Plan for Probable maximum flow from New Spillway at Folsom Dam

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The Folsom Dam Joint Federal Project is well underway with construction expected to be completed in Late 2017. The next project at Folsom will be to raise the dam providing additional volume. It is expected that the completed dam project will reduce the 1:200yr peak flood flow in the lower American River to about what the mean 1:100yr flow is today. Thus, allowing for certification of the levee system in accordance with the requirements of Central Valley Flood Protection legislation (2007-SB-5 and subsequent bills). Meanwhile, SAFCA is working to certify the American River levees to the 1:100yr FEMA standard.

In 2014, we received the 200-yr flood maps from the California Department of Water Resources, assuming a release of 230,000 cubic feet per second from the dam. Based on this information and other flow rates the City and County of Sacramento will prepare inundation and evacuation maps (funded by a grant from the state). In 2015, the City and County with Reclamation District 1000 and American River Flood Control are preparing a flood emergency action plan update.

Folsom Dam Joint Federal Project

Lead jurisdiction: SAFCA

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?):

Folsom Dam Raise

Lead jurisdiction: SAFCA

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?):

Drought Mitigation Actions

Drought Contingency Plan

Lead jurisdiction: Southgate Park & Recreation District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Southgate RPD has taken measures consistent with the State's mandatory drought emergency water conservation guidelines to reduce water consumption since 2014 and has continued to do so through 2016. Since our parks and facilities depend on water to remain viable as recreation opportunities, Southgate RPD is always trying to identify water-saving measures. Southgate RPD has taken steps to use water more efficiently, such as replacement of more efficient sprinkler heads, fixing line breaks immediately, replanting underutilized areas with drought-tolerant plants, and reseeding with grasses that perform well under drought conditions when possible.

Loss Avoidance: Cannot be determined

Earthquake Mitigation Actions

Hughes Stadium Renovation at Sacramento City College

Lead jurisdiction: Los Rios Community College District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Was successfully completed with District funds.

Flood Mitigation Actions

Improve County ALERT (Automated Local Evaluation in Real Time) system of stream and rain gages

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In 2014 with partial funding from a State grant, this project was launched. County Water Resources is working to assure that the computer system is working properly (indoors) before we begin upgrading the units at the ALERT sites (outdoors). 2015 Status: The ALERT system is functioning well to serve the community as the upgrades continue. Expansion of the ALERT system will depend upon land development and interests in monitoring the streams.

Elevation Projects to Mitigate Flood Risk

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): 2015 status: as the County looks ahead to implementation of the flood insurance reform, there is a strong possibility that property owners may become more interested in flood risk mitigation. There is one home elevation project slated for 2016 in the Delta area. Water Resources anticipates increased interest in flood hazard mitigation prompted by increasing flood insurance cost.

Arcade Creek Corridor Plan

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The County remains interest in constructon of two bike trails crossings over Arcade Creek. and in other actions recommended by the Watershed Group.

Elevate up to Three Homes on Long Island (Grand Island Road, Sacramento River)

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): urrently, one applicant/ resident on Long Island has begun design work to elevate their home under a HMGP grant fund. The project is progressing.

Mitigation Projects for Repetitive Loss Structures/Areas

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): 2015 status: as the County looks ahead to implementation of flood insurance reform, there is a strong possibility that property owners may become more interested in flood risk mitigation.

Improve Strawberry Creek Basins at East Stockton Blvd

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): 2015 status: the City of Sacramento and SAFCA constructed berms and channel improvements along a portion of Strawberry Creek in 2013 to protect existing residential areas form overbank flooding. These areas were removed from the FEMA floodplain in 2014 floodplain map revision (LOMR) based on the model developed for the US Army Corps and the channel improvement constructed. The work by the City largely resolved downstream flooding concerns. However the updated LOMR model will be used to evaluate potential impacts to these channel improvements and flood control system due to future development in upstream areas of Strawberry Creek with Sacramento County and Elk Grove.

Triangle Detention Basin

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): 2015 status: the County is seeking additional right of way at the inter-basin transfer to construct a second detention basin. Both the Triangle Rock Basin and the second basin will allow the inter-basin transfer of flow from Laguna Creek to Gerber Creek to be cut-off. A Conditional Letter of Map Revision (CLOMR) will be submitted to FEMA once the right-of-way for the second basin has been acquired and a basin design prepared.

Unionhouse Detention Basin Upstream of East Stockton Blvd Partnering with Park District and SAFCA

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In 2012 it was reported that Water Resources continues to work with the City of Sacramento, the Corps of Engineers and Sacramento Area Flood Control Agency. As of 2014, there was nothing new to report on this measure.

Unionhouse Creek Joint Use Detention Basins – Park Active or Passive Joint Use

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): 2015 status: This measure is moving forward as development is planned in the watershed area.

South Sacramento Stream Group Detention Basins

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): 2015 status: Sacramento County continues to evaluate development planning in the County to ensure there will be no impacts to FEMA flood insurance study base flood elevations within the City of Sacramento and is working closely with the City of Sacramento and SAFCA to evaluate impacts that development projects may have on recently constructed state and federal flood control projects. Sacramento County is working with the US Army Corps, SAFCA and the City of Sacramento to construct improvements along Florin Creek including an off-line detention basin at a park site owned by Southgate Recreation and Park District. The project will reduce out bank flooding and remove about 500 homes in the City and 20 homes in the County form the FEMA floodplain.

Elder and Gerber Creek

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): in 2012 it was reported that Water Resources continues to seek opportunities prepare this project for further advancement by development interests. In 2013, it was stated that the land development interests are engaging again with Water Resources after a long recession. There should be more to report next year. In 2014, Water Resources was actively working with County Real Estate Division to acquire channel right-of-way. Development interests intend to construct the lower reach of Elder Creek, the upper reach of Elder Creek, and the upper reach of Gerber Creek in the next two construction seasons. 2015 saw ground breaking, with target to complete in 2018.

Florin Creek Basins –Florin Vineyard Drainage Master Plan

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In 2012 there was very little development activity at the time. The finance plans are not yet implemented. In 2013, there seemed to be some renewed land development interest; there might be more to report next year. In 2014, the developer of a proposed subdivision named Florin Vineyards is working on a drainage study to detail a proposed reach of concrete lined channel to serve the fact that downstream drainage flowline is too high for the pipe that had been a part of the original drainage master plan document. As of 2015, developers continue to work on a drainage study to evaluate creek drainage improvements that mitigate flood impacts and address environmental constraints.

Joint Use Detention-Park Basins on Laguna Creek

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In 2012, it was reported that this project can be ready for a Vineyard Springs Developer to construct after the Triangle weir is in place and subject to hydraulic analysis and an approved FEMA map revision submittal. Water Resources continues to pursue this goal. It was reported in 2013 that there seems to be some renewed land development interest; there might be more to report next year. As of 2014, the weir was constructed at Triangle Aggregate.

Southgate Basin - The County is working to obtain the Corps permit. The preliminary design is complete for the Southgate detention basin, construction will await developer interest in obtaining the fill material from the basin.

Pasa Robles Drive - Concrete Channel Lining Rehabilitation

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Not started.

Chicken Ranch Slough - Concrete Channel Lining Rehabilitation

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Not started. Funding for initial studies is included in the current fiscal year budget.

Morrison Creek - Concrete Channel Lining Rehabilitation

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Not started.

Mayhew Slough - Concrete Channel Lining Rehabilitation

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Not started.

Strong Ranch Slough - Concrete Channel Lining Rehabilitation

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Not started.

Keep Watershed Management Plan Current CRS Activity 450 (county and cities)

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Every year the County receives development plans, FEMA floodplain studies, hydrology and hydraulic analyses and, of late, a state mandated 200-year flood hazard mitigation requirement; meanwhile, watersheds know no political boundaries. No adverse impact is a CEQA mandate yet watershed models may show unintended consequences farther downstream from a development area. Consequently, Sacramento County and the cities must maintain a continuous dialogue to assure each other that flood hazards are not exacerbated. To accomplish this, in 2012, the County Water Resources developed the Watershed Management Plan (WMP) as appendix to the Countywide Hazard Mitigation Plan. The WMP is updated every five years in concert with this LHMP. The 2016 WMP update was outreached to the cities and is currently being evaluated (for Community Rating System credit) by the Insurance Services Office.

Woodside Condominiums Repetitive Flood Loss Property

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): There has been no activity on this mitigation measure. Water Resources stands ready to assist Woodside including the pursuit of mitigation project grant funding. Status: National Flood Insurance Program, as reformed in 2014, will continue to increase insurance rates. It was recommended to the homeowners' association to retain the services of an engineering consultant who could prepare elevation information to assure that their insurance agent correctly rates their policy. Meanwhile, Water Resources annually discusses flood preparedness and flood hazard mitigation measure with the Woodside manager and HOA president.

Conversion to NAVD88 vertical datum (from NGVD29)

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): As of 2014, this effort is progressing. Conversion to NAVD 88 Vertical Datum – Status: This effort continues, it was suggested that the County consider seeking a FEMA grant to assist in the assurance that NAVD88 benchmarks are widely available for those surveyors who do not use GPS survey systems.

Mitigation projects to reduce flood risk to critical facilities.

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Starting in the fall of 2014, Sacramento City and County will be updating flood plain maps and information for the American River Flood Plain utilizing the new river flow rates provided by the US Bureau of Reclamation. The new flood plain maps will be used to develop evacuation planning, strengthening infrastructure facilities based on the new information.

Hydrologic and Hydraulic Modeling in Compliance with 2012 Central Valley Flood Protection Plan

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): in 2012, the standards and applicability are not yet clearly stated by California officials. It was noted in 2014 that there should be more to report on this in 2015-2016. The CVFPP Urban Level of Protection Criteria "ULOP" is published by the state and the County intends to implement it. The City and County of Sacramento and the City of Elk Grove will work with SAFCA to develop a plan to achieve 200-yr flood protection before 2025, in accordance with ULOP, for urban areas protected by levees. ULOP also applies to streams with more than 10 square miles of contributing watershed area. Update 2015 Status: the CVFPP Urban Level of Flood Protection Criteria

requires analysis of the 1:200yr storm event. In discussions with weather and climatology professionals there seems to be some uncertainty in the determination of the depth, duration and intensity of such a statistically improbable event particularly in light of the President's Executive Order 13690, recommending consideration of global climate change. It was suggested that the County seek a FEMA grant to assist in this analysis.

Delta Area Fire Station Needs to be Elevated or Flood Proofed to Protect Against Levee Breach Flooding to Assure Function in that Disaster Event.

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Not started.

Update and Adopt Floodplain Management Ordinance in Light of Levee De-accreditation

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The Board of Supervisors adopted the updated floodplain management ordinance. This activity is completed as of 2014. In 2015, it was reported that the California Central Valley Flood Protection law requires amendment to the Ordinance to assure reasonable level of protection from the 1:200yr flood hazard in urban areas where the contributing watershed exceeds ten square miles. The Central Valley Flood Protection Plan Urban Level of Flood Protection Criteria requires inclusion of mitigation for the 1:200 year flood hazard in the Zoning Code, thus a revision to the County's Floodplain Management Ordinance. Water Resources staff are working on this.

Mitigate Peak Flow on Dry Creek and Tributaries (including Sacramento County and City of Roseville)

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): There is no regional flood control basin proposed for Dry Creek. As of 2015, Placer County Flood Control with the City of Roseville is planning a basin on Antelope Creek that is reported to reduce peak flow in Dry Creek, measured at Vernon Street by ultimately to 800 cubic feet per second. Phase 1 work should begin in coming few years.

Repetitive Loss Church Building on Dry Creek

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Water Resources stands ready to provide technical assistance and/or to apply for FEMA grant opportunities to help mitigate this situation. Annual outreach efforts should serve to keep this in the mind of the owners. In 2014, as the County looks ahead to

implementation of the flood insurance reform, there is a strong possibility that property owners may become more interested in flood risk mitigation.

Determine Cause and Mitigate Mercury and Methyl Mercury Coming from Tributaries of American River

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): As reported in 2012, the County Stormwater Program is pursuing the following actions, primarily as part of the Sacramento Stormwater Quality Partnership (SSQP, a collaboration of the County and the cities of Citrus Heights, Elk Grove, Folsom, Galt, Rancho Cordova, and Sacramento):

1. Continuing to implement the Mercury Plan submitted in 2004 to the Central Valley Regional Water Quality Control Board. This plan includes provisions for mercury control, including proper management of mercury wastes (proper lamp disposal by County maintenance, and household hazardous waste services for the public), control of industrial sites with the potential to discharge mercury, municipal operations (e.g. street sweeping, channel cleaning) and public outreach efforts.

2. Developing a quantitative model to better estimate the contribution of structural Best Management Practices (BMPs) at new and existing developments for removing mercury (and other pollutants).

3. Completed Phase I control study of structural BMPs done in compliance with the Delta Mercury Total Maximum Daily Loads (TMDL). The results of the control study will be utilized to refine estimates of the effectiveness and feasibility of controlling mercury within the urban watershed.

4. Contributed to the development and funding of the Methylmercury Exposure Reduction Plan (a program implemented by the California Department of Public Health), as required by the Delta Mercury TMDL.

5. Explore opportunities to work with other parties subject to mercury TMDLs to develop approaches for reducing key mercury sources cost effectively on a watershed basis. This may include working with entities such as the California Department of Water Resources and others that are involved in managing Delta waterways, levees, islands, and other land uses and activities that have the potential to impact methylmercury levels.

The County was unable to reach agreement with the US Bureau of Reclamation to support a joint study of mercury discharges from Alder Creek. The County is interested in continuing to explore funding sources and partners to characterize and mitigate as necessary thepotential hazard of mercury laden sediment in Alder Creek including that in the impoundment created by the small dam on the creek. upstream from Folsom Boulevard.

6. Continuing support California Product Stewardship Council efforts to promote Extended Producer Responsibility for mercury lamps and other mercury containing products.

Pump Stations

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): 2015 status: D05 Howe Avenue is scheduled for construction in 2016. D02 Kadema and D09 Mayhew are currently under construction. D45 Franklin Morrison and D06 North Mayhew design is scheduled for 2016. D11 West Coloma was removed from the list when the City of Rancho Cordova assumed ownership of the facility this past year.

Public Outreach Mailers

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): These mailers go out every year, September through November. This year approximately 10, 300 tri-fold mailers were sent to County residents within both FEMA and locally identified flood zones. Mailer information subscribe to all CRS required information such as informing residents they are in a flood zone, encouraging them to maintain flood insurance and offering contact information for additional information.

Drainage improvements to reduce flooding on key evacuation routes

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In 2014, it was reported that the County will be working on evacuation routing as part of the urban flood emergency action planning project with the City of Sacramento. This will occur over the next few years {under a grant from the state}. Furthermore, when the Capital Southeast Connector Project is constructed it will be a facility that can serve as a major evacuation route to the region.

South Branch Arcade Creek – Gum Ranch Basin (with Fair Oaks Park District)

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In 2014, there was no developer for this project. 2015 Status: The schedule for land development is in the hands of the landowner to decide.

Dry Creek Flood Hazard Mitigation Acquisitions with County Park Dept

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): As the County looks ahead to implementation of

the flood insurance reform, there is a strong possibility that property owners may become more interested in flood risk mitigation.

Arcade Creek at Evergreen Estates Floodwall improvements

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The levee-floodwall system is shown on the FEMA flood insurance rate maps as provisionally accredited, however that status has expired and the neighborhood will be mapped as a special flood hazard area in the next FEMA map revision. The project necessary to bring the wall into FEMA 100-yr and California 200-yr design standard is very expensive and involved disturbance to non-benefitting property owners. Meanwhile, the wall has served the neighborhood well saving them from at least three floods (1995, 1997, 2005) since it was constructed. Physical flood fighting is necessary during exceptional high water events. The improvement necessary, to assure flood protection by the floodwall system, is very expensive, affecting Winding Way and several private properties. There is a developer holding the vacant land to the west of Evergreen Estates who is motivated, but the cost of the flood control improvements are prohibitive. This will become a greater concern as the NFIP reform is implemented. There may be motivation to consider alternatives such as home elevation. 2015 Status: The City of Sacramento plans to reconstruct the Auburn Blvd bridge crossing Arcade Creek, immediately downstream of the subject floodwall. Water Resources is working with the City to determine if there is anything that can be done to improve conveyance, knowing that the existing condition leaves Auburn Blvd vulnerable to flood water overtopping in the 1:20 year storm event (e.g. Dec 31, 2005). Meanwhile, Water Resources is talking to FEMA about levee mapping procedures in hope of lowering the base flood elevation in Evergreen Estates.

Linda Creek Peak Flow Mitigation

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Any development in this watershed pays the Zone 11C supplemental fee for Linda Creek 'fair share' mitigation. The funds are transferred to Placer County Flood Control as compensation for impacts to the watershed. FEMA flood insurance rate mapping, dated August 16, 2012, includes the latest study prepared by Nolte Engineering (under a FEMA cooperating technical partnership agreement), and Placer County prepared an updated model of the Dry Creek watershed. County Water Resources has no significant flood control projects planned in this watershed, but intends to cooperate with Placer County as mitigation projects are contemplated.

In 2014, Placer County Flood Control developed a new nexus study, there may be a minor adjustment to the fee in this area as the Zone 11 Fee Study is updated it will be outreached to Placer County for comment.

Improve flood protection and/or Evacuation Planning for Mobile Home/RV Park at Manzanita/Auburn. Alternatively, the park Should Establish Flood Warning and Evacuation Procedures.

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The property owner hired an engineer (Watermark) to consider mitigation measures. – Status: nothing to report at this time.

Capital Improvement Projects – Pipelines (2012-13)

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The following projects were constructed in 2012: El Sur/Arden Way, Elkhorn Boulevard/Schofield Way – Phase 2, Flagstone Street/Agate Way, and New York Avenue/Oriana Court.

Projects under construction in 2013: Elkhorn Boulevard/Schofield Way – Phase 3. The Ravenwood Avenue project was re-assessed and the construction date was revised to 2015. The Barrington Road project investigation determined the project was not needed and the project was deleted. A portion of the Kings Way/Verna Way project was pulled from the project to create the El Camino Ave – Transportation Project Phase I project. This project was scheduled for construction in 2013 as a part of an Additive bid section of a County Transportation project. Due to high bids on the Base Bid, County Transportation did not add any Additives to their project. As a result, the El Camino Ave – Transportation Project Phase I project was deleted and the planned work was returned to the Kings Way/Verna Way project. In addition, the Kings Way/Verna Way project was re-assessed and the construction date was revised to 2017. The 3509 El Camino Avenue project was re-assessed and combined with other adjacent projects resulting in the revised name of Kentfield Way/Watt Avenue and construction date of 2014.

In 2015, it was reported that the Ravenwood and Kentfield Way/Watt Avenue projects are currently under construction. The Kings Way/Verna Way project remains on schedule for 2017.

Capital Improvement Projects – Pipelines (2014-15)

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The Somersby/Wixford and Eastern/Arden projects were re-assessed and their construction dates were revised to be beyond 2018. The Rich Hill Drive project was re-assessed and the construction date was revised to 2018. The following projects have been added to replace the three previously scheduled projects with construction dates noted in parenthesis:

- Femoyer Street Outfall (2014)
- Florin Road/Frasinetti Road (2014)

- Kentfield Way/Watt Avenue (2014)
- Kovanda Avenue (2014)
- Rowena Way (2014)
- Ravenwood Avenue (2015)

As of 2015, the Kentfield Way/Watt Avenue and Ravenwood projects are currently under construction. The Florin Road/Frasinetti Road project is under review and may no longer be needed due to recent upstream private development improvements.

New City Sump 90 Operation Plan

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Nothing to report. The schedule is led by the City of Sacramento Department of Utilities as the pump operator.

Land Acquisition

Lead jurisdiction: Southgate Park & Recreation District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Park lands within the North Vineyard Station Specific Plan area have been designated in locations adjacent to Elder Creek, Gerber Creek and Laguna Creek. The park sites will have storm water detentions basins with water quality treatment functions, and trail facilities. In addition there is also a proposed park with an integrated multi-use storm water detention basin with soccer fields adjacent to Laguna Creek within the Vineyard Springs Comprehensive Plan area. In 2016 Florin Creek Park was expanded and converted to a multi-use basin for recreational use. The basin will provide flood control for areas within the 100-year flood plain of Florin Creek and improve recreational benefits at the park site. Southgate RPD continues to pursue the acquisition of open space land when it makes geographic and economic sense and proves beneficial to Southgate RPD's long term acquisition goals.

Loss Avoidance: TBD

Conservation Easements

Lead jurisdiction: Southgate Park & Recreation District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Southgate RPD is in the process of acquiring property within the North Vineyard Station Specific Plan – Elder Creek and Gerber Creek open space preserve area associated with current subdivision developments and as a required by the U.S. Army Corps of Engineers. A conservation easement will be granted over each portion of the Preserve. The conservation easement will run with the land and protect the Preserve as wetland and wildlife habitat in perpetuity, subject to the long term management responsibilities of Southgate RPD and drainage maintenance

responsibilities of Water Resources for the purpose of flood control maintenance. Wildlife Heritage Foundation will hold the Conservation Easement over the Preserve areas. Southgate RPD will manage and maintain the preserve as outline in the Open Space Preserve Operations and Management Plan for the North Vineyard Station Specific Plan – Elder and Gerber Creek.

Loss Avoidance: TBD

Multi-jurisdictional Cooperation within Watersheds

Lead jurisdiction: Southgate Park & Recreation District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Southgate RPD has participated with SAFCA "Sacramento Area Flood Control Agency" to construct a multi-use basin at Florin Creek Park to provide flood control for areas within the 100-year flood plain of Florin Creek. The improvements included the reconstruction of a paved trail along the Florin Creek channel that connects Sheldon Park and Florin Creek Park. The U.S. Army Corps of Engineers proposed the construction of improvements to the creek in conjunction with SAFCA, the State Department of Water Resources, City of Sacramento and County of Sacramento.

Loss Avoidance: TBD

South Sacramento Streams Group

Lead jurisdiction: SAFCA

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): SAFCA is not a participant in this plan process. As such, no update on this action was available from the Agency.

American River Common Features

Lead jurisdiction: SAFCA

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): SAFCA is not a participant in this plan process. As such, no update on this action was available from the Agency.

CVFPP - Flood Emergency Plan

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): A DWR grant was awarded to the City and County of Sacramento, reclamation districts, and other local partners in September 2013. The grant includes writing a regional emergency action plan, upgrading the ALERT system, funding part of the new reverse 911

system, flood inundation maps, and emergency response training. Currently, the new emergency action plan and flood inundation maps are in draft format.

Adopt Additional Floodplain Development Standards

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The Development Services Task Force has made recommendations on additional floodplain development standards and submitted them to FEMA. These will be added to the City's Floodplain Ordinance will be taken to City Council this fall of 2015 along with the Comprehensive Flood Management Plan.

Update the General Plan to include the requirements of the CVFPP

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The City updated its General Plan in March 2015 and has incorporated the required maps and policies to comply with the CVFPP and SB 1278. The City will have its zoning code amended by March 2016 to meet other CVFPP and SB1278 requirements.

Historic Magpie Creek Study

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): FEMA's new guidelines, "The Revised Analysis and Mapping Procedures for Non-Accredited Levees", are in final form as of July 2013. Using these guidelines will allow the City and FEMA to map the Magpie Creek floodplain assuming overtopping of the diversion instead of just assuming the diversion is non-existent. This will allow for more accurate and realistic floodplains. FEMA is still working on the physical map revision study for Magpie Creek.

South Sacramento Streams Project: Union Pacific Railroad Flood Wall

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The flood wall was completed at the 2012. The certification data for the flood wall was submitted to FEMA on June 18, 2013. About 3,200 residents were removed from the floodplain in May 2014.

Natomas Levee Improvement Project (NLIP)

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The work is complete to meet the A99 Zone criteria in the Natomas Basin. The project received federal authorization from Congress in June 2014 for the NLIP, which was another FEMA A99 requirement. The A99 flood zone became effective on June 16, 2015. For 200-year protection and to obtain X Zone for the basin, it is predicted that this construction work will be completed in approximately 2019 by the Corps.

Retrofit of Repetitive Loss Properties

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The City submitted a request to FEMA in December 2007 and September 2009 to remove 19 properties from the Repetitive Loss List. In the January 2011 repetitive loss data, these 19 properties were removed from the unmitigated Repetitive Loss list. The list has dropped from 40 to 21 properties. Grants were applied for in September 2011 to retrofit 3 repetitive loss properties, but the Local Hazard Mitigation Plan was not approved by FEMA and City Council until June 2012. Grants will be pursued in the future.

Preferred Risk Policy (PRP) Outreach Campaign

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Since July 2010, the City has engaged in a public education campaign to educate property owners in the City of Sacramento about PRP policies, the benefits of having a PRP to protect your home and investment, and the dangers of living behind levees. In spring of 2011, City staff attended 6 community meetings in Natomas held by the Sacramento Area Flood Control Agency and hosting a table at each of the meetings sharing information regarding the importance of flood insurance. The City also worked with the Sacramento Business Journal and the Natomas Buzz on stories pertaining to the impacts of the Corrective Action Plan and the current flood zone designation in Natomas.

The City also promoted flood insurance by: insertion of the "Be Flood Ready" Brochure in the November City of Sacramento Utility Bills; the billboard on Business Interstate 80 carrying the "Be Flood Ready. Buy Flood Insurance." Message from November 2010-February 2011; and ads on Regional Transit buses for November and December 2010 stating "Be Flood Ready. Buy Flood Insurance." The City saw more than a 10% increase in PRP policies from 2008 to 2010. Although, this is hard to measure since Natomas residents were in the 2-year PRP extension program and the floodplain changes from Letter of Map Revisions and Physical Map Revisions.

	AE, A,A0, AH	AR,A99, STD.X	PRP	TOTAL
Apr-08	NA	NA	NA	43,789
Aug-08	737	12,360	30,050	43,147
May-09	1,318	16,984	30,107	48,409
Aug-09	924	30,974	19,459	51,357
May-10	1,047	15,091	33,434	49,572
Sep-10	1,106	15,372	32,722	49,200
Mar-12	791	10,676	36,459	47,926
Oct-13	571	3,788	40,277	44,636

Drainage Projects for Repetitive Loss Properties

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The City submitted a request to FEMA in December 2007 and September 2009 to remove 19 properties from the Repetitive Loss List. In the January 2011 repetitive loss data, these 19 properties were removed from the unmitigated Repetitive Loss list. The list has dropped from 40 to 21 properties. Grants were applied for in September 2011 to retrofit 3 repetitive loss properties, but the LHMP was not approved by FEMA and City Council until June 2012. Grants will be pursued in the future. In addition, the City listed local drainage projects for three repetitive loss sites in the 2013 American River Basin Integrated Water Management Plan, which allows for grant opportunities.

Unionhouse Creek Existing Conditions LOMR and Channel Improvements

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The construction for channel improvements along Unionhouse Creek was finished at the end of 2012. A conditional letter of map revision (CLOMR) was not completed for Unionhouse Creek because the Base Flood Elevation was not increased with the proposed project. A LOMR was submitted in June 2013 to reflect the Unionhouse Creek project and the other South Sacramento Streams Group floodwalls. In May 2014, the LOMR was approved. Approximately 3,200 parcels were removed from the floodplain.

Emergency Notification and Evacuation Planning

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The Reverse 911 system of emergency notification is complete. Now, in addition to regular testing and deployment, two "self registration portal announcement" system launches were completed (February 2012). These announcements reached 14,145 locations in the North Natomas / 95835 zipcode. Communications Center Staff attended the Natomas Charter School Festival (May 2012) in an effort to educate area residents about the Reverse 911 system"s self registration portal for mobile devices. Staff took a wireless laptop so interested persons could initiate registration on site. The Winter 2012 edition of City Express, a quarterly City of Sacramento newsletter, included an article titled, "What is Reverse 911 and why should I sign up?". Since 2012, County and City OES have implemented an even faster system than Reverse 911 called Everbridge. The residents who registered for Reverse 911 were transferred to the new system.

Drainage Projects from the City's Priority Drainage Project List

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The drainage projects constructed in 2014 included:

- Sump 157 Access Ramp – $73,000
- PG&E Ditch Improvements - $888,000
- Sears Ditch Liner Repair Project - $233,000
- River Park drainage Improvements - $512,000
- Sump 44 Discharge Main Replacement - $50,000

The design and/or construction of following projects are currently underway:

- Sump 115 Electrical Rehabilitation - $160,000
- Sump 117 Electrical Rehabilitation - $233,000 Sump 38 & 39 Switchgear Replacement - $280,000
- Sump 22 Generator Control Panel - $30,000
- Leisure Lane/Hwy 160 Box Culvert - $250,000
- Drainage Sump Outfall Design - $300,000
- Sump 90 Inlet Channel Repair - $118,000
- Sump 142 Site and Outfall Repair - $90,000
- Sump 138 Site and Outfall Repair - $149,000
- Sump 34 Load Bank Project - $254,000
- Sump 28 Load Bank Project - $180,000
- 65th Avenue/25th Street Drainage Improvement - $437,000
- Basin 141 Pipe Improvements - $1,650,000
- Hudson Way Drainage Improvements - $150,000
- Florin Creek Detention Basin - $4,000,000

Riconada Flood Wall

Lead jurisdiction: City of Citrus Heights

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Based on the 2012 revisions to the local flood plain hazard, the city changed the project. A new project includes install approximately 500' of 42" Storm drain pipe in an effort to remove 13.1 acres of runoff area that contributed to Riconada. This area is being redirected to a location 250' downstream of the street. The initial 250' of pipe, inlets and outfall has been installed as part of a new development. The City will complete the pipe & inlet installation in 2017.

Storm Debris Removal

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Based on the 2012 revisions to the local flood plain hazard, the city changed the project. A new project includes install approximately 500' of 42" Storm drain pipe in an effort to remove 13.1 acres of runoff area that contributed to Riconada. This area is being redirected to a location 250' downstream of the street. The initial 250' of pipe, inlets and outfall has been installed as part of a new development. The City will complete the pipe & inlet installation in 2017.

Drainage and Flood Control Programs

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Drainage and Flood Control Programs are implemented to reduce risk and losses. The Drainage and Flood Control Programs are identified in the City of Elk Grove's Storm Drainage Master Plan.

LID Rain Garden Plaza

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project has been constructed; however, it is an educational stormwater garden/facility which provides continuous education and outreach efforts on Low Impact Development (LID) practices and using stormwater as a resource.

School Street Alley Drainage Improvements

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed and it reduced

localized flooding in the alley. The Storm Drainage Master Plan efforts identified this area as being impacted by localized flooding if improvements were not completed.

Elk Grove Creek Outfalls

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed to prevent backwater flows onto the streets from the creek. This improvement reduces risks of localized flooding on the streets.

Elk Grove Creek Restoration

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed and helped with habitat restoration efforts.

Waterman Road Culvert Repair and Replacement

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed and it replaced a damage 66-inch culvert under the roadway reducing risks to the roadway failing and impacts to drainage flow.

Waterman Road Culvert Replacement

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed and it replaced a badly deteriorated culvert under the roadway reducing risks to the roadway failing and impacts to drainage flow.

Elk Grove Creek Flood Protection and Clean Water

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is on-going. The City submitted for a Prop 1 grant for $2.5 million to construct the project.

Elk Grove Watershed Recommended Improvements

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed which enlarged existing pipes and constructed 24-acre-feet of detention storage to reduce flooding. The Storm Drainage Master Plan modeling efforts identified this area as being impacted by flooding if improvements were not completed.

Multi-Functional Drainage Corridor for Shed C

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is on-going and will be constructed as new development is implemented.

9816 Sheldon Road – Enlarge Culverts

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed which enlarged existing pipes and constructed 24-acre-feet of detention storage to reduce flooding. The Storm Drainage Master Plan modeling efforts identified this area as being impacted by flooding if improvements were not completed.

Sheldon Road Drainage Project

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is constructed and replaced existing culver5s with two 2x4 foot box culverts under Sheldon Road and one 2x4 foot box culvert under Bader Road to reduced localized flooding. The Storm Drainage Master Plan modeling efforts identified this area as being impacted by localized flooding if improvements were not completed. (same project as above)

Sleepy Hollow Detention Basin Retrofit

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is on-going and is part of a Prop 84 Stormwater Grant. This project will help mitigate impacts to the surrounding community on reducing the 10-year and 100-year storm elevations in the detention basin; serve as a pilot/demonstration project for

conversion of conventional detention basins into multi-use/benefit detention basins for holistic watershed protection; increase existing groundwater elevations; improve the habitat of local and migrating wildlife species; and provide a valuable recreational space for public with a jogging/walking trail.

Sleepy Hollow Lane Drainage Improvements

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is targeted as a future project to install an 18-inch pipe to carry stormwater runoff from low spots in the roadway that flood periodically.

East Elk Grove Area/ Rural Region Improvements

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is targeted as a future project to accommodate future development and existing deficiencies with detention basins, pipelines, culverts, and open channels.

Sheldon Road Ditch Improvements and Multi-Use Trails

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is targeted as a future project to construct a multi-use ditch along the roadway which addresses the unique rural characteristics of the area.

Laguna Creek Watershed Improvements (New Pipeline and Enlarge Existing Pipelines)

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed with new pipeline and enlarged existing pipelines to reduce flooding. The Storm Drainage Master Plan modeling efforts identified this area as being impacted by localized flooding if improvements were not completed.

Deer Creek Watershed Improvements (New Detention Basins)

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is targeted for the future to accommodate future development with a 5 acre-feet of storage detention.

SCADA System for the Stormwater Pump Stations

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is on-going. Hard line phones wires were installed at all of the pump stations, except for one pump station that has a wireless connection due to access issues. Auto dialers were installed at the pump stations to trigger an alarm to alert staff for high water levels and malfunctions. These improvements will help manage the pump stations during storm events.

Dry Well Installation at Kent Street and St. Anthony Court

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed. These areas were subject to frequent flooding. The City received calls on an annual basis from residents impacted by the flooding. The installation of dry wells alleviate reoccurring flooding that occurred by improving the conveyance capacity.

Elk Crest Drive Pipes

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project was constructed which enlarged existing pipes to reduce street and property flooding. The Storm Drainage Master Plan modeling efforts identified this area as being impacted by localized flooding if improvements were not completed.

Strawberry Creek Detention Basin Retrofit

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is on-going. A portion of the project has been completed by constructing a dry well in the water quality portion of the detention basin. The dry well is part of a Prop 84 Stormwater Grant to help capture, cleanse and infiltrate stormwater to recharge groundwater supplies to help mitigate for the drought and climate change.

Laguna Creek and Whitehouse Creek Multi-Functional Corridor Enhancement

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is targeted for the future.

Whitehouse Creek Watershed Improvements

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is in progress and will accommodate future development with new pipelines, enlarge existing pipelines, and detention basins. The Storm Drainage Master Plan modeling efforts identified this area as being impacted by flooding if improvements were not completed. This project will also provide habitat enhancements.

Grant Line Channel Improvements (Pump Station and Enlarge Pipes)

Lead jurisdiction: City of Elk Grove

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is targeted for the future.

Alder Creek Watershed Council

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Activities are on-going. The Council provided comprehensive decision making to ensure implementation of the Alder Creek Watershed Management Action Plan with regards to the development of the Folsom Plan Area.

Redevelopment Area Drainage Improvements

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort is on hold. Through the recession, the redevelopment agency was dissolved. The funding mechanism for redevelopment was lost. Redevelopment will be revived if future funding mechanism becomes available.

Drainage System Maintenance Tax Assessment

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort is ongoing. A study is being updated and is awaiting City Council action to be placed on a ballot.

Floodplain Mapping

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The Floodplain Mapping effort is in the final stages of the update. The City is currently working with FEMA to incorporate the update.

Drain Inlet Retrofit Capital Improvement Plan (CIP)

Lead jurisdiction: City of Galt

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): No money has been budgeted nor grants found to implement mitigation.

Creek/Streams Vegetation Management Plan

Lead jurisdiction: City of Galt

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): No money has been budgeted nor grants found to implement mitigation.

Sunrise Boulevard Widening Kiefer to Jackson

Lead jurisdiction: City of Rancho Cordova

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project is ongoing and is included in this Plan Update.

Flood Response Equipment

Lead jurisdiction: Cosumnes Community Services District Fire Department

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is ongoing and will be carried forward in this Plan Update.

Flood Response Training

Lead jurisdiction: Cosumnes Community Services District Fire Department

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is ongoing and will be carried forward in this Plan Update.

Coordinate with SAFCA, CA-DWR, USACE, and Sacramento County on Proposed Flood Control projects on Magpie Creek

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In the beginning of 2012, SAFCA purchased four vacant parcels in the Magpie Creek 100-year floodplain with a FEMA grant. The parcels are along Raley Blvd. between Vinci and Santa Ana Ave. The proposed project has not been constructed. It will be years before the Army Corps of Engineers can construct this project.

Storm Water Management Practices – Implement Storm Water Management Practices as identified in Stormwater Quality Design Manual

Lead jurisdiction: Southgate Park & Recreation District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Southgate RPD works collaboratively with the Sacramento County Department of Water Resources (DWR) to plan and design joint-use facilities that will provide both storm water management and recreation use to Southgate RPD residents. These types of projects keep creek drainage corridors in their natural state and provide storm water detention basins with compatible recreational uses such as trails and sports fields. These types of projects help improve the storm water quality and drainage capacity in our neighborhoods while at the same time providing additional recreation opportunities in the community. An example of these joint-use facilities includes the Laguna Creek Parkway open space which has preserved a 130 acre portion of the 100 year flood plain of Laguna Creek while providing a multi-use trail and open space corridor for residents to enjoy. A similar joint-use open space corridor is planned for the Elder and Gerber Creek drainage corridors that traverse Southgate RPD. The Southgate RPD is also in the process of designing two storm water detention projects with the County DWR that will accommodate soccer fields within the basin areas.

Loss Avoidance: TBD

Main Drainage Canal Bank Stabilization and Sediment Removal

Lead jurisdiction: Reclamation District #1000

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project has not been started. The District is looking at the flood safety issues associated with this project and may determine it does not significantly reduce the flood risk. The District may look at other similar projects that provided a more significant reduction in the flood risk.

Security of District Facilities

Lead jurisdiction: Reclamation District #1000

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The District has initiated security risk improvements at some of its critical facility sites. A security fence was installed along a portion of the perimeter fencing system around Pumping Plant No. 1. Since this fence was constructed we have not had a security breach at this location. A contract to construct a security fence around the inner perimeter of Pumping Plant No. 8 has been awarded and the work is being constructed in 2016. Other security measures are in the planning phase.

South River Pump Station Flood Protection Project

Lead jurisdiction: Sacramento Regional County Sanitation District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project is ongoing and is being carried forward as a mitigation action in this Plan Update.

SRCSD Critical Facilities Flood Study (Planning)

Lead jurisdiction: Sacramento Regional County Sanitation District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): No actions taken on this effort.

Levee Failure Mitigation Actions

Hydromodification and Stormwater Quality countywide

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The County developed a hydromod basin-sizing calculator (the SAHM Calculator). Status: nothing to report at this time.

Ring Levees to Protect Delta Historic Villages

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Depends on community interest and funding

Levee Breach Scenario, Inundation, Evacuation, and Recovery Planning for Rural Areas South of Freeport

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The City and County of Sacramento will be

developing an Urban Flood Emergency Action Plan over the next two years, subject to State grant funding. In 2014 it was reported that the County awaits approval of a grant from the State. As of 2015, the grant is approved and contracts are issued. It is anticipated that work will be completed by the end of 2016.

Improved Flood Inundation and Evacuation Plan for Structural Flood Control System Failure Scenarios in Urban Areas

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The City and County of Sacramento will be developing an Urban Flood Emergency Action Plan over the next two years, the State grant funding was approved and the project is underway. As of 2015, the County awaits approval of a grant from the State. As of 2015, the grant is approved and contracts are issued, work is underway for a completion schedule at the end of 2016.

Human Vertical Evacuation Structures in Areas of Widespread Flood Hazard

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The City and County of Sacramento will be developing an Urban Flood Emergency Action Plan over the next two years. This component will be in discussions during the upcoming LHMP 2017 update.

Livestock Vertical Evacuation Mounds in Areas of Widespread Flood Hazard

Lead jurisdiction: Sacramento County

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Searching for a funding source. This component will be in discussions during the upcoming LHMP 2017 update.

Implement the Recommended Actions of the Sherman Island Five Year Plan

Lead jurisdiction: Reclamation District #341

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): RD 341 has implemented multiple projects mentioned in the 2011 plan. The Projects, along with ongoing annual levee maintenance have reduced the risk of levee failure on Sherman Island.

Highway 16 Levee Rehabilitation Project

Lead jurisdiction: Reclamation District #800

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): RD 800 was unable to secure funding for the HWY 16 Levee Rehabilitation Project.

Bank and Levee erosion

Lead jurisdiction: Reclamation District #1000

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): No work has been initiated on this project other than monitoring the critical sites. Because of the recent drought years with lower than normal river levels, the sites have not significantly eroded any further.

Severe Weather: Heavy Rains and Storms Mitigation Actions

Public Education/Outreach Extreme Weather

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort has been implemented and is ongoing. The program continues to reduce risk and provides for loss avoidance.

Heating and Cooling Centers for Extreme Weather

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort has been implemented and is ongoing. The program continues to reduce risk and provides for loss avoidance.

District Wide Roofing Renovations

Lead jurisdiction: Los Rios Community College District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Project has been ongoing with the majority of the project completed using District funds. Please keep on the list.

Tree Management

Lead jurisdiction: Southgate Park & Recreation District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In 2012 the Southgate RPD received a grant from the Urban Forestry Program Entitled, "An Urban Forest for Every City". This Program Grant funded the development and implementation of a management plan for our urban forest which determined reasonable

maintenance goals and set a standard maintenance cycle to help the District proactively manage our forest in a way that reflects the values of our community within a set budget. The grant was used to conduct a tree inventory as the first step in better understanding the needs and distribution of its trees and the value of its forest asset. A consulting arborist and certified tree risk assessor provided an inventory of all the trees in the parks, parkways, open space and landscape corridors in the Southgate RPD. The inventory noted the location, species, size, health, and potential for infrastructure conflicts and hazards for each tree on Southgate RPD owned property as well as noting empty planting locations. High risk trees were identified and most have been removed. Southgate RPD is still in the process of developing an Urban Forest Management Plan that aims to identify actions that will support a healthy and regenerative urban forest.

Loss Avoidance: TBD

Wildfire Mitigation Actions

Fuels Reduction in the American River Parkway

Lead jurisdiction: City of Sacramento/Sacramento Metropolitan Fire District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): A CWPP for the American River Parkway was completed in June of 2014.

Previous to 2014 on the American River Parkway

1. The Invasive Plant Management Plan (IPMP) was initiated in the early 2000's and has since effectively minimized all populations of the highly flammable giant reed, Spanish broom, pampas grass over the entire American River Parkway, and (in pilot project areas) yellow star thistle. This project is being maintained on an annual basis to control these flammable weed species.

2. Sacramento Regional Conservation Corps removed ladder fuels in the wildland urban interface, defined as within 100 feet of private property lines, on the American River Parkway. (These areas were revisited for maintenance in 2014, as listed below).

American River Parkway 2014

1. Public and maintenance roadways were limbed up to allow adequate emergency vehicle clearance in the River Bend and Sunrise Areas. Maintaining roadway clearance through tree limbing should occur every 4-6 years.

2. Fire fuel reduction within 100 feet of private property lines (including limbing up trees, removing vines, and removing dead wood) was maintained at Fair Oaks Bluff, Lower Sunrise, Sailor Bar and Rossmoor Bar. This was a maintenance effort for a portion of a larger area that was initially treated in 2010. Maintaining fire fuel reduction areas along private property lines should occur every 4-6 years.

3. A firebreak system was initiated along existing maintenance roads in the Woodlake and Cal Expo areas, by mowing 10 feet on either side of existing roads (to create a 30 foot wide firebreak.) These mowed firebreaks should continue to be maintained on an annual basis.

4. The Woodlake and Cal Expo fire road system was mapped and labeled with signs for City of Sacramento Fire Department. Signage should be maintained as needed.

5. Fire breaks were disked at Rossmoor Bar and Lower Sunrise as part our routine annual maintenance routine. These fire breaks should continue to be maintained on an annual basis.

6. County ordinance passed limiting places where barbeques and smoking are permitted in American River Parkway.

7. Maintenance roadways at Sailor Bar and Sacramento Bar were limbed up to allow adequate emergency vehicle access.

8. All park fire hydrants mapped, categorized, tested, and painted for high visibility.

9. Access gates to fire roads painted for high visibility.

10. Brush removed from private property fence line at Lower Sunrise and Sailor Bar.

11. Sacramento City Fire conducted training burns in the open fields in the Woodlake and Cal Expo Area of the American River Parkway. Firefighters were trained in wildland fire suppression techniques, which benefited the Parkway by also reducing the flashy fuel loads in these open fields.

12. New firebreak systems are regularly maintained.

13. Passed County ordinances which limit locations of barbeques and combustibles.

14. Goats and sheep brought into the downstream reach (Cal Expo to Discovery), to reduce ladder fuels in forested areas.

Other Regional Park areas

Dry Creek Parkway:

1) Maintenance roadways were limbed up to allow emergency vehicle access. This was a first time treatment for these firebreaks and will continue to be maintained.

2) A prescribed burn was conducted in the open fields on either side of Q Street, as part of an annual maintenance routine. Fuels reduction in these fields, through burning or through an alternative measure should continue each year.

3) Mowed fire breaks were maintained along paved bike trail, as part of an annual maintenance routine. These fire breaks should continue to be maintained on an annual basis.

4) In fire break areas, trees were limbed up to allow mowing under trees and to reduce risk of ground to crown fires. This was a first time treatment for these firebreaks. Maintaining the firebreaks through tree limbing should occur every 4-6 year.

Mather Park:

1) Firebreaks behind homes and along roadways were mowed as part of our annual maintenance routine. These fire breaks should continue to be maintained on an annual basis

Indian Stone Corral:

1) In 2014: KD Goat Ranch brought 250 goats for 48 days to reduce flashy fuel cover. Goats grazed from late June to early August. Staff is very pleased that the treatment achieved the desired results, with minimal damage to the oak trees. Fuels reduction, through grazing or, through an alternative measure, should continue every one to three years.

2) Goats returned in early summer 2015.

Rollingwood Open Space:

1) In 2011, and in 2014: Fire fuel reduction within 100 feet of private property lines (including limbing up trees, removing vines, and removing dead wood) was maintained along the western section of the Rollingwood Open Space. This was a maintenance effort on a portion of a larger area that was initially treated in 2010. Maintaining these fire fuel reduction areas should occur every 4-6 years.

Coordinate with the County and State to Create defensible space to protect vital infrastructure located in the American River Parkway from wildfires (from 2005 Plan)

Lead jurisdiction: City of Sacramento

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Ongoing. The City of Sacramento Fire Department and City Emergency Services are working with the Sacramento County Parks Department who oversees the American River Parkway. The County Parks Department is currently controlling vegetation growth surrounding Sacramento Municipal Utility District (SMUD), Pacific Gas & Electric (PG&E) and WAPA transmission lines that traverse the parkway.

Fuel Reduction and Modification

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort has been implemented and is ongoing. The program continues to reduce risk and provides for loss avoidance.

Wildfire Prevention Outreach

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort has been implemented and is ongoing. The program continues to reduce risk and provides for loss avoidance.

Wildfire Hazard Identification

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort has been implemented and is ongoing. The program continues to reduce risk and provides for loss avoidance.

Arson Prevention & Control Outreach

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort has been implemented and is ongoing. The program continues to reduce risk and provides for loss avoidance.

Ignition Resistant Building Construction Upgrades

Lead jurisdiction: City of Folsom

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This effort has been implemented and is ongoing. The program continues to reduce risk and provides for loss avoidance.

Reduction of Fire Hazard SRCSD Bufferlands

Lead jurisdiction: Sacramento Regional County Sanitation District

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Annually by the end May, Regional San uses a combination of mowing and disking to establish firebreaks on the Bufferlands as a fire control measure. The firebreak widths vary from 30-60 feet depending on the habitat types and fire risks.

Twin Rivers School District Mitigation Actions

Reduce Risk to Flooding of Northern Area Schools

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This project has not been started and is not being carried forward.

New drainage plans to sites within the flood areas including, site drainage, storm drain upgrades and re-grading fields to shed water (on-site) away from buildings.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The District intends to begin work with civil engineers to begin design and planning to engage in this work in the 2017/18 school year. The current District is a culmination of five smaller districts that incorporated in 2008, therefore, paper records are difficult to trace, but there is evidence of damage in the surrounding communities that prove difficulties during heavy storms and rains.

Work with City/County/Water departments to create defensible spaces at sites where nearby creeks are prone to flooding. Build-up earthen berms (off-site) to shed water away from critically located schools.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Although this cooperative effort has not begun, the District's intent is to reach out to other agencies this year, 2016/17. The District will need to begin searching for funding for this work. The current District is a culmination of five smaller districts that incorporated in 2008, therefore paper records are difficult to trace. However, there is evidence of damage in the surrounding communities that prove difficulties during heavy storms and rains.

Update the Emergency Preparedness Plan and the Emergency Operations Plan so that in event of emergency or disastrous event, personnel and procedures are in place and streamlined. This will include purchase of new equipment not reliant on typical system power; including communications equipment, emergency housing and supplies.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The EPP and EOP have been updated and procedures are being developed. The Risk Manager will be purchasing new equipment upon receipt of specific funding. A portion of the plan; communications within school sites, is being upgrading during this 2016/17 school year. This plan is critical to the safety of the District.

Working with the Department of the State Architect (DSA) on Earthquake Retrofit Plan on all sites.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The District intends to contact DSA for this in the

2016/17 school year, after current projects start. It is anticipated that funding may become available to proceed with improvements.

Revise and update district-wide Storm Water Prevention Plan

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): In progress. Each project has to have an independent SWPP, but the District is developing standards for all new construction

Create email notification system for families for emergency situations.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The District has an Emergency Notification System for emergencies, which is continuously updated. As funding allows, the District will update the system to better serve the school sites and community.

Incorporate new rules for M&O department to keep drains clear, trees trimmed and vegetation removed to minimize impact during heavy rains.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The M&O department has initiated this work as part of the Preventative Maintenance Plan and has begun the work for the 2016 season. As funding allows, the District will continue this as part of the bi-yearly preventative plan.

Create defensible perimeter space – for fire areas. Trees trimmed and vegetation removed to minimize impact during fire season.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The M&O department has initiated this work as part of the Preventative Maintenance Plan and has begun the work for the 2016 season. As funding allows, the District will continue this as part of the bi-yearly preventative plan.

Updating Evacuation Plans.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): Evacuation plans have been updated at all of the sites.

Updating District Policy for new Construction.

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): New standards for construction for were completed however, as no new construction was considered for this year or next, specific policy for flood areas was not completed. The District intends to add raised foundations, installation of earthen berms and critical drainage/water retention in those areas that are susceptible. The current District is a culmination of five

smaller districts that incorporated in 2008, therefore paper records are difficult to trace. However, there is evidence of damage in the surrounding communities that prove difficulties during heavy storms and rains.

Updating Evacuation Plans for Excessive Heat

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The District has upgraded Heating, Ventilation, and Air Conditioning (HVAC) systems in three sites and continues to do so as funds become available. This District has also included HVAC systems continuous service and eventual replacement in the Preventative Maintenance Plan. While there are still sites pending new systems, the upgrades will continue as funding allows.

Updating Evacuation Plans for Streambank Erosion

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): This item is being worked on with the guidance of civil engineers and geotechnical professionals. The District intends to have this completed this year; 2016/17, if funding becomes available.

Updating Evacuation Plans for Fog

Progress to Date (Consider: Was the project implemented – why or why not? Did the project reduce risks? Can you provide evidence of loss avoidance?): The District has begun installing parking lot lighting in new parking lots that will help as guidance in instances of dense fog. While dense fog has been less of a problem in the past year, the District still intends to implement an "Alert Line" on the District Website (similar to Kern) that will notify families of dense fog advisories. We cannot provide evidence of loss avoidance as there are no records of previous incidents.

Chapter 3 Planning Process

Requirements §201.6(b) and §201.6(c)(1): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and

3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Sacramento County recognized the need and importance of the update process for their 2011 Local Hazard Mitigation Plan (LHMP) and initiated its development. After receiving a grant from the Federal Emergency Management Agency (FEMA), which served as the primary funding source for this plan, the County contracted with Foster Morrison Consulting, Ltd. (Foster Morrison) to facilitate and develop the plan. Jeanine Foster, a professional planner with Foster Morrison, was the project manager and Community Rating System (CRS) lead in charge of overseeing the planning process and the development of this LHMP update. Chris Morrison, also a professional planner with Foster Morrison, was the lead planner for the development of this update. The Foster Morrison's team's role was to:

- Assist in establishing the Hazard Mitigation Planning Committee (HMPC) as defined by the Disaster Mitigation Act (DMA);
- Meet the DMA requirements as established by federal regulations and following FEMA's planning guidance;
- Support objectives under the NFIPs CRS and the Flood Mitigation Assistance (FMA) program;
- Facilitate the entire planning process;
- Identify the data requirements that HMPC participants could provide and conduct the research and documentation necessary to augment that data;
- Assist in facilitating the public input process;
- Produce the draft and final plan documents; and
- Coordinate with the California Office of Emergency Services (Cal OES) and FEMA Region IX plan reviews.

3.1 Local Government Participation

Sacramento County and the City of Sacramento, as the two participating NFIP CRS communities, the other six incorporated communities, and participating special districts made a commitment to this 2016 LHMP Update, as participating jurisdictions. The DMA planning regulations and guidance stress that each local government (participating jurisdiction) seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC;
- Detail where within the planning area the risk differs from that facing the entire area;
- Identify potential mitigation actions; and
- Formally adopt the plan.

For the Sacramento County Planning Area's HMPC, "participation" meant the following:

- Providing facilities for meetings;
- Providing printed materials and refreshments for meeting attendees;
- Attending and participating in the HMPC meetings;
- Completing and returning the Data Collection Worksheets;
- Collecting and providing other requested data (as available);
- Coordinating information sharing between internal and external agencies;
- Managing administrative details;
- Making decisions on plan process and content;
- Identifying mitigation actions for the plan;
- Reviewing and providing comments on plan drafts; including annexes
- Providing two (2) hardcopy Draft documents of 2000+ pages for public review;
- Informing the public, local officials, and other interested stakeholders about the planning process and providing opportunity for them to comment on the plan;
- Coordinating, and participating in the public input process; and
- Coordinating the formal adoption of the plan by the governing boards.

The County and all jurisdictions with annexes to this plan seeking FEMA approval met all of these participation requirements. In most cases one or more representatives for each jurisdiction attended the HMPC meetings described in Table 3-4 and also brought together a local planning team to help collect data, identify mitigation actions and implementation strategies, and review and provide data on plan drafts. Appendix A provides additional information and documentation of the planning process.

In order to promote the integration of CRS into this planning process, the HMPC representatives from the County and City of Sacramento were selected based on their areas of expertise relative to the CRS mitigation categories as detailed in Table 3-1 and Table 3-2. In addition, the Sacramento County Community Development Department, Planning and Environmental Review Division, Long Range Planning Section (Todd Taylor, Associate Planner and Mike Winter, Senior Planner) and the City of Sacramento, Community Development Department (Remi Mendoza, Associate Planner, Long Term Planning) in association with planners from many of the other cities and Foster Morrison Planners were involved in the development of this Plan Update through attendance at meetings, coordination, providing data, future land use planning support, and help with meeting facilitation. In addition to attending meetings, providing draft text for inclusion in the plan, reviewing plan documents, and coordinating input from other departments and stakeholders, Sacramento County and City of Sacramento planners also provided information on development since the last plan, mapping, text, and details on future development areas, input on current mitigation capabilities, and new and in-progress modifications to the General Plan and associated documents specific to Sacramento County's and City of Sacramento's floodplain management provisions for regulating to the 200-year level of flood protection.

Table 3-1 Sacramento County LHMP Staff Capability with Six Mitigation Categories

Jurisdiction/Departments	Prevention	Property Protection	Natural Resource Protection	Emergency Services	Structural Flood Control Projects	Public Information	Other
Sacramento County							
Community Development Department/Planning and Environmental Review Division, Long Range Planning Section– Todd Taylor	X	X	X			X	X
Emergency Services – Steve Catalme/Roger Ince	X	X	X	X	X	X	X
Department of Water Resources, Flood Management and Engineering/Sacramento County Water Agency-George Booth	X	X	X	X	X	X	X
Department of Water Resources, Flood Management and Engineering – Celine Livengood	X	X	X			X	X
County Sustainability Manager, Department of Waste Management and Recycling – Judy Robinson	X					X	X
Public Information – Diane Margetts/Mathew Robinson	X					X	X
City of Sacramento							
Community Development Department/Long Term Planning – Remi Mendoza	X	X	X			X	X
*Emergency Services – Jason Sirney	X	X	X	X	X	X	X
Department of Utilities – Floodplain Management/Engineering – Kelly Sherfey	X	X	X	X	X	X	X
Public Information – Rhea Serran	X					X	X

Specific individuals representing Sacramento County and City of Sacramento (CRS communities) departments and other jurisdictions participating in this LHMP Update were actively involved throughout the Plan Update process as identified in Appendix A in the sign-in sheets for the meetings and as evident through the data, information and input provided by HMPC representatives to the development of this LHMP Update. This Chapter 3 and Appendix A provides additional information and documentation of the planning process and participants to this Plan Update, including members of the steering and working committees, comprising the HMPC.

3.2 The 10-Step Planning Process

Foster Morrison established the planning process for updating the Sacramento County LHMP using the DMA planning requirements and FEMA's associated guidance. This guidance is structured around a four-phase process:

1. Organize Resources;
2. Assess Risks;
3. Develop the Mitigation Plan; and
4. Implement the Plan and Monitor Progress.

Into this process, Foster Morrison integrated a more detailed 10-step planning process used for FEMA's CRS and FMA programs. Thus, the modified 10-step process used for this plan meets the requirements of six major programs: FEMA's Hazard Mitigation Grant Program (HMGP); Pre-Disaster Mitigation (PDM) program; CRS program; FMA Program; Severe Repetitive Loss (SRL) program; and new flood control projects authorized by the U.S. Army Corps of Engineers (USACE).

Table 3-2 shows how the modified 10-step process fits into FEMA's four-phase process. The sections that follow describe each planning step in more detail.

Table 3-2 Mitigation Planning Processes Used to Develop the Sacramento County Local Hazard Mitigation Plan

DMA Process	Modified CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan

This LHMP update involved a comprehensive review and update of each section of the 2011 plan and includes an assessment of the success of the participating communities in evaluating, monitoring and implementing the mitigation strategy outlined in the initial plan, as previously described in more detail in Chapter 2 and throughout Chapter 4.

The process followed to update the plan is detailed in the above table and the sections that follow and is in conformance with the latest DMA planning guidance and the CRS 2013 Coordinator's Manual. As part of this Plan Update, all sections of the plan were reviewed and updated to reflect new data, processes,

participating jurisdictions, and resulting mitigation strategies. Only the information and data still valid from the 2011 plan was carried forward as applicable into this LHMP update.

3.2.1. Phase 1: Organize Resources

Planning Step 1: Organize the Planning Effort

With Sacramento County's, the City of Sacramento's and other participating jurisdictions' commitment to participate in the DMA planning process and the CRS program, Foster Morrison worked with the County's Department of Water Resources (County DWR), as overall project lead, to establish the framework and organization for development of the plan. An initial meeting was held with key community representatives to discuss the organizational and process aspects of this Plan Update process. At the beginning of this planning process, a resolution was passed by Sacramento County establishing the planning process and the HMPC. These executed resolution is included in Appendix A.

The initial kick-off meetings were held on April 5 and 6, 2015. To better facilitate the planning process, for each planned meeting, duplicate meetings were held in the northern part of the County (City of Sacramento) and the southern part of the County in Elk Grove or Hood/Courtland. Invitations to these kickoff meetings were extended to key county departments, the seven incorporated communities, special districts located within the planning area, as well as to other federal, state, and local stakeholders, including representatives from the public, that might have an interest in participating in the planning process. Representatives from participating jurisdictions and HMPC members to the 2011 plan were used as a starting point for the invite list, with additional invitations extended as appropriate throughout the planning process. The list of initial invitees is included in Appendix A.

The HMPC was established as a result of these initial meetings, as well as through interest generated through the initial public meetings and outreach conducted for this project as detailed later in this section. The HMPC, comprising key county, city, special district, and other government and stakeholder representatives and the public, developed the plan with leadership from the County DWR and facilitation by Foster Morrison. Each participating jurisdiction seeking FEMA approval of the plan had representation on the HMPC. The HMPC was comprised of members of the steering committee established for this process (as discussed further in this section) as well as other representatives from key county, city, and other government agencies, key stakeholders, and the public, with an interest in hazard mitigation. The following participated on the HMPC:

Sacramento County

- Agriculture Department
- Airports
- Assessor
- Community Development, Planning and Environmental Review
- Emergency Services
- Geographic Information Systems
- Health and Human Services, Public Health
- Fire
- Planning Department

- Regional Parks
- Sheriff
- Sustainability
- Transportation
- Waste Management and Recycling
- Water Quality
- Water Resources

Participating Cities

- City of Citrus Heights
- City of Elk Grove
- City of Folsom
- City of Galt
- City of Isleton
- City of Rancho Cordova
- City of Sacramento

Other Government and Stakeholder Representatives:

- Brannan Andrus Levee Maintenance District* and Reclamation Districts 317, 407, 2067
- California Department of Water Resources (Cal DWR)
- Consumnes Fire*
- Environmental Coalition for Water Justice
- Folsom Fire Safe Council
- Herald Fire Protection District
- Golden State Water Company
- Los Rios Community College*
- National Weather Service
- Reclamation District 3*
- Reclamation District 341*
- Reclamation District 369*
- Reclamation District 551*
- Reclamation District 554*
- Reclamation District 556*
- Reclamation District 563*
- Reclamation District 755
- Reclamation District 800*
- Reclamation District 813
- Reclamation District 1000*
- Reclamation District 1002*
- Reclamation District 1601*
- Reclamation District 2010
- Reclamation District 2111*
- Sacramento State
- Sacramento Metro Air Quality Management District
- Sacramento Metro Fire District*
- Sacramento Municipal Utility District
- State DWR MA9
- Southgate Park and Rec District*

- Sacramento County Regional Sanitation District*
- Sacramento Area Sewer District*
- Twin Rivers Unified School District*
- UC Davis, Capital Region Climate Readiness Collaborative

*Indicates participating jurisdiction seeking FEMA approval of this plan

Citizens

- Alan Vail, VCS Consulting
- Amber Mace
- Bill Virvitch
- Charlie Moore
- Chris Ferrerai, GEI Consultants
- Colin Bailey
- Connie Gutowsky
- Dan Henderson, ESRI
- Emmerson Zapata
- Frederick Gayle
- George Whitney
- Heinz Lorza Saberig
- Homer Herod
- Joyce Dibble
- Katherine Teteak
- Karla Tejada
- Kirkland Stout
- Lance Armstrong
- Maria Lopez Lee
- Meg Arnold, Valley Vision
- Mike Miramazehere
- Tim Franusich
- Paul Franusich
- Peter Stone
- Richard Coombs, Nepenthe/Campus Commons, Insurance, Legal, & Safety Committee
- Robert Mead
- Ross Dibble
- Russ Ekman
- Sami Nall
- Tim Hodgson, Courtland Town Association
- Walt Hoppe
- Warren Teateak

A list of participating HMPC representatives for each participating jurisdiction is included in Appendix A. The above list of HMPC members also includes several other government and stakeholder representatives that were invited to participate and contributed to the planning process. This list includes all HMPC members that attended one or more HMPC meetings detailed in Table 3-4. In addition to providing representation on the HMPC and Steering Committee, participating jurisdictions formulated their own internal planning teams to collect and provide requested data and to conduct timely reviews of the draft documents as further detailed in each annex to this plan and as detailed in the list of HMPC representatives for Sacramento County.

Steering Committee

The HMPC includes both a Steering Committee and the larger working group. The Steering Committee is the policy body which has primary input and decides what is included in the plan document. The larger working group provides data and information to the Steering Committee for consideration. The Steering Committee is comprised of a key representative from the County and each incorporated community, and other agency and public representatives. The non-local government members of the Steering Committee (citizens and other outside stakeholders) represent more than 50% representation of the committee. See Table 3-3 and Appendix A for details on the makeup of the Steering Committee.

Table 3-3 Sacramento County LHMP Steering Committee

Community/Representative	Department/Organization	Citizen	Stakeholder	# Meetings
Sacramento County				
George Booth	Department of Water Resources		X	4
City of Citrus Heights				
Kevin Becker	Department of Public Works/Principal Engineer		X	2
City of Elk Grove				
Connie Nelson			X	5
City of Folsom				
Allan Laca	Department of Public Works/Sr. Civil Engineer		X	4
City of Galt				
Bill Forrest	Department of Public Works/Sr. Civil Engineer		X	4
Town of Isleton				
Romi Balbini	Director of Public Works		X	4
City of Rancho Cordova				
Allen Quynn	Department of Public Works/Assoc. Civil Engineer		X	5
City of Sacramento				
Kelly Sherfey	Department of Utilities, Floodplain Management/Engineering		X	5
Permanent Public Stakeholders				
Robert Mead	Resident	X		5
Chris Ferrari	Resident/GEI	X		4
Walt Hoppe	Resident	X		4
Meg Arnold	Valley Vision	X	X	3
Alan Vail	Resident/VCS Consulting	X		3
Tim Hodgson	Resident	X		3

Community/Representative	Department/Organization	Citizen	Stakeholder	# Meetings
Maria Lorenzo-Lee	Resident	X	X	3
Richard Coombs	Campus Commons/Nepenthe Insurance, Legal & Safety	X	X	4
Dan Henderson	Esri	X	X	2
Mike Miramazehere	GEI Consultants	X	X	2
Connie Gutowsky	Resident	X	X	2
Other Public Stakeholders:				
Sami Nall	Cal DWR	X	X	1
Kirkland Stout	Sacramento State	X		1
Amber Mace	UC Davis	X	X	1
Kathleen Ave	Cap Region Climate Readiness/SMUD	X	X	1
Bill Virvitch	Resident	X		1
Ross Dibble	Resident	X		1
Joyce Dibble	Resident	X		1
Pam Hodgson	Resident	X		1
Tim Franesich	Resident	X		1
Paul Franusich	Resident	X		1
Homer Herod	Resident	X		1
Bob Berger	Resident	X		1
Peter Stone	Resident	X		1
Heinz Lorza Saberig	Resident	X		1
Emmerson Zapata	Resident	X		1
Lance Armstrong	Resident	X		1
Charlie Moore	Resident	X		1
Karla Tejada	Golden State Western Company	X	X	1
George Whitney	Resident	X		1
Colin Bailey	Env. Justice Coalition for Water	X	X	1
Frederick Gayle	Resident, Surburan Water District	X	X	1
Russ Ekman	State DWR MA09	X	X	1

Table 3-3 demonstrates the Sacramento County HMPC/Steering Committee members' expertise in the six mitigation categories (Prevention, Property Protection, Emergency Services, Natural Resource Protection, Structural Flood Control Projects, and Public Information) The Sacramento County and City of Sacramento (as the CRS communities) staff responsible for community land use and comprehensive planning for the County were active participants on the HMPC and provided data and information to support development of the plan. Specifically, this includes the Planning Services Divisions of the Community Development Departments from Sacramento County and the City of Sacramento as previously described. The support

of staff from all participating jurisdictions were called upon to collect and provide requested data and to conduct timely reviews of the draft documents. Note that the above list of HMPC and steering committee members also includes citizens and several other government and stakeholder representatives that contributed to the planning process. Specific participants from these other agencies are identified above and, with supporting documentation included in Appendix A.

Meetings

The planning process officially began with a kick-off meeting held in both the northern portion of the City of Sacramento in the Natomas area, and in the Southern part of the County in Elk Grove, on April 5 & 6, 2016, followed by public kick-off meeting held the same day as each of the two meetings at 6:00 pm at the same locations. The meetings covered the scope of work and an introduction to the DMA, CRS, and FMA requirements. During the HMPC meetings, participants were provided with data collection worksheets to facilitate the collection of information necessary to support development of the plan. Using FEMA guidance, these worksheets were designed to capture information on past hazard events, identify hazards of concern to each of the participating jurisdictions, quantify values at risk to identified hazards, inventory existing capabilities, record possible mitigation actions, and to capture information on the status of mitigation action items from the 2011 plan. A copy of the worksheets for this project are included in Appendix A. The County and each jurisdiction seeking FEMA approval of this Plan Update completed and returned the worksheets to Foster Morrison for incorporation into the plan document.

During the planning process, the HMPC communicated through face-to-face meetings, email, telephone conversations, file transfer protocol (ftp) and Dropbox websites, and through a County developed webpage dedicated to the plan development process. This later website was developed to provide information to the HMPC, the public and all other stakeholders on the LHMP process. Draft documents were also posted on these websites so that the HMPC members and the public could easily access and review them. The LHMP website can be accessed at:

- Sacramento County – http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Committee-2016-Plan-Update.aspx

The HMPC met formally five times during the planning period (April 2016 – November 2016) which adequately covers the four phases of DMA and the 10-Step CRS planning process. The formal meetings held and topics discussed are described in Table 3-4. Agendas and sign-in sheets for each of the meetings are included in Appendix A.

In addition to the five HMPC meetings, an additional HMPC/community meeting was held the evening of June 21, 2016 as an extension of HMPC Meeting #2. This meeting was held in the Delta area at the Courtland Fire House to provide a local forum for both the participating Delta RDs and the community members to participate in the LHMP Update process. This Delta-focused meeting combined the elements of both the kickoff meeting and HMPC #2 for this LHMP Update process and also included information on the Emergency Action Planning being done to address flood emergencies in the Delta area. Similarly, an additional HMPC meeting was held in the Delta area on September 9, 2016 as an extension of HMPC #3 and #4, the mitigation strategy meetings, with a focus on Delta participants. These meetings are also included in the table below.

Table 3-4 HMPC Meetings

Meeting Type	Meeting Topic	Meeting Date(s)	Meeting Location(s)
HMPC #1 Kick-off Meeting	1) Introduction to DMA and the planning process 2) Overview of current LHMP; 3) Organize Resources (CRS Steps 1,2,&3): the role of the HMPC, planning for public involvement, coordinating with other agencies/stakeholders 4) Introduction to Hazard Identification	4/5 & 6, 2016	South Natomas Community Center, Sacramento and Laguna Town Hall, Elk Grove
HMPC #2	1) Risk assessment overview and work session -CRS Step 4: Assess the Hazard -CRS Step 5: Assess the Problem	6/21 & 22, 2016	Bannon Creek Elementary School, Sacramento and Laguna High School, Elk Grove
Delta Area Meeting	1) Introduction to DMA and the planning process 2) Risk assessment overview and work session 3) Emergency Action Planning Status	6/21, 2016	Courtland Fire House, Hood/Courtland
HMPC #3	1) Review of risk assessment summary 2) Review and update of mitigation goals -CRS Step 6: Set Goals -CRS Step 7: Review possible activities	7/12, 2016	Bannon Creek Elementary School, Sacramento and Laguna High School, Elk Grove
HMPC #4	1) Review of mitigation alternatives 2) Review and update of mitigation actions from the 2010 plan 3) Identify updated list of mitigation actions by hazard 4) Review of mitigation selection criteria 5) Update and prioritize mitigation actions 6) Mitigation Action Strategy Implementation and Draft Action Development -CRS Step 7: Review possible activities -CRS Step 8: Draft an Action Plan	7/13, 2016	Bannon Creek Elementary School, Sacramento and Laguna High School, Elk Grove
Delta Area Meeting	1) Review of RD participation in this LHMP Update Process 2) Review and discussion of hazard risks and vulnerabilities in the Delta area 3) Review and discussion of potential mitigation alternatives 4) Overview and development of RD annexes	9/9, 2016	Courtland Fire House, Hood/Courtland
HMPC #5	1) Review of final HMPC, jurisdictional and public comments and input to plan 2) Review and documentation of changed conditions, vulnerabilities and mitigation priorities 3) CRS Step 8: Draft an Action Plan 4) CRS Step 9 & 10: Plan maintenance and Implementation Procedures	9/16 & 17, 2016	South Natomas Community Center, Sacramento and Courtland Fire House, Hood/Courtland

Planning Step 2: Involve the Public

Up-front coordination discussions with the Sacramento County Department of Water Resources, City of Sacramento Utilities Department, respective planning staff and floodplain managers established the initial plan for public involvement. Public involvement activities for this Plan Update included press releases,

social media communications, stakeholder and public meetings, development of an LHMP webpage and associated website postings, the collection of public and stakeholder comments on the draft plan through a variety of mechanisms, and other public outreach activities as further described below, as well as specific targeted outreach to different groups of people and other agencies throughout the county and incorporated municipalities. Information provided to the public included an overview of the mitigation status and successes resulting from implementation of the 2011 plan as well as information on the processes, new risk assessment data, and proposed mitigation strategies for this Plan Update. As part of the plan development process, a Public Involvement Strategy was also developed to ensure a meaningful public process and to focus efforts on maximizing CRS credits for public outreach. At the planning team kick-off meetings, the HMPC discussed additional strategies for public involvement and agreed to an approach using established public information mechanisms and resources within the community.

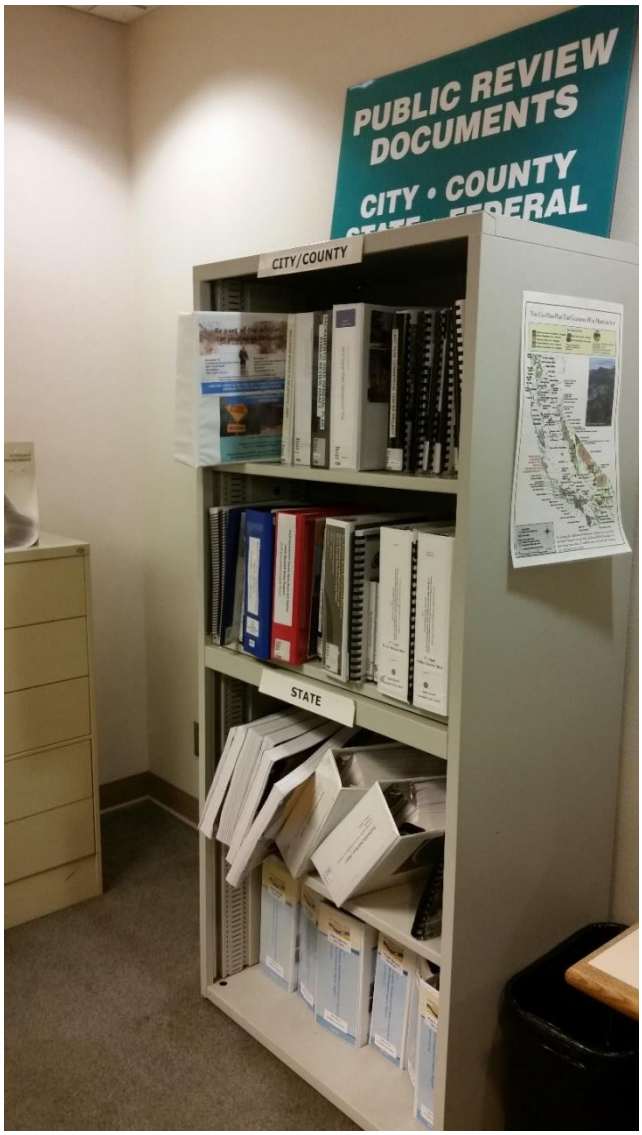
Early Public Meetings

Public outreach for this Plan Update began at the beginning of the plan development process with an advertisement placed in the local newspaper and other local outreach methods to inform the public of the purpose of the DMA and the hazard mitigation planning process for the Sacramento County Planning Area and an advertisement placed to invite the public to early public meetings held in duplicate in the northern portion of the City of Sacramento and the southern portion of the County to kick-off the project on April 5 & 6, 2016 at the South Natomas Community Center in Sacramento and Laguna Town Hall in Elk Grove. These meeting locations were selected for easy access for all area residents.

Final Public Meetings

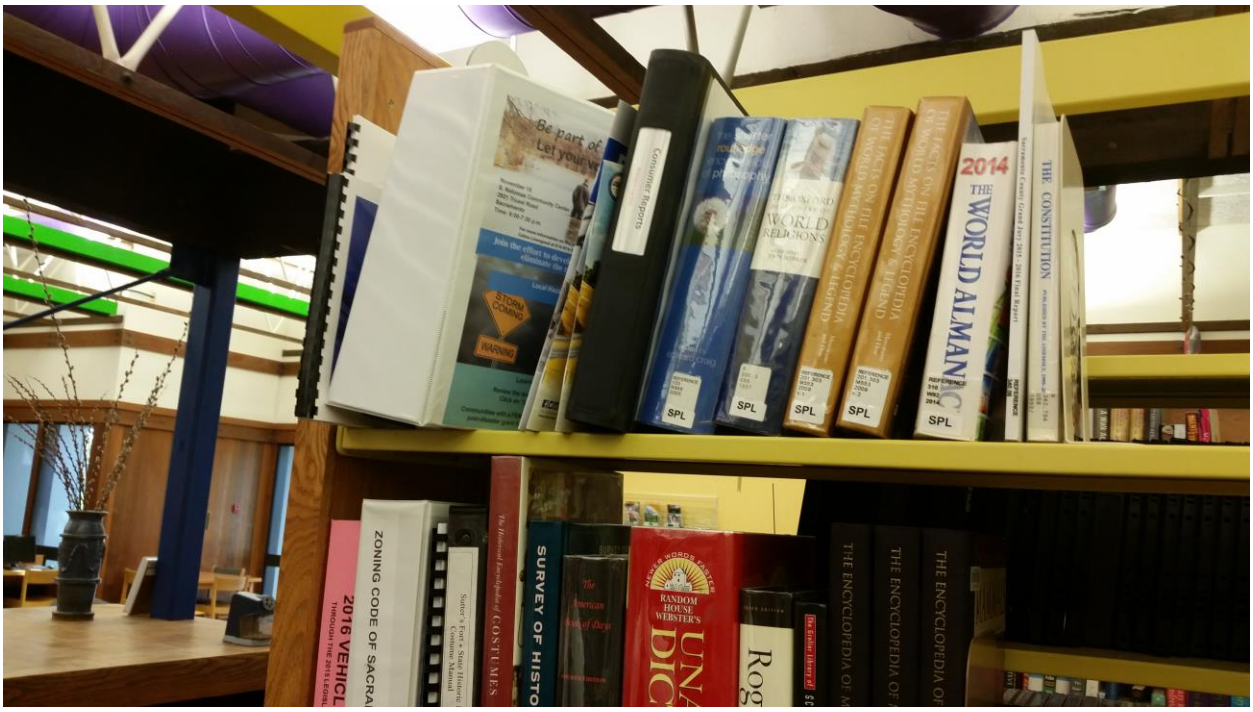
The first draft of the plan was provided to the HMPC in September of 2016, with a public review draft provided in October of 2016. Two public meetings were held on November 15 & 16, 2016 to present the draft LHMP and to collect public comments on the plan prior to finalization and submittal to Cal OES/FEMA. Public meetings were advertised in a variety of ways to maximize outreach efforts to both targeted groups and to the public at large and included an advertisement in two local newspapers inviting the public to attend either the formal public meetings or the planning team meetings at their convenience. The advertisement in the local newspapers included information on the date, location and time of the meeting, where the draft plan could be accessed in the community, and how to provide comments on the draft plan. Similar to the early public meetings, the two public meetings on the draft plan were held in the northern and southern sides of the County to facilitate participation by all Planning Area residents. In addition to a copy of the draft plan being placed on the County website in advance of these meetings, hard copies of the draft of the plan were made available to interested parties at two Sacramento County Public Libraries: The Main Sacramento County library and the library in Elk Grove.

Figure 3-1 Public Outreach at Main Sacramento County Library



Source: Sacramento County

Figure 3-2 Public Outreach at Fair Oaks Library



Source: Sacramento County

Documentation to support the final public meeting can be found in Appendix A. In addition to advertisement for public participation, notices of meetings were sent directly to all persons on the HMPC contact list and also to other agency and key stakeholders with an interest in the Sacramento County Planning Area. The majority of these people reside in Sacramento County or in surrounding communities. Because this is a multi-jurisdictional planning effort, all public outreach activities for this Plan Update were conducted in cooperation with and on behalf of Sacramento County and the City of Sacramento, as the two CRS communities, the other incorporated communities, and all participating jurisdictions. The formal public meetings for this project are summarized in Table 3-5. As mentioned above, the Delta meeting held on June 21, 2016 is also included in the list of public meetings as it was a combined HMPC/Public meeting specific to the Delta community.

Table 3-5 Schedule of Public and Stakeholder Meetings

Meeting Type	Meeting Topic	Meeting Date	Meeting Locations
Early Public Meetings	1) Intro to DMA, CRS and mitigation planning 2) 2016 LHMP Update Process	4/5 & 6, 2016	South Natomas Community Center, Sacramento and Laguna Town Hall, Elk Grove
Delta HMPC/Community Meeting	1) Introduction to DMA and the planning process 2) Risk assessment overview and work session 3) Emergency Action Planning Status	6/21, 2016	Courtland Fire House, Hood/Courtland

Meeting Type	Meeting Topic	Meeting Date	Meeting Locations
Final Public Meetings	1)Presentation of Draft LHMP and solicitation of public and stakeholder comments	10/ 15 & 16, 2016	Courtland Fire House, Hood/Courtland and Laguna Creek High School, Elk Grove

Where appropriate, stakeholder and public comments and recommendations were incorporated into the final plan throughout the plan development process, including the sections that address mitigation goals and strategies. No formal comments were provided on the draft plan. All press releases, newspaper advertisements and articles, website postings, and public outreach efforts are on file with the Sacramento County DWR and City of Sacramento Department of Utilities and are included in Appendix A.

Other Public Outreach Efforts

Beyond these more formal public involvement activities, the update process also included the following public outreach activities included in Table 3-6 which are further documented and described in Appendix A. The public outreach activities described here were conducted with participation from and on behalf of all jurisdictions participating in this plan, including the CRS communities of Sacramento County and the City of Sacramento.

Table 3-6 Other Public Outreach Efforts

Effort	Description
Public Outreach Flyer	An initial public outreach flyer was developed for use at all public events and meetings. A second public outreach flyer was developed for public outreach on the draft plan and prior to final HMPC and public meetings. These flyers are referenced below in these other public outreach activities.
Article in Newspaper	An article was published in the Elk Grove Citizen after the Kickoff meetings to make citizens in the County aware of the hazard mitigation update process and invite participation and attendance at upcoming HMPC and Public Meetings
Survey	A public survey was posted on the County's website at the beginning of the planning process inviting the public to comment on how prepared both the County and individuals are for a possible natural disaster, including flood events
Sacramento County LHMP Update Website	Information on the Plan update process and location of documents, and final HMPC and public meeting locations were posted on the County website. Links to the County website were placed on websites from the other incorporated communities. This website also included a link to the Survey.
Delta Area Community & HMPC Meeting	This meeting was held in the Delta area at the Courtland Fire House to provide a local forum for both the participating Delta RDs and the community members to participate in the LHMP Update process.
SAFCA Assessment Meetings – Joe Mims Jr. Comm. Center, May 11, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, representatives of the American River Flood Control District, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.

Effort	Description
SAFCA Assessment Meetings – George Sim Comm. Center, May 11, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – Johnson Comm. Center, May 12, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, representatives of the American River Flood Control District, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – South Natomas Comm. Center, May 12, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, RD 1000, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – Heron School, May 17, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, RD 1000, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – Clunie Comm. Center, May 17, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, American River Flood Control District, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – Elks Lodge #6, May 18, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – Samuel Pannell Comm. Center, May 18, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meeting – Sierra 2 Center, May 19, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meeting – Sierra Oaks Elementary School, May 19, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, American River Flood Control District, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
Bay Stone Lake Community Meeting	This meeting was held in the Bay Stone Lake Community area on August 30th, 2016 to discuss mitigation options for area residents in flood prone areas. The meeting started with a discussion of the LHMP Update and mitigation options such as home elevation.
Sacramento County Storm Water Quality Division Exhibit at State of California, Green Fair Event	Sacramento Water Quality Division had an exhibit at the State of California, Department of Technology, Green Fair Event in Rancho Cordova. This meeting targeted state employees. The exhibit included information on the LHMP Update process and how to get involved. The public information flyer was included as a handout.

Effort	Description
Public Outreach at Sacramento County Public Library, Sacramento County Main Library location	The County placed the draft plan in the reference section at the Sacramento County Public Library, Main Library location. Invitations were placed on Facebook, the County website, and as part of the advertisement for public meetings to let the public know that the documents were there for review and input.
Public Outreach at Sacramento County Public Library, Sacramento County Elk Grove Library location	The County placed the draft plan in the reference section at the Sacramento County Public Library, Elk Grove Library location. Invitations were placed on Facebook, the County website, and as part of the advertisement for public meetings to let the public know that the documents were there for review and input.
Supervisor Kennedy's Public Meeting Fern Bacon Middle School, October 27, 2016	A brief overview of the LHMP plan update was given by the Sacramento County Department of Water Resources at this Supervisor's public meeting and the LHMP public information flyer was provided to meeting attendees. This flyer provided information on where and how the Public Review Draft could be reviewed, information on upcoming public meetings on the draft plan, and how to provide comments. County DWR also provided 500 Storm Ready Kits to attendees.
Directed email Outreach to Sacramento Residents	November 2, directed email to Sacramento residents previously showing interest in the LHMP Update process. This email requested a review and comment on the LHMP Public Review Draft and participation in the Hazard Survey.

The draft plan is currently available online on the Sacramento County website at: http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Committee-2016-Plan-Update.aspx. The public outreach activities described here were conducted with participation from and on behalf of all jurisdictions participating in this plan, including the CRS communities of Sacramento County and the City of Sacramento, other incorporated communities, and participating jurisdictions.

Public Outreach Survey

An integral element in hazard mitigation planning is broad public participation. Information provided by residents fosters a better understanding of local hazard concerns and can spawn innovative ideas to reduce impacts of future hazard events. A public opinion survey was accomplished to gather information from Sacramento area residents concerning local hazards. The survey was located on the County's LHMP website throughout most of the planning process and survey participation was promoted through public meetings, program websites, press releases, social media, and other public outreach events as previously described. Following is a summary of survey results.

- 21 individuals took the survey.
- Over half of the survey takers were from the City of Sacramento (11).
- 19 of the 21 people who took the survey were at least somewhat concerned with being impacted by a natural disaster.
- Localized flood, heavy rains, and dam/levee failure were hazards of greatest concern.
- Most survey takers had not experienced a natural disaster.
- Social media, television, and direct mailings were the best choices to reach the public regarding disaster information and making homes more disaster resistant.
- A slight minority of people were located in the floodplain, or in levee protected areas

The survey and survey results are included in Appendix G.

Program for Public Information (PPI) Strategy

As part of their overall flood outreach programs, Sacramento County and the City of Sacramento have in place a Program for Public Information (PPI) strategy designed to maximize credits under CRS Activity 330, Outreach Projects. The objective of CRS credit for a PPI is to provide additional credit for information programs that are designed to meet local needs and that are monitored, evaluated, and revised to improve their effectiveness. The PPI is an ongoing public information effort to design and transmit the messages that the community determines are most important to its flood safety and the protection of its floodplains' natural functions. Program elements include instructing residents on actions they should take before, during and after storm events to mitigate their flood risk. These actions can include being aware of your own flood risk, implementing mitigation options available such as elevating or retrofitting a home, or understanding the benefits of purchasing flood insurance, even if a resident is outside of a federal flood hazard area.

These County and City PPI programs are important to consider in the development and implementation of this LHMP Update to ensure coordination and effectiveness of all public outreach and education efforts in the Sacramento County Planning Area.

Planning Step 3: Coordinate with Other Departments and Agencies

Early in the planning process, the HMPC determined that data collection, mitigation strategy development, and plan approval would be greatly enhanced by inviting other local, state and federal agencies and organizations to participate in the process. Based on their involvement in hazard mitigation planning, their landowner status in the County, and/or their interest as a neighboring jurisdiction, representatives from the following agencies were invited to participate on the HMPC:

- American Red Cross
- American River Flood Control
- Cal DWR
- Cal Fire
- Cal OES
- California Department of Water Resources
- Community Services Districts
- Emergency Services Departments
- Incorporated communities in Sacramento County
- Fire Protect Districts
- Fire Departments
- Fire Safe Alliance
- Flood Control Districts
- National Weather Service
- Neighboring Communities
- Park Districts
- NFIP/CRS Program Coordinators
- Placer County OES
- Reclamation Districts
- Regional Water Authority
- Sewer Districts
- School Districts
- United States Corps of Engineers

- Water Districts

Coordination with key agencies, organizations, and advisory groups throughout the planning process allowed the HMPC to review common problems, development policies, and mitigation strategies as well as identifying any conflicts or inconsistencies with regional mitigation policies, plans, programs and regulations. Coordination involved contacting these agencies through a variety of mechanisms and informing them on how to participate in the Plan Update process and if they had any expertise or assistance they could lend to the planning process or specific mitigation strategies. Coordination with these groups included, holding face-to-face meetings, sending outreach letters or e-mails, some with follow up phone calls; and making phone calls alone to out of area agencies. All of these groups and agencies were solicited asking for their assistance and input, telling them how to become involved in the Plan Update process, and inviting them to HMPC meetings. This coordination with other agencies is documented in Appendix A and includes a summary table of who was contacted, the method of contact, and the purpose. Supporting documentation such as emails and meeting logs are also included.

In addition, as part of the overall stakeholder and agency coordination effort, the HMPC coordinated with and utilized input to the LHMP update from the following agencies:

- American River Flood Control District
- Ascent Environmental
- CAL OES
- CAL FIRE
- California Department of Finance
- California Department of Water Resources
- California Geological Survey
- California State University System
- Central Valley Water Board
- FEMA Region IX
- Library of Congress
- Local Government Commission
- National Oceanic and Atmospheric Association
- National Performance of Dams Program
- National Register of Historic Places
- National Resource Conservation Service
- National Response Center
- National Weather Service, WFO Sacramento
- Sacramento Area Council of Governments
- Sacramento Metropolitan Air Quality District
- Sacramento Municipal Utility District
- UC Davis
- United States Army Corps of Engineers
- United States Bureau of Land Management
- United States Bureau of Reclamation
- United States Department of Agriculture
- United States Farm Service Agency
- United States Forest Service
- United States Geological Survey
- Valley Vision
- Western Regional Climate Center

Several opportunities were provided for the groups listed above to participate in the planning process. At the beginning of the planning process, invitations were extended to many of these groups to actively participate on the HMPC. Specific participants from these groups are detailed in Appendix A. Others assisted in the process by providing data directly as requested in the Data Worksheets or through data contained on their websites or as maintained by their offices. Further as part of the public outreach process, all groups were invited to attend the public meetings and to review and comment on the plan prior to submittal to CAL OES and FEMA. In addition, as part of the review of the draft plan, key agency stakeholders were contacted and their comments specifically solicited as described further in this Section and included in Appendix A.

Other Community Planning Efforts and Hazard Mitigation Activities

Coordination with other community planning efforts is also paramount to the success of this plan. Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. Sacramento County uses a variety of comprehensive planning mechanisms, such as general plans and ordinances, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. The development of this plan incorporated information from the following existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

- CAL FIRE plans
- CAL OES plans
- California Delta Plans
- California Department of Finance demographic documents
- California DWR plans
- Emergency Operations Plans
- FAA Reports
- FEMA mitigation planning documents
- Flood Insurance Studies
- General Plans
- Habitat Conservation Plans
- Levee plans and inventories
- National Weather Service documents
- Stormwater Master Plans
- US Fish and Wildlife reports
- USGS Reports

Specific source documents are referenced at the beginning of each section of Chapter 4 and Appendix B. These and other documents were reviewed and considered, as appropriate, during the collection of data to support Planning Steps 4 and 5, which include the hazard identification, vulnerability assessment, and capability assessment. Data from these plans and ordinances were incorporated into the risk assessment and hazard vulnerability sections of the plan. Where the data from the existing studies and reports is used in this Plan Update, the source document is referenced throughout this Plan Update. The data was also used in determining the capability of the community in being able to implement certain mitigation strategies. Appendix B, References, provides a detailed list of references used in the preparation of this Plan Update.

3.2.2. Phase 2: Assess Risks

Planning Steps 4 and 5: Identify the Hazards and Assess the Risks

Foster Morrison led the HMPC in a research effort to identify, document, and profile all the hazards that have, or could have, an impact the planning area. Starting with the 2011 plan, natural hazards of concern were added, deleted, and modified for this LHMP Update. Data collection worksheets and jurisdictional annexes were developed and used in this effort to aid in determining hazards and vulnerabilities and where the risk varies across the planning area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities.

The HMPC also conducted a capability assessment to review and document the planning area's current capabilities to mitigate risk from and vulnerability to hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the HMPC could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. A more detailed description of the risk assessment process, methodologies, and results are included in Chapter 4 Risk Assessment.

3.2.3. Phase 3: Develop the Mitigation Plan

Planning Steps 6 and 7: Set Goals and Review Possible Activities

Foster Morrison facilitated brainstorming and discussion sessions with the HMPC that described the purpose and process of developing planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Chapter 5 Mitigation Strategy. Additional documentation on the process the HMPC used to develop the goals and strategy is in Appendix C.

Planning Step 8: Draft an Action Plan

Based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, a complete first draft of the plan was developed. This complete draft was provided for HMPC review and comment via a Dropbox web link. Other agencies were invited to comment on this draft as well. HMPC and agency comments were integrated into the second public review draft, which was advertised and distributed to collect public input and comments. The HMPC integrated comments and issues from the public, as appropriate, along with additional internal review comments and produced a final draft for the CAL OES and FEMA Region IX to review and approve, contingent upon final adoption by the governing boards of each participating jurisdiction.

3.2.4. Phase 4: Implement the Plan and Monitor Progress

Planning Step 9: Adopt the Plan

In order to secure buy-in and officially implement the plan, the plan was adopted by the governing boards of each participating jurisdiction using the sample resolution contained in Appendix D.

Planning Step 10: Implement, Evaluate, and Revise the Plan

The true worth of any mitigation plan is in the effectiveness of its implementation. Up to this point in the planning process, all of the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Each recommended action includes key descriptors, such as a lead manager and possible funding sources, to help initiate implementation. An overall implementation strategy is described in Chapter 7 Plan Implementation and Maintenance.

Finally, there are numerous organizations within the Sacramento County Planning Area whose goals and interests interface with hazard mitigation. Coordination with these other planning efforts, as addressed in Planning Step 3, is paramount to the implementation and ongoing success of this plan and mitigation in Sacramento County and is addressed further in Chapter 7.

Implementation and Maintenance Process: 2011

The 2011 Sacramento County, California Local Hazard Mitigation Plan Update included a process for plan maintenance and implementation of the mitigation strategy as well as formal updates to the plan document. The 2011 process called for annual reviews with the status of mitigation strategy implementation documented in an annual report. In addition the 2011 process called for a formal plan update as required by DMA regulations every 5 years. In accordance with the process outlined in the 2011 plan, formal annual reviews were conducted and documented by the Sacramento County Department of Water Resources and the City of Sacramento's Department of Utilities, and other participating jurisdictions, and this LHMP update, once complete, will meet the DMA formal update requirements.

Specifically, Sacramento County's existing plan was completed and adopted by the County in 2011. It was anticipated that in compliance with the five-year update requirement, the next complete update of the plan would be in 2016. This current Plan Update process was initiated in spring 2016, and finished in December 2016 with the submittal of this LHMP update to Cal OES and FEMA Region IX.

As stated, documented reviews of the 2011 plan took place on an annual basis by the County and participating jurisdictions, and the 2011 LHMP was integrated into many other planning mechanisms in the County. The entire LHMP was adopted and incorporated by reference into the Sacramento County General Plan Safety Element as part of their General Plan Update Process. For those jurisdictions who have not yet updated their Safety Element, this LHMP Update will be adopted/incorporated by reference into the respective Safety Element updates. The risk assessment portion of the 2011 LHMP was relied on and further integrated into other planning mechanisms. Table 3-7 lists the planning mechanism the 2011 LHMP was integrated into by Sacramento County. Each of the jurisdictional annexes have similar tables that show how the 2011plan was specifically integrated into their local community planning mechanisms.

Table 3-7 Incorporation of Sacramento County LHMP into Other Planning Mechanisms

Planning Mechanism 2011 LHMP Was Incorporated or Implemented Through	Details
Sacramento County General Plan	The County adopted the 2011 LHMP Update into the Safety Element of the General Plan.
Sacramento County EOP	The 2011 LHMP and its hazard information is utilized in the County Emergency Operations Plan.
Sacramento County Climate Adaptation Plan	The Climate Adaptation Plan used many items from the 2011 LHMP. The Climate Adaptation Plan is still in process, and will incorporate items from this LHMP Update as well.

The plan implementation and maintenance process as set forth in the 2011 plan has been updated for this LHMP update. The revised update implementation and maintenance process for the Sacramento County 2016 LHMP update is set forth in Section 7 of this plan document. A strategy for continued public involvement for this update process is also included in Chapter 7.

Chapter 4 Risk Assessment

Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

As defined by the Federal Emergency Management Agency (FEMA), risk is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage."

The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of a jurisdiction's potential risk to natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

This risk assessment followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (FEMA 386-2, 2002), which breaks the assessment down to a four-step process:

1. Identify Hazards;
2. Profile Hazard Events;
3. Inventory Assets; and
4. Estimate Losses.

Data collected through this process has been incorporated into the following sections of this chapter:

- **Section 4.1: Hazard Identification: Natural Hazards** identifies the natural hazards that threaten the Planning Area and describes why some hazards have been omitted from further consideration.
- **Section 4.2: Hazard Profiles** discusses the threat to the Planning Area and describes previous occurrences of hazard events and the likelihood of future occurrences.
- **Section 4.3: Vulnerability Assessment** assesses the Planning Areas' exposure to natural hazards; considering assets at risk, critical facilities, future development trends, and, where possible, estimates potential hazard losses.
- **Section 4.4: Capability Assessment** inventories existing mitigation activities and policies, regulations, plans, and projects that pertain to mitigation and can affect net vulnerability.

This risk assessment covers the entire geographical extent of the Sacramento County Planning Area, which includes the unincorporated County, all incorporated communities and other participating jurisdictions. Throughout this chapter, information is presented for the Sacramento Planning Area as a whole and specific to unincorporated Sacramento County. Since this plan is a multi-jurisdictional plan, an assessment of how the hazards and risks vary from jurisdiction to jurisdiction is included. While these differences are noted in this chapter, they are expanded upon in the annexes of the participating jurisdictions. If no additional

data is provided in an annex, it should be assumed that the risk and potential impacts to the affected jurisdiction are similar to those described here for the entire Sacramento County Planning Area.

This LHMP Update involved a comprehensive review and update of each section of the risk assessment. As part of the risk assessment update, new data was used, where available, and new analyses were conducted. Where data from existing studies and reports was used, the source is referenced throughout this risk assessment. Refinements, changes, and new methodologies used in the development of this updated risk assessment are summarized in Chapter 2 What's New and are also detailed in this Chapter 4 Risk Assessment portion of the plan.

4.1 Hazard Identification: Natural Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

The Sacramento County Hazard Mitigation Planning Committee (HMPC) conducted a hazard identification assessment to determine the hazards that threaten the Planning Area. This section details the methodology and results of this effort.

Data Sources

The following data sources were used for this Hazard Identification: Natural Hazards portion of the plan:

- 2013 State of California Hazard Mitigation Plan
- FEMA Disaster Declaration Database

4.1.1. Results and Methodology

Using existing natural hazards data and input gained through planning meetings, the HMPC agreed upon a list of natural hazards that could affect Sacramento County. Hazards data from the California Office of Emergency Services (Cal OES), FEMA, California Department of Water Resources (Cal DWR), the National Oceanic and Atmospheric Administration (NOAA), and many other sources were examined to assess the significance of these hazards to the Planning Area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage. The natural hazards evaluated as part of this plan include those that have occurred historically or have the potential to cause significant human and/or monetary losses in the future. The ability of a community to reduce losses through implementation of existing and new mitigation measures was also considered as to the significance of a hazard. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 4.3 Vulnerability Assessment.

The following hazards in Table 4-1, listed alphabetically, were identified and investigated for this Plan Update. As a starting point, the updated 2013 California State Hazard Mitigation Plan was consulted to evaluate the applicability of new hazards of concern to the State to the Sacramento County Planning Area. Building upon this effort, hazards from the past plan were also identified, and comments explain how

hazards were updated from the previous plan. All hazards from the 2011 plan were profiled in this plan, with the wind hazard being moved from heavy rain and storms to the discussion on tornado. The agricultural hazard was modified to focus more on severe weather impacts. Water shortage was added to the drought hazard. New hazards include climate change as a stand-alone hazard.

Table 4-1 Sacramento County Hazard Identification and Comparison

2016 Hazards	2011 Hazards	Comment
Agricultural Hazards	Agricultural Hazards: Insects/Pests	The hazard significance was changed. As a result, a vulnerability assessment was added. Added focus on severe weather impacts. Climate change impacts were expanded upon.
Bird Strike	Bird Strike	Similar analysis was performed.
Climate Change	–	New stand-alone hazard. Climate change influence on other hazards was touched on in the last plan.
Dam Failure	Dam Failure	Similar analysis was performed on updated parcel and assessor data. Climate change impacts were expanded upon.
Drought and Water Shortage	Drought	Water shortage was added to the hazard. Climate change impacts were expanded upon.
Earthquake	Earthquake	Similar analysis was performed.
Earthquake: Liquefaction	Earthquake: Liquefaction	Similar analysis was performed.
Flood: 100/200/500-year	Flood: 100/200/500-year	Updated Digital Flood Insurance Rate Map (DFIRM) and assessor's data was used to perform updated and enhanced analysis, to include flooded acres. Climate change impacts were expanded upon.
Flood: Localized Stormwater Flooding	Flood: Localized Stormwater Flooding	Similar analysis was performed. Climate change impacts were expanded upon.
Landslides	Landslides and Debris Flows	Similar analysis was performed.
Levee Failure	Levee Failure	Updated DFIRM and assessor's data was used to perform updated analysis. Climate change impacts were expanded upon.
River/Stream/Creek Bank Erosion	River/Stream/Creek Bank Erosion	Similar analysis was performed. Climate change impacts were expanded upon.
Severe Weather: Extreme Temperatures - Heat	Severe Weather: Heat	Similar analysis was performed. Climate change impacts were expanded upon.
Severe Weather: Extreme Temperatures – Cold/Freeze	Severe Weather: Freeze	Similar analysis was performed. Climate change impacts were expanded upon.
Severe Weather: Fog	Severe Weather: Fog	Similar analysis was performed. Climate change impacts were expanded upon.
Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning)	Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning/Wind)	Wind was removed and added to the tornado profile. Climate change impacts were expanded upon.

2016 Hazards	2011 Hazards	Comment
Severe Weather: Wind and Tornadoes	Severe Weather: Tornadoes	Wind was added to this profile. Climate change impacts were expanded upon.
Subsidence	Subsidence	Due to recent drought conditions, a greater discussion of groundwater subsidence impacts was added. Climate change impacts were expanded upon.
Volcano	Volcano	Similar analysis was performed.
Wildfire (Burn Area/Smoke)	Wildfire	This hazard was expanded upon to further address the smoke hazard. Similar analysis was performed using updated parcel and assessor's data. Climate change impacts were expanded upon.

Table 4-2 was completed by the County and HMPC to identify, profile, and rate the significance of identified hazards, specific to the Sacramento County Planning Area and unincorporated Sacramento County. Only the more significant (or priority) hazards have a more detailed hazard profile and are analyzed further in Section 4.3 Vulnerability Assessment. Table 4-38 in Section 4.2.22 Natural Hazards Summary provides an overview of these significant hazards.

Table 4-2 Sacramento County Planning Area/Unincorporated County Hazard Assessment

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards	Significant	Highly Likely	Critical	Medium	Medium
Bird Strike	Limited	Highly Likely	Critical	Medium	Low
Climate Change	Extensive	Highly Likely	Critical	High	–
Dam Failure	Significant	Unlikely	Catastrophic	Medium	High
Drought and Water Shortage	Extensive	Likely/Occasional	Limited	High	High
Earthquake	Limited	Occasional	Critical	Medium	None
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium	None
Flood: 100/200/500-year	Significant	Occasional/Unlikely	Catastrophic	High	High
Flood: Localized Stormwater Flooding	Limited	Highly Likely	Limited	Medium	High
Landslides	Limited	Unlikely	Negligible	Low	Medium
Levee Failure	Significant	Occasional	Catastrophic	High	High
River/Stream/Creek Bank Erosion	Limited	Highly Likely	Limited	Medium	High
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Low	High
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Critical	High	High
Severe Weather: Fog	Extensive	Highly Likely	Limited	Low	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Critical	Medium	High
Severe Weather: Wind and Tornadoes	Limited	Highly Likely	Limited	Low	Medium
Subsidence	Significant	Highly Likely	Limited	Low	Medium
Volcano	Limited	Unlikely	Limited	Low	None
Wildfire (Burn Area/Smoke)	Significant	Highly Likely	Limited	Medium	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

4.1.2. Disaster Declaration History

One method the HMPC used to identify hazards was the researching of past events that triggered federal and/or state emergency or disaster declarations in the Planning Area. Federal and/or state disaster declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). USDA declarations are discussed in Section 4.2.7. FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors. Sacramento County received 17 federal and 28 state declarations since 1950. Of the 17 federal declarations 12 were for flood, rains and severe storm events, 2 for earthquake, 2 for levee break, 1 was for drought, and 1 was for Hurricane Katrina evacuations (all counties in the United States were declared). Of the 11 remaining state declarations, 8 were for flood, rains and severe storm events. 1 was for drought, 1 was for energy emergency, and 1 was related to a railroad explosion.

Based on the disaster declaration history provided in Table 4-3, Sacramento County is among the many counties in California susceptible to disaster. Details on federal and state disaster declarations were obtained by the HMPC, FEMA, and Cal OES and compiled in chronological order, from present, in Table 4-3.

Table 4-3 Sacramento County State and Federal Disasters Declaration, 1950-2015

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2014	Napa Earthquake	Natural	Earthquake	EM4193	–	9/17/2014
Drought	California Drought	GP 2014-13	1/17/2014	–	–	–
2008	Central Valley Drought	Drought	Drought	GP 2008-03	6/12/2008	–
2008	2008 January Storms	Flood	Storms	GP 2008-01	1/5/2008	–
2005/2006	2005/06 Winter Storms	Flood	Storms	DR-1628	-	2/3/2006
2005	Hurricane Katrina Evacuations	Economic	Hurricane	EM-3248 2005	-	9/13/2005
2001	Energy Emergency	Economic	Greed	GP 2001	1/1/2001	–

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
1998	1998 El Nino Floods	Flood	Storms	DR-1203	Proclaimed	2/19/1998
1997	1997 January Floods	Flood	Storms	DR-1155	1/2/97-1/31/97	1/4/1997
1996	Torrential Winds and Rain	Flood	Storms	GP 96-01	1/21/1996	–
1995	1995 Late Winter Storms	Flood	Storms	DR-1046	Proclaimed	1/10/1995
1995	1995 Severe Winter Storms	Flood	Storms	DR-1044	1/6/95-3/14/95	1/13/1995
1989	Loma Prieta Earthquake	Earthquake	Earthquake	DR-845	10/18/89-10/30/89	10/18/1989
1986	1986 Storms	Flood	Storms	DR-758	2/18-86-3/12/86	2/18/1986
1983	Winter Storms	Flood	Flood	DR-677	12/8/82-3/21/83	2/9/1983
1982	High Tides and Rains	Flood	Storms	-	12/8/1982	–
1982	Heavy Rains and Flooding	Flood	Storms	DC 82-03	4/1/1982	–
1980	Delta Levee Break	Flood	Levee break	EM-3078	1/23/1980	1/23/1980
1977	1977 Drought	Drought	Drought	EM-3023	-	1/20/1977
1973	Southern Pacific Railroad Fires and Explosions (Roseville)	Fire	Explosion	-	4/30/1973	–
1972	Andrus Island Levee Break	Flood	Levee break	DR-342	6/21/1972	6/27/1972
1969	1969 Storms	Flood	Storms	DR-253	1/23/69-3/12/69	1/26/1969
1964	1964 Late Winter Storms	Flood	Storms	DR-183	-	12/24/1964
1963	1963 Floods	Flood	Storms	-	2/14/1964	–
1958	1958 April Storms and Floods	Flood	Storms	DR-52	4/5/1958	4/4/1958
1958	1958 February Storms and Floods	Flood	Storms	CDO 58-03	2/26/1958	–
1955	1955 Floods	Flood	Flood	DR-47	12/22/1955	12/23/1955

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
1950	1950 Floods	Flood	Flood	OCD 50-01	11/21/1950	–

Source: Cal OES, FEMA

This disaster history (combined FEMA and state) suggests that Sacramento County experiences a major event worthy of a disaster declaration every 1.25 years. The County has an 80.3 percent chance of receiving a federal or state disaster declaration in any given year.

Disasters since 2011

There has been one FEMA Emergency Management declaration for the Napa earthquake in 2014 since the 2011 plan. In addition, there have been 10 USDA Secretarial Disaster Declarations for drought (discussed in Section 4.2.7) since 2011.

4.2 Hazard Profiles

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

The hazards identified in Section 4.1 Hazard Identification Natural Hazards, are profiled individually in this section as it applies to both the Sacramento County Planning Area and the unincorporated County. In general, information provided by planning team members is integrated into this section with information from other data sources. These profiles set the stage for Section 4.3 Vulnerability Assessment, where the vulnerability is quantified, as data allows, for each of the priority hazards.

Each hazard is profiled in the following format:

- **Hazard/Problem Description**—This section gives a description of the hazard and associated issues followed by details on the hazard specific to the Sacramento County Planning Area and the unincorporated County. Where known, this includes information on the hazard extent, area, seasonal patterns, speed of onset/duration, and magnitude and/or any secondary effects.
- **Past Occurrences**—This section contains information on historical incidents, including impacts where known. The extent or location of the hazard within or near the Sacramento County Planning Area and the unincorporated County is also included here. Historical incident worksheets were used to capture information from participating jurisdictions on past occurrences.
- **Frequency/Likelihood of Future Occurrence**—The frequency of past events is used in this section to gauge the likelihood of future occurrences specific to the Sacramento County Planning Area and the unincorporated County. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of the event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a experiencing a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:
  - ✓ **Highly Likely**—Near 100 percent chance of occurrence in next year or happens every year

- ✓ **Likely**—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less
- ✓ **Occasional**—Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years
- ✓ **Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

- **Climate Change**—This section contains the effects or influence of climate change to that hazard (if applicable). The possible ramifications of climate change on the hazard are discussed.

Section 4.2.22 Natural Hazards Summary provides an initial assessment of the profiles and assigns an initial level of significance or priority to each hazard. Those hazards determined to be of high or medium significance are characterized as priority hazards that required further evaluation in Section 4.3 Vulnerability Assessment. Those hazards that occur infrequently or have little or no impact on the Planning Area, including unincorporated Sacramento County, were determined to be of low significance and not considered a priority hazard. Significance was determined based on the hazard profile, focusing on key criteria such as frequency and resulting damage, including deaths/injuries and property, crop, and economic damage. The ability of a community to reduce losses through implementation of existing and new mitigation measures was also considered as to the significance of a hazard. This assessment was used by the HMPC to prioritize those hazards of greatest significance to the Planning Area, enabling the County and participating jurisdictions to focus resources where they are most needed.

The following sections provide profiles of the natural hazards that the HMPC identified in Section 4.1 Hazard Identification. The severe weather hazards are discussed first because it provides an overview of climatological conditions in the Planning Area, it sets the stage for the types of natural hazards likely to occur, and it is often the secondary hazards generated by severe weather (e.g., flood and wildfire) that can result in the most significant losses. The other hazards follow alphabetically.

Data Sources

The following data sources formed the basis for this Hazard Profiles portion of the plan:

- 2013 State of California Multi-Hazard Mitigation Plan
- CALFED Levee System Integrity Program
- CAL FIRE Wildfire History Database
- California Climate Adaptation Strategy
- California Department of Water Resources Division of Safety of Dams
- California Department of Water Resources Best Available Maps
- California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources. 2010.
- California Division of Mines and Geology
- California Natural Resources Report
- Delta Risk Management Strategy. June 2011.
- Federal Aviation Administration National Wildlife Database
- Federal Aviation Administration Wildlife Strike Database
- Federal Emergency Management Agency: Building Performance Assessment: Oklahoma and Kansas Tornadoes

- Federal Emergency Management Agency: Multi-Hazard Identification and Risk Assessment. 1997
- Federal Emergency Management Agency – Wind Zones in the United States
- Johnstone, J. and Dawson, T. Climatic context and ecological implications of summer fog decline in the coast redwood region. Proceedings of the National Academy of Sciences, January 7, 2010.
- Galloway, Jr Dr. Gerald E. Levees in History: The Levee Challenge. Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.
- Lighthouse Marina EIR/EIS. E D A W, Inc., November, 1985.
- Mount J, Twiss R. 2005. Subsidence, sea level rise, seismicity in the Sacramento-San Joaquin Delta. San Francisco Estuary and Watershed Science. Vol. 3, Issue 1 (March 2005), Article 5.
- National Aeronautics and Space Administration
- National Drought Mitigation Center
- National Flood Insurance Program
- National Integrated Drought Information System
- National Oceanic and Atmospheric Administration's National Climatic Data Center
- National Oceanic and Atmospheric Administration Storm Prediction Center
- National Performance of Dams Program
- National Weather Service Heat Index
- National Weather Service Sacramento – Climate of Sacramento, California, 2010
- National Weather Service Wind Chill Index
- North American Breeding Bird Survey
- Post Authorization Change Report for the Sacramento River Bank Protection Project Draft EIS
- Public Policy Institute of California. If drought continues: Environment and poor rural communities most likely to suffer. [press release]. 2015.
- Sacramento Bee
- Sacramento County Airport System
- Sacramento County Agricultural Commissioner's Reports, 2010-2014
- Sacramento County Flood Insurance Study, June 16, 2015
- Sacramento County Department of Water Resources – 2011 to 2015 Storm Reports
- Sacrament County 2035 General Plan
- Sacramento County General Plan Background Report
- Sacramento County Watershed Master Plan
- Sacramento County WMA Strategic Plan
- Some Significant Wildlife Strikes to Civil Aircraft in the United States, January 1990 – November 2015. U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services. December 3, 2015.
- State of California Department of Conservation Farmland Mapping and Monitoring Program
- Underwood, E. Models predict longer, deeper US droughts. Science, 347(6223) 707 DOI: 10.1126/science.347.6223.707. 2015.
- University of California Santa Barbara Department of Geology
- United State Geologic Survey. Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.
- United States Geological Survey. Open File Report 2015-3009. 2015.
- USA TODAY
- US Department of the Interior. Fact Sheet 2014-3120. December 2014.
- US Army Corps of Engineers
- US Bureau of Reclamation

- US Drought Monitor
- US Geological Survey: Volcanic Ash: Effect & Mitigation Strategies.
- Ingebritsen, S.E. and Ikehara, M. Sacramento-San Joaquin Delta: The Sinking Heart of the State. US Geological Survey Report FS-005-00.
- USDA Secretarial Disasters Declarations
- Western Regional Climate Center
- Wildlife Strikes to Civil Aircraft in the United States 1990–2012. US Department of Transportation and Animal and Plant Health Inspection Services. September 2013.

4.2.1. Severe Weather: General

Severe weather is generally any destructive weather event, but usually occurs in the Sacramento County Planning Area as localized storms that bring heavy rain, hail, lightning, and strong winds.

The NOAA's National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following: all weather events from 1993 to current (except from 6/1993-7/1993); and additional data from the Storm Prediction Center, which includes tornadoes (1950-1992), thunderstorm winds (1955-1992), and hail (1955-1992). This database contains 212 severe weather events that occurred in Sacramento County between January 1, 1950, and December 31, 2015. Table 4-4 summarizes these events.

*Table 4-4 NCDC Severe Weather Events for Sacramento County 1950-12/31/2015**

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Cold/Wind Chill	13	0	0	0	0	$0	$0
Dense Fog	6	6	1	38	0	$2,120,000	$0
Drought	19	0	0	0	0	$0	$0
Excessive Heat	1	0	0	0	0	$0	$0
Extreme Cold/Wind Chill	1	0	0	0	0	$0	$0
Flash Flood	4	1	0	0	0	$4,400,000	$0
Flood	29	1	0	0	0	$8,826,000	$7,800,000
Frost/Freeze	6	0	0	0	0	$200,000	$5,000,000
Funnel Cloud	6	0	0	0	0	$0	$0
Hail	7	0	0	0	0	$11,030	$0
Heat	31	0	1	30	1	$0	$0
Heavy Rain	18	0	0	1	0	$365,000	$50,000
Heavy Snow	1	0	0	0	0	$0	$0
High Surf	1	0	0	0	0	$0	$0
High Wind	36	1	0	0	0	$8,842,000	$39,000
Lightning	1	0	0	0	0	$150,000	$0
Strong Wind	9	0	1	0	2	$2,185,000	$0

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Thunderstorm Winds	7	0	0	0	0	$0	$0
Tornado	11	0	0	0	0	$1,455,000	$0
Wildfire	3	0	0	0	0	$3,000,000	$0
Winter Storm	2	0	0	0	0	$0	$0
Total	**212**	**9**	**3**	**69**	**3**	**$31,554,030**	**$12,889,000**

Source: NCDC

*Note: Losses reflect totals for all impacted areas

The NCDC table above summarizes severe weather events that occurred in Sacramento County. Only a few of the events actually resulted in state and federal disaster declarations. It is interesting to note that different data sources capture different events during the same time period, and often display different information specific to the same events. While the HMPC recognizes these inconsistencies, they see the value this data provides in depicting the County's "big picture" hazard environment.

As previously mentioned, most all of Sacramento County's state and federal disaster declarations have been a result of severe weather. For this plan, severe weather is discussed in the following subsections:

- Extreme Temperatures – Cold/Freeze
- Extreme Temperatures – Heat
- Fog
- Heavy Rains and Storms (Thunderstorms/Hail, Lightning)
- Wind and Tornadoes

Climate Change and Severe Weather

Climate change can have direct implications on almost every hazard addressed in the plan, with earthquake and bird strike being possible exceptions. Climate change has the potential to alter the nature and frequency of most hazards. The potential for climate change influences on hazards are further noted in the climate change hazard profile and in each of the hazard discussions.

4.2.2. Severe Weather: Extreme Temperatures – Cold and Freeze

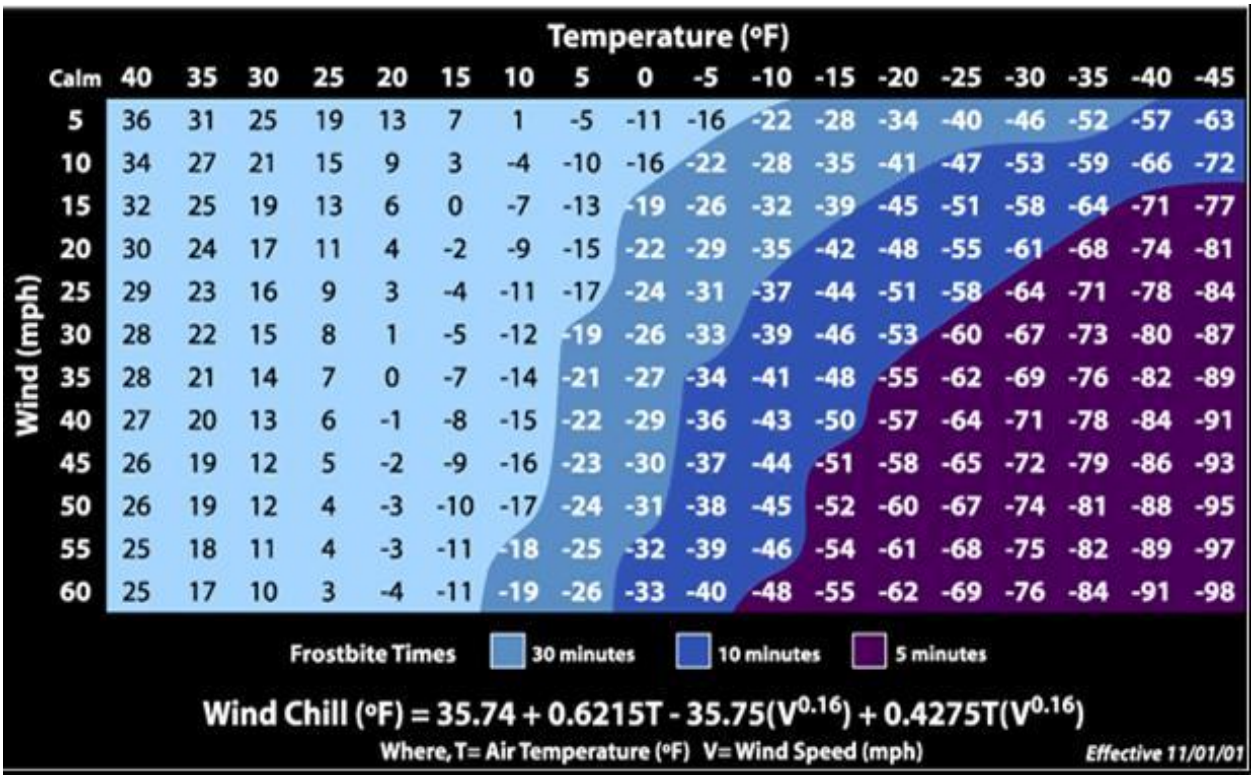
Hazard/Problem Description

Extreme cold often accompanies a winter storm or is left in its wake. It is most likely to occur in the winter months of December, January, and February. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat. Extreme cold can disrupt or impair communications facilities. Extreme cold can also affect the crops grown in Sacramento County.

In 2001, the National Weather Service (NWS) implemented an updated Wind Chill Temperature index, shown in Figure 4-1. This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin

caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Figure 4-1 Wind Chill Temperature Chart



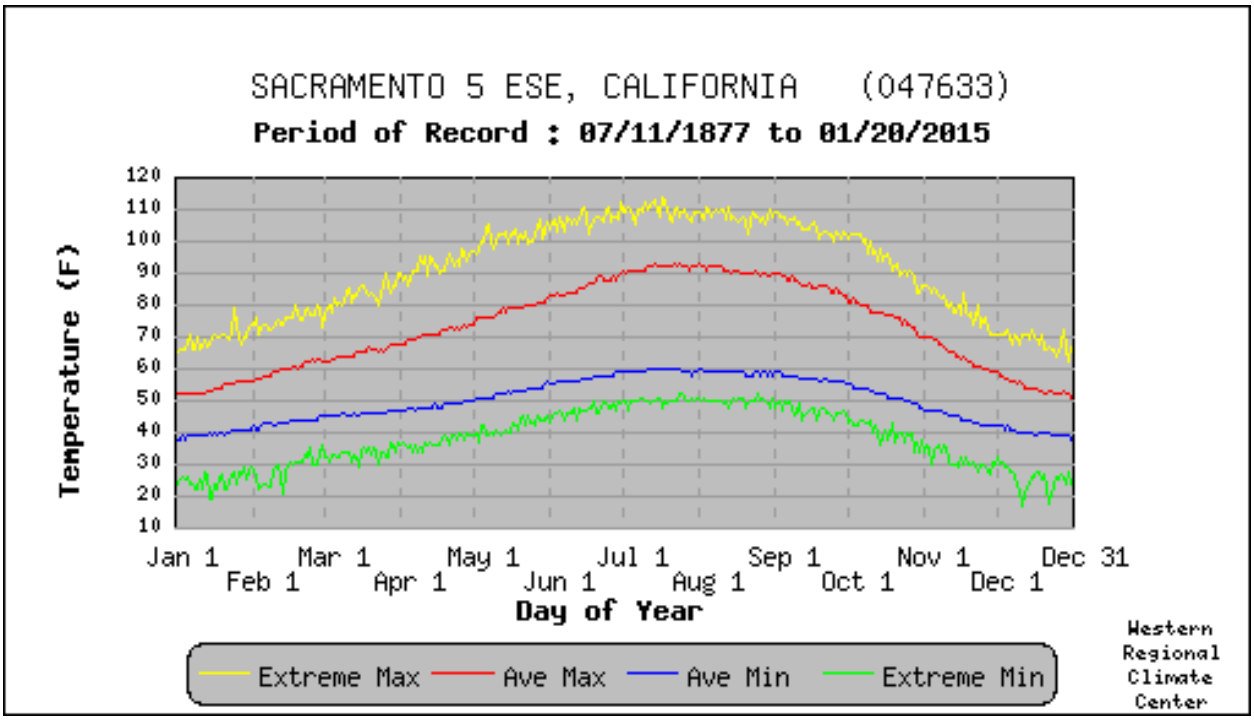
Source: National Weather Service

The effects of freezing temperatures on agriculture in Sacramento County are discussed further in Section 4.2.7 Agricultural Hazards. Information from the oldest continually reporting weather station in the County is summarized below and in Figure 4-2.

Sacramento County (5 ESE Weather Station, Period of Record 1877 to 2015)

According to the Western Regional Climate Center (WRCC), monthly average minimum temperatures in the County from November through April range from the upper-30s to the upper-50s. The lowest recorded daily extreme was 17°F on December 11, 1932. In a typical year, minimum temperatures fall below 32°F on 8.3 days with no days falling below 0°F.

Figure 4-2 Sacramento County—Daily Temperature Averages and Extremes



Source: Western Regional Climate Center

Past Occurrences

Disaster Declaration History

There have been no state or FEMA disaster declarations for Sacramento County associated with extreme cold or freeze. There have been three USDA secretarial disaster declarations for Sacramento County from cold and freeze, which can be found in Table 4-22 in the Section 4.2.7 Agriculture Hazards of this document.

NCDC Events

The NCDC data recorded 22 cold and freeze incidents for Sacramento County since 1993. A summary of these events are shown in Table 4-5. Specific events from the NCDC database that caused injuries, deaths, or damages in Sacramento County are discussed below the table.

Table 4-5 NCDC Winter Storms and Extreme Cold Events in Sacramento County 1993 to 12/31/2015

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Cold/Wind Chill	13	0	0	0	0	$0	$0
Extreme Cold/Wind Chill	1	0	0	0	0	$0	$0

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Frost/Freeze	6	0	0	0	0	$200,000	$5,000,000
Winter Storm	2	0	0	0	$0	$0	$0
Total	**22**	**0**	**0**	**0**	**$0.00**	**$200,000**	**$5,000,000**

Source: NCDC

*Deaths, injuries, and damages are for the entire event, and may not be exclusive to the County.

- **December 4, 1998** – A substantial freeze occurred as valley temperatures dropped into the middle to upper 20s.
- **December 6, 1998** – The second Arctic blast in a five-day period produced well below normal temperatures. The cold air not only affected the Northern Sacramento Valley, but also seeped south into the Northern San Joaquin Valley. Record low temperatures as well as low maximum temperatures were recorded at the Sacramento Executive Airport. The City of Sacramento reported a low of 27°.
- **December 29, 1998** – The third Arctic airmass of the month to spread into the Central California interior was the coldest of the three and produced large amounts of crop damage/loss. Downtown Sacramento experienced 6 consecutive days with low temperatures at or below freezing. The lowest temperature recorded downtown was 26°. $2.4 million in crop damages were reported in Sacramento and surrounding counties. A USDA disaster declaration was declared for the County.
- **December 6, 2005 –** Morning temperatures dropped into the 20s across the Sacramento and Northern San Joaquin Valleys. A record low temperature was tied in Sacramento. The temperature at Sacramento Executive Airport (SAC) dropped to 28°, which tied the record set in 1980.
- **November 30, 200**6 – Clear skies and a cold arctic airmass led to freezing temperatures across the Planning Area. Temperatures dropped to the mid to upper 20s, which was near record values for the date.
- **January 14-23, 2007** – A very cold arctic airmass settled over the region and temperatures in the Central Valley of California dropped sharply for a relatively prolonged period of time. Many temperature records were tied and broken during the episode and the damage to area crops was extensive.
- **April 20-24, 2008** – A cool and dry airmass coupled with light winds resulted in cold morning temperatures from April 20th to the 24th in the Planning Area. Record low temperatures were set in several locations. Frost and freezing temperatures caused significant damage to young walnuts, prunes, peaches, pears, and wine grapes across the area.
- **December 4, 2008** – High pressure over the area brought light winds and clear skies. This allowed the unusual case of a record minimum and a record maximum both being tied on the same day in the northern Sacramento Valley. Light winds and clear skies brought cold morning temperatures to the northern Sacramento Valley.
- **December 6-10, 2009** – A very cold airmass brought a hard freeze and record cold to the northern Central Valley. Many pipes in homes and businesses froze and burst, including those for fire sprinkler systems. Some crop damage in orchards was also reported. A hard freeze caused pipes and sprinkler systems to burst throughout the southern Sacramento Valley, causing water damage to homes and businesses. There were nine water main breaks reported in Sacramento, with eighty-two customers reporting problems with leaking pipes.

HMPC Events

The HMPC noted that extreme cold events continue to occur on an annual basis. They did not identify any specific additional events related to extreme cold temperatures in the Sacramento County Planning Area.

Western Regional Climate Center Data

The WRCC maintains data on extreme temperatures in the County. Past record lows from the Sacramento 5 ESE Coop Weather Station by month are shown in Table 4-6.

Table 4-6 Record Low Temperatures – Sacramento 5 ESE Weather Station (1877-2015)

Month	Temperature	Date	Month	Temperature	Date
January	19°	1/14/1888	July	47°	7/03/1901
February	21°	2/13/1884	August	48°	8/30/1887
March	29°	3/15/1880	September	44°	9/18/1882
April	34°	4/34/1927	October	34°	10/30/1935
May	37°	5/03/1950	November	27°	11/28/1880
June	43°	6/01/1929	December	17°	12/11/1932

Source: WRCC

Likelihood of Future Occurrence

Likely—Cold and freeze are likely to continue to occur annually in the Sacramento County Planning Area.

Climate Change and Freeze and Snow

According to the California Climate Adaptation Strategy (CAS), freezing spells are likely to become less frequent in California as climate temperatures increase. If emissions increase, freezing events could occur only once per decade in large portion of the state by the second half of the 21st century. According to a California Natural Resources Report in 2009, it was determined that while fewer freezing spells would decrease cold related health effects, too few freezes could lead to increased incidence of disease as vectors and pathogens do not die off.

Preliminary Draft – Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan (CAP), Ascent Environmental 2016 Analysis

According to the 2016 Preliminary Draft CAP, which utilized Cal Adapt to model potential climate change impacts to Sacramento County, annual average low temperatures in Sacramento County of 49.8° F (from 1961-1990) would increase under the low admissions scenario by 1.6° F to 51.4° F. Under the high emissions scenario, the average annual low temperature is projected to increase by 6.0° F to 55.8° F by 2099.

4.2.3. Severe Weather: Extreme Temperatures – Heat

Hazard/Problem Description

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980 more than 1,250 people died. Extreme heat can also affect the agricultural industry. Extreme heat as it affects agriculture in Sacramento County is discussed further in the section on agricultural hazards.

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds a level at which the body can remove it, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop. Elderly persons, small children, chronic invalids, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to heat reactions.

Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations. Heat waves do not cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios. While heat waves are obviously less dramatic, they are potentially more deadly. According to the 2013 California State Hazard Mitigation Plan, the worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave resulted in 946 deaths.

The Western Regional Climate Center (WRCC) maintains data on weather normal and extremes in the western United States. WRCC data for the County is summarized below and in Figure 4-2 above.

Sacramento County (Sacramento 5 ESE Weather Station, Period of Record 1877 to 2015)

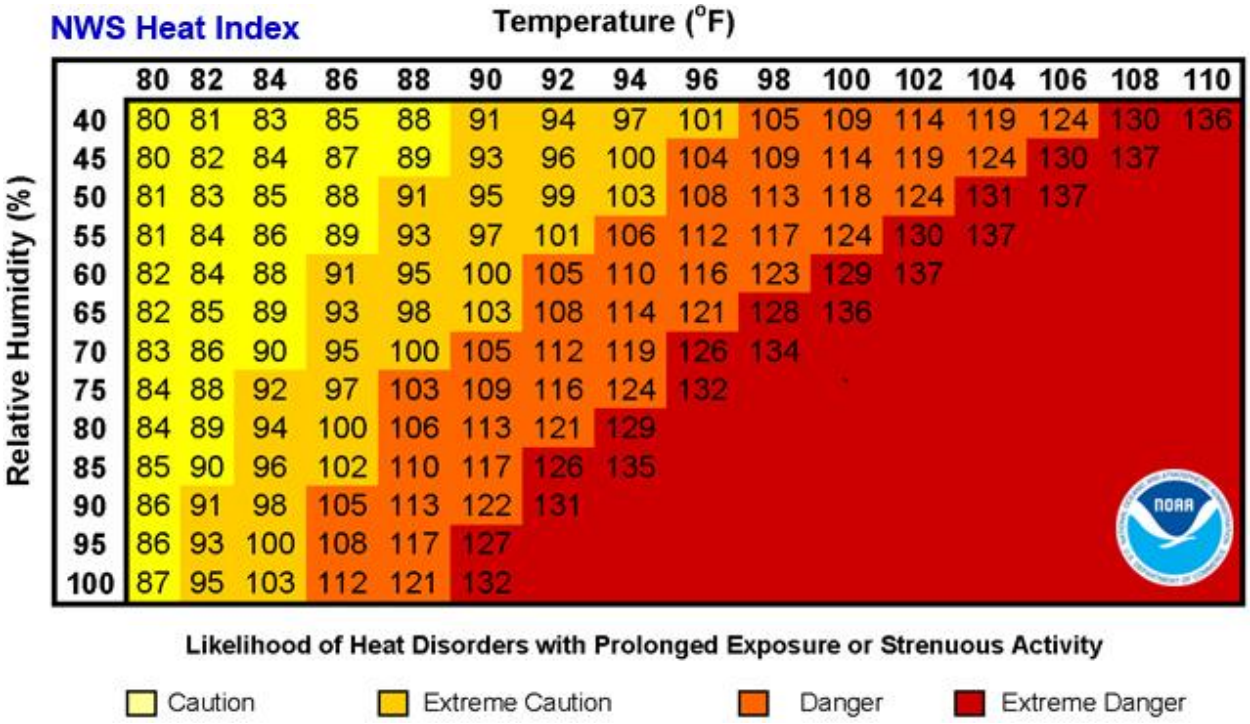
According to the WRCC, in the western portion of Sacramento County, monthly average maximum temperatures in the warmest months (May through October) range from the mid-70s to the low 90s. The highest recorded daily extreme was 114°F on July 17, 1925. In a typical year, maximum temperatures exceed 90°F on 65.4 days.

Figure 4-3 and Figure 4-4 show the Heat Index (HI) that the National Weather Service uses to show the relationship between heat and relative humidity. The Heat Index describes how hot the heat-humidity combination makes it feel. As relative humidity increases, the air seems warmer than it actually is because the body is less able to cool itself via evaporation of perspiration. As the HI rises, so do health risks.

- When the HI is 90°F, heat exhaustion is possible with prolonged exposure and/or physical activity.
- When it is 90°-105°F, heat exhaustion is probable with the possibility of sunstroke or heat cramps with prolonged exposure and/or physical activity.

- When it is 105°-129°F, sunstroke, heat cramps or heat exhaustion is likely, and heatstroke is possible with prolonged exposure and/or physical activity.
- When it is 130°F and higher, heatstroke and sunstroke are extremely likely with continued exposure. Physical activity and prolonged exposure to the heat increase the risks.

Figure 4-3 Heat Index



Source: National Weather Service

Note: Since HI values were devised for shady, light wind conditions, exposure to full sunshine can increase HI values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

Figure 4-4 Possible Heat Disorders by Heat Index Level

Heat Index	Category	Possible heat disorders for people in high risk groups
130°F or higher	Extreme Danger	Heatstroke risk extremely high with continued exposure.
105° - 129°F	Danger	Sunstroke, Heat Cramps and Heat Exhaustion likely, Heatstroke possible with prolonged exposure and/or physical activity.
90° - 105°F	*Extreme Caution*	*Sunstroke, Heat Cramps and Heat Exhaustion possible with prolonged exposure and or physical activity.*
80° - 90 °F	Caution	Fatigue possible with prolonged exposure and/or physical activity.

Source: National Weather Service

The NWS has in place a system to initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for the issuance of excessive heat alerts

is when the maximum daytime high is expected to equal or exceed 105°F and a nighttime minimum high of 80°F or above is expected for two or more consecutive days. The NWS office in Sacramento can issue the following heat-related advisory as conditions warrant.

- **Excessive Heat Outlook**: are issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to Heat Index forecast map for the contiguous United States those who need considerable lead time to prepare for the event, such as public utilities, emergency management and public health officials.
- **Excessive Heat Watch**: is issued when conditions are favorable for an excessive heat event in the next 12 to 48 hours. A Watch is used when the risk of a heat wave has increased, but its occurrence and timing is still uncertain. A Watch provides enough lead time so those who need to prepare can do so, such as cities that have excessive heat event mitigation plans.
- **Excessive Heat Warning/Advisory**: are issued when an excessive heat event is expected in the next 36 hours. These products are issued when an excessive heat event is occurring, is imminent, or has a very high probability of occurring. The warning is used for conditions posing a threat to life or property. An advisory is for less serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life and/or property.

Past Occurrences

Disaster Declaration History

There have been no state or FEMA disaster declarations associated with extreme heat. Two USDA Secretarial Disasters related to extreme heat have occurred in the County and can be found in Table 4-27 in Section 4.2.7.

NCDC Disasters

The NCDC data shows 32 extreme heat incidents for Sacramento County since 1993. These are shown in Table 4-7. Events that caused specific injuries or damage are discussed below the table.

Table 4-7 NCDC Extreme Heat Events in Sacramento County 1993 to 12/31/2015

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Excessive Heat	1	0	0	0	0	$0	$0
Heat	31	0	1	30	1	$0	$0
Total	**32**	**0**	**1**	**30**	**1**	**$0**	**$0**

Source: NCDC

- **July 11, 1999** – Afternoon high temperatures averaged 10 to 20 degrees above normal across the central and northern interior. No fatalities or severe heat related injuries were noted by area hospitals, although there was an increase in lesser heat related illnesses caused by prolonged dehydration. Area utilities indicated that facilities were stressed during the event and the voluntary brown out program had to be utilized. SMUD also indicated they broke an all-time record on the 12th for electrical production and distribution. No injuries or fatalities were reported.

- **May 21, 2000** – Daily maximum temperatures across the area reached record levels for three consecutive days and most official reporting sites were fifteen to twenty degrees above normal readings. Sacramento tied or broke records on one or more days. The normal maximum temperature for Sacramento for this period is 82°, yet temperatures reached 100°, 103°, and 99°, all new daily records. No injuries or fatalities were reported.
- **June 13, 2000** – Very hot weather persisted across interior Northern California for three days, resulting in record and near record temperatures at most reporting sites. Sixteen people were treated for heat stroke in Sacramento and Solano counties and one, a 16-year-old male in West Sacramento, died. A heavily used portion of I-80 between Sacramento and San Francisco was closed for several hours to repair three lanes in which the asphalt had buckled due to the sustained heat. Power outages were suffered by more than 100,000 customers during the event. Maximum temperatures were fifteen to twenty degrees above normal throughout the valley and foothills, but what made the weather especially difficult to handle was that the minimum temperatures were also ten to twenty degrees above normal for the period. The hottest day across the area was the 14th, with maximum temperatures of 107°F in Sacramento. The maximum temperatures on the 8th, less than a week earlier, were 71°. Sacramento set a daily high minimum temperature record by dropping only to 68° on the 13th. No injuries or fatalities were reported.
- **July 29, 2000** – Excessive heat impacted the Sacramento and northern San Joaquin Valleys during the last few days of July. Temperatures reached and exceeded 100° in many areas before peaking on the 31st at 104° in Sacramento. No injuries or fatalities were reported.
- **September 18, 2000** – Daily maximum temperature records were tied and broken across the Sacramento and northern San Joaquin valleys. The Sacramento temperature reached 101°, which tied the record previously set in 1984. No injuries or fatalities were reported.
- **September 20, 2000** – The daily high maximum temperature record was set in Sacramento when it reached 102°, breaking the previous record of 101° set in 1994. No injuries or fatalities were reported.
- **July 1, 2005** – July 2005 set a new record for heat in Sacramento. The average temperature in Sacramento was 81.8° for the month. This was the hottest average temperature ever recorded in Sacramento. The old record was 81.6° set in July 2003. In addition, the average low temperature for the month of July was 65.2°, breaking the old record of 65.1° set in July 2003. However, the average high temperature record was not broken. The average for July 2005 was 98.4°, which is well below the record average high of 99.6° set in 1988.
- **July 4-5, 2007** – High pressure over the western United States brought record heat to Northern California on July 4th and 5th. New daily high temperature records were set today at the Downtown Sacramento and the Sacramento Executive Airport sites. At Downtown Sacramento, the temperature reached 108°, which broke the old record of 107° set in 1931. At Sacramento Executive Airport, the temperature reached 107°, which broke the old record of 105° set in 1968.
- **August 23, 2007** – High pressure over California resulted in hot conditions in the Planning Area. Temperatures in excess of 100° were recorded at many locations in the Planning Area.
- **May 15-18, 2008** – A strong high pressure ridge over the region produced hot temperatures across interior Northern California from May 14th to May 17th, with many triple digit daily high temperature records set. Record daily high minimum temperatures were also set as clouds and northerly winds maintained the heat overnight. The hot temperatures lingered into the 19th, especially for the northern San Joaquin Valley.
- **July 9, 2008** – A strong upper level ridge brought hot weather to much of the Planning Area from July 6th to the 10th. High temperatures well over the century mark were recorded, with records tied or set

across the northern Central Valley on the 9th. Overnight temperatures also remained very warm, with several record high minimums set or tied.

- **August 15, 2008** – A strong high pressure ridge allowed high temperatures to reach triple digits across the northern Central Valley. In the Planning Area, temperatures of 102° to 108° were recorded.
- **August 26-29, 2008** – A strong upper level ridge brought hot weather to much of the area from the 26th to the 28th. High temperatures well over the century mark were recorded, with records tied or set across the northern Central Valley. A daily maximum temperature record of 104° was set at Sacramento Executive Airport. This broke the previous record of 103° set in 1950.

HMPC Events

The HMPC identified the following events related to extreme temperatures in the Sacramento County Planning Area.

- 2013 Jun7& 8 – 100°-112°F
- 2013 Jun 28-30, again Jul 1 – over 100°F for 7 days
- July 1-4, 2013 – A strong high pressure ridge built over Northern California, keeping max temperatures in the Central Valley above 100 for at least 7 days. Overnight temperatures failed to recover, reaching generally down to the mid 60s to 90. The heat wave felt warmer due to the moisture in the air from the previous rainfall on June 26th, as well as from the intrusion of subtropical moisture from the south.
- January 2014 – January was an abnormally dry and warm month for interior Northern California. Many record high temperatures were broken, and a state-wide drought was declared on January 17th.

Western Regional Climate Center Data

The WRCC maintains data on extreme temperatures in the County. Past record highs from the Sacramento 5 ESE Coop Weather Station by month are shown in Table 4-8.

Table 4-8 Record High Temperatures – Sacramento 5 ESE Weather Station (1877-2015)

Month	Temperature	Date	Month	Temperature	Date
January	74°	1/31/1976	July	114°	7/18/1925
February	80°	2/18/1899	August	111°	8/13/1933
March	90°	3/31/1966	September	109°	9/01/1950
April	98°	4/26/2004	October	102°	10/2/1952
May	107°	5/28/1984	November	86°	11/1/1966
June	112°	6/30/1934	December	72°	12/15/1958

Source: WRCC

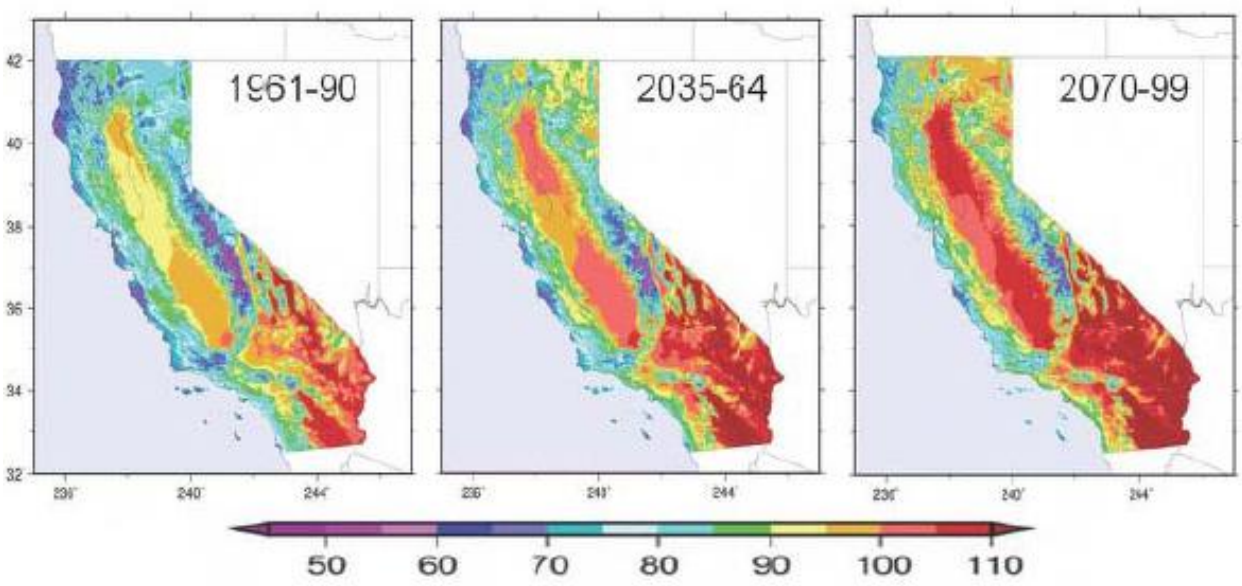
Likelihood of Future Occurrence

Highly Likely—Temperature extremes are likely to continue to occur annually in the Sacramento County Planning Area. Temperatures at or above 90°F are common most summer days in the County.

Climate Change and Extreme Heat

The CAS, citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." This study shows that California is getting warmer, leading to an increased frequency, magnitude, and duration of heat waves. These factors may lead to increased mortality from excessive heat, as shown in Figure 4-5.

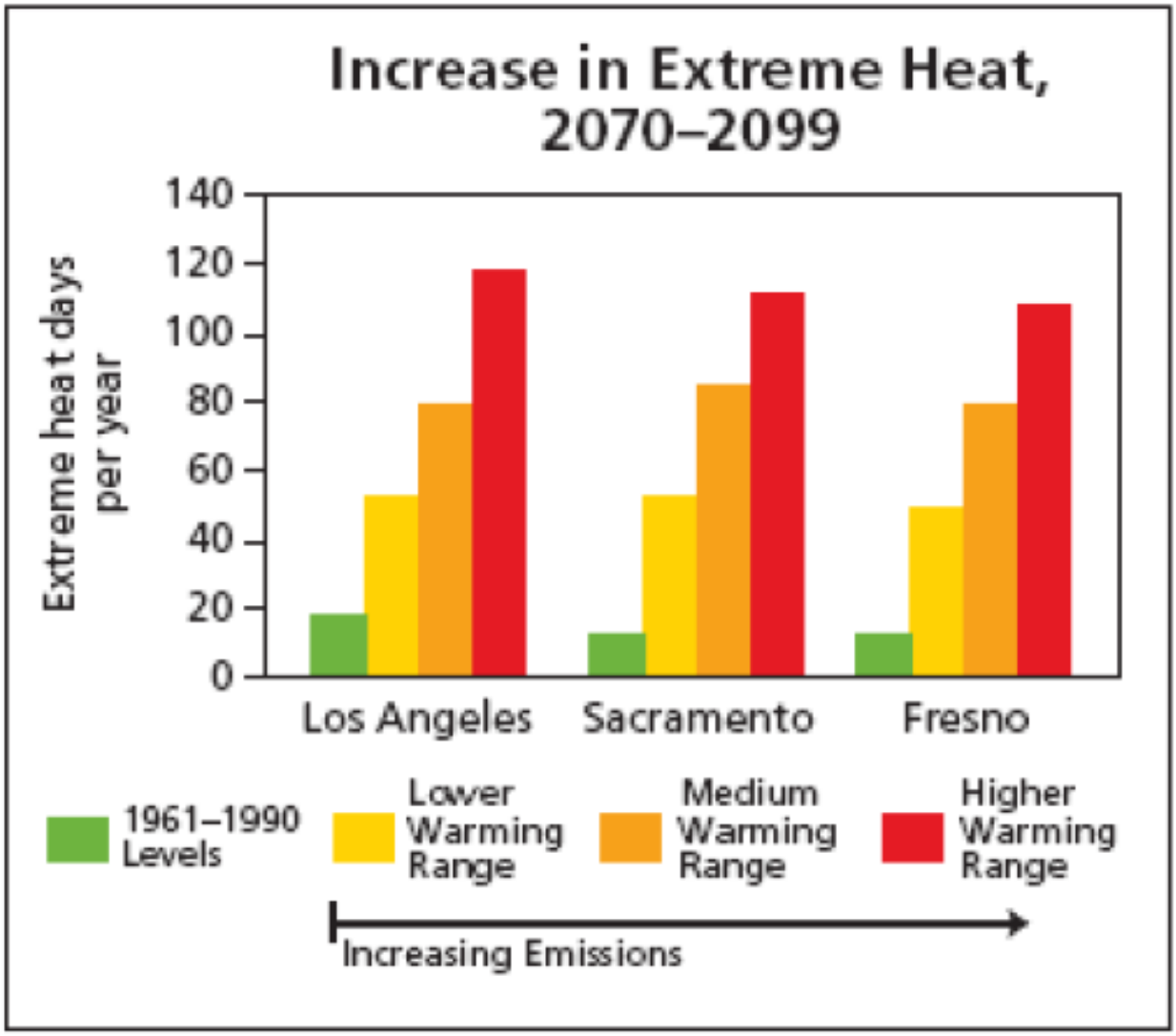
Figure 4-5 California Historical and Projected Temperature Increases - 1961 to 2099



Source: Dan Cayan; California Climate Adaptation Strategy

As temperatures increase, California and Sacramento County will face increased risk of death from dehydration, heat stroke, heat exhaustion, heart attack, stroke and respiratory distress caused by extreme heat. According to the CAS report and the 2010 State of California Hazard Mitigation Plan, by 2100, hotter temperatures are expected throughout the state, with projected increases of 3-5.5°F (under a lower emissions scenario) to 8-10.5°F (under a higher emissions scenario). If temperatures rise to the higher warming range, there could be 100 more days per year with temperatures above 95°F in the City of Sacramento (see Figure 4-6). These changes could lead to an increase in deaths related to extreme heat in Sacramento County.

Figure 4-6 Increase in Heat in Major California Cities from 2070 to 2099



Source: 2010 California State Hazard Mitigation Plan

Preliminary Draft - Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan (CAP), Ascent Environmental 2016 Analysis

According to the Sacramento County Phase 1 Vulnerability Assessment, contained within the 2016 Preliminary Draft CAP, which utilized Cal Adapt to model potential climate change impacts to Sacramento County, it concluded that annual average high temperatures in Sacramento County of 73.1°F would increase under the low emissions scenario by 3.1°F to 76.2°F. Under the high emissions scenario, the average annual high temperature is projected to increase by 7.2°F to 80.3°F by 2099.

In addition, research published by California Environmental Protection Agency suggests that heat impacts are felt disproportionately in the northern portions of Sacramento County and the surrounding areas, due to prevailing wind patterns. This phenomenon is likely be exacerbated by climate change.

Extreme Heat Days. Extreme heat days are defined by Cal adapt for Sacramento County as 100 ºF or higher. From 1961 to 1990, Sacramento County has a historical average of four extreme heat days a year. From 2010 to 2016, extreme heat days increase in Sacramento County with a current average of 8 to 9 extreme heat days per year. Utilizing Cal-Adapt, the projected average annual number of extreme heat days under the low emissions scenario is approximately 15 days per year in 2050 and between 19 to 45 days per year at the end of the century. Under the high emissions scenario, Cal-Adapt predicts that Sacramento County will experience 25-31 extreme heat days per year in 2050 and 50 to 67 days per year by 2099. Also to be considered are warm nights. A warm night is defined as a day between April and October where the minimum temperature exceeds the historical minimum temperatures between 1961 and 1990. Historically, Sacramento County has an average of four warm nights a year, with a threshold of 65 ºF. Under the low- and high- emissions scenarios, the number of warm nights is expected to increase to an average of 12-33 nights by 2050 and 23 to 90 nights by 2099.

Frequency and Timing of Heat Waves. When these extreme temperatures are experienced over a period of several days or more, they are considered heat waves. Cal-Adapt defines a heat wave for Sacramento County as an event where the extreme heat day threshold of 100 ˚F is exceeded for five days or more. Based on this analysis, heat waves consisting of a five-day period have occurred in Sacramento County at a rate of about one to two heat waves per decade between 1950 and 2000. The Cal-Adapt model projects an increase in heat waves as the century progresses. Under the low emissions scenario, Sacramento County is expected to experience approximately three heat waves per year around 2050 and up to four per year by 2099. Under the high emissions scenario, an average of three to five heat waves per year by 2050 are projected and up to 12 per year by the end of the century. Also to be noted, as shown in both emissions scenarios, the model projects that the occurrence of these heat waves will occur both earlier and later in the season.

The HMPC noted that low income people and communities of color in urban neighborhoods are particularly vulnerable to heat waves, as they are often segregated and surrounded by heat trapping surfaces like asphalt and less likely to have air conditioning.

4.2.4. Severe Weather: Fog

Hazard/Problem Description

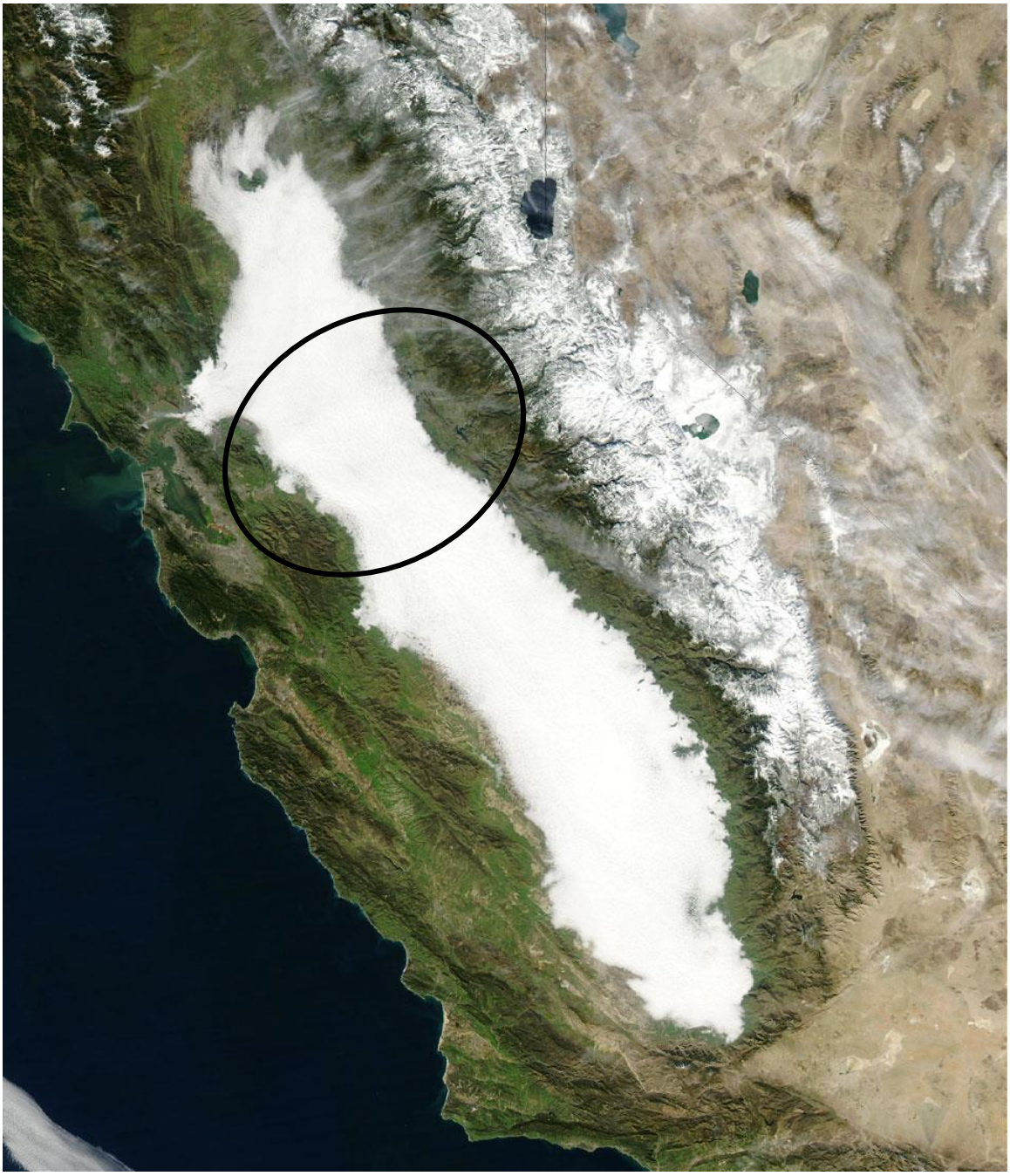
Fog is a collection of water droplets or ice crystals suspended in the air at or near the Earth's surface. Fog results from air being cooled to the point where it can no longer hold all of the water vapor it contains. Fog can form in a number of ways, depending on how the cooling that caused the condensation occurred. The most common types in the County are radiation and advection fog.

Radiation Fog

This type of fog forms at night under clear skies with calm winds when heat absorbed by the earth's surface during the day is radiated into space. As the earth's surface continues to cool, provided a deep enough layer of moist air is present near the ground, the humidity will reach 100% and fog will form. Radiation fog varies in depth from 3 feet to about 1,000 feet and is always found at ground level and usually remains stationary. This type of fog can reduce visibility to near zero at times and make driving very hazardous.

One of the most dangerous types of radiation fog unique to the planning is tule fog. It forms on clear nights when the ground is moist and the wind is near calm. On nights like this, the ground cools rapidly. In turn, the moist air above it cools and causes water vapor to condense. Once it has formed, the air must be heated enough to either evaporate the fog or lift it above the surface so that visibilities improve. It can cover large areas, as seen in Figure 4-7, with Sacramento County's location approximated with the black oval. The fog layer in tule fog often builds to several hundred feet thick, and can effectively block out incoming sunlight.

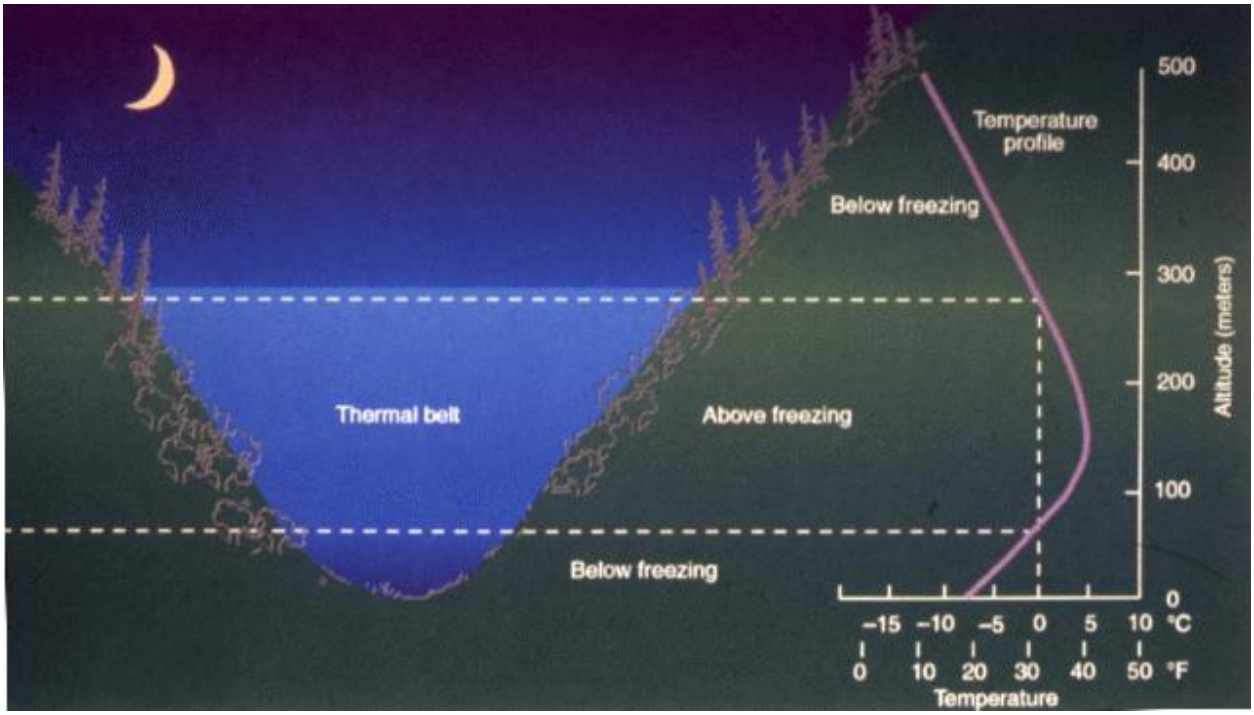
Figure 4-7 Tule Fog in the Central and San Joaquin Valley of California



Source: University of California Santa Barbara Department of Geology.

The Great Valley of California (the Sacramento and San Joaquin Valleys) is essentially a closed air basin. Therefore, the introduction of moisture is not removed from the valley air basin unless pushed or lifted out by atmospheric processes. By the late fall, cool season frontal passages begin to bring rain to the valley floor thereby adding low-level atmospheric moisture. High pressure building aloft behind frontal passages after a significant rain event provides moisture at low atmospheric levels, light wind, clear skies, and a temperature inversion aloft. This can be seen in Figure 4-8.

Figure 4-8 Temperature Inversion Affecting Fog in Valleys like Sacramento Valley



Source: University of California Santa Barbara Department of Geology.

This inversion limits vertical air movement from the valley air basin. Radiational cooling of the ground during the long nights cools the adjacent air and forms fog as temperatures reach dew points. The lack of strong sunshine during the fall and winter daytime hours does not provide sufficient incoming energy to always evaporate the overnight fog development. Thus, fog can and does last several days at a time until the atmosphere provides some form of additional drying or mixing. The combination of the previous mentioned parameters and circumstances provides for a rather dense fog where visibility is often limited to mere feet. It is situations like these that often lead to multi-car accidents where one car follows another into a fog bank. Another area prone to fatal accidents is intersections across major roads or heavily traveled roads, where the cross traffic does not have to stop.

Advection Fog

Advection fog often looks like radiation fog and is also the result of condensation. However, the condensation in this case is caused not by a reduction in surface temperature, but rather by the horizontal movement of warm moist air over a cold surface. This means that advection fog can sometimes be distinguished from radiation fog by its horizontal motion along the ground.

The fog season in Sacramento County is typically in the late fall and winter (November through March) but can occur as late as May. Fog typically forms rapidly in the early morning hours. Fog can have devastating effects on transportation corridors in the County. Severe fog incidents can close roads, cause accidents, and impair the effectiveness of emergency responders. These accidents can cause multiple injuries and deaths and can have serious implications for human health and the environment if a hazardous or nuclear waste shipment is involved.

Past Occurrences

Disaster Declaration History

There are no fog related FEMA federal or Cal OES state disaster declarations for Sacramento County. In addition, there are no USDA secretarial disaster declarations associated with fog.

NCDC Events

The NCDC data recorded 5 fog incidents for Sacramento County since 1993. A summary of these events is shown in Table 4-9, with details following the table.

Table 4-9 NCDC Fog Events in Sacramento County 1993 – 12/31/2014

Event	Date	Deaths (Direct)	Injuries (Direct)	Property Damage	Crop Damage	Injuries (Indirect)	Deaths (Indirect)
Dense Fog	12/11/1997	5	26	$1,500,000	$0	0	0
Dense Fog	12/18/1998	1	10	$500,000	$0	0	0
Dense Fog	12/20/1999	0	2	$120,000	$0	0	0
Dense Fog	1/3/2001	0	0	$0	$0	0	0
Dense Fog	1/3/2001	0	0	$0	$0	0	0
Dense Fog	12/8/2015	0	0	$0	$0	0	1
Total		**6**	**38**	**2,120,000**	**$0**	**0**	**1**

Source: NCDC

- **December 11, 1997** – Patchy dense fog was a main contributing factor in a major chain reaction collision on northbound Interstate 5 near Lambert, CA, 17 miles south of downtown Sacramento. The crash involved 8 tractor trailers, 1 tanker truck, and 28 automobiles and small trucks. The five fatalities were burn victims caught in the fires from exploding fuel tanks. 26 other people were injured, and damage of $1.5 million was attributed to the fog.
- **December 18, 1998** – Dense morning fog resulted in a 38-vehicle pileup 10 miles northwest of downtown Sacramento on Interstate 5. The crash involved 26 automobiles, 10 tractor trailers, and 2 motor homes. Interstate 5 was closed for more than 10 hours in both directions. 1 fatality and 10 injuries were recorded. $500,000 in damages was attributed to the fog.
- **December 20, 1999** – Dense fog was responsible for an 8-vehicle pileup on Highway 12 on Andrus Island in south Sacramento County. California Highway Patrol reported visibilities of 75 feet. Two big-rigs and 6 passenger vehicles were involved in the accident. 2 injuries and $120,000 were attributed to the fog. No fatalities occurred during this fog event.

- **January 3, 2001** – Dense fog affected morning travel between the Central Sacramento Valley and the Northern San Joaquin Valley. The Delta was also affected. The California Highway Patrol escorted travelers through Sacramento and Yolo Counties where visibilities lowered to 200 feet. They also reported that the combination of high speeds and dense fog tripled the average amount of minor accidents during the morning commute. Nearly one-third of the commercial flights originating from the Sacramento International Airport were cancelled. No injuries, fatalities, or damages were recorded.
- **December 8, 2015** – Light winds and wet ground allowed fog to develop overnight and in the early morning. Around 5:20 a.m., 42-year-old male was killed when he crossed Power Inn Road at Florin Road against the light and was struck by a northbound vehicle that had a green light, according to the CHP. Poor visibility from fog is believed to have been a factor. Speed and alcohol reportedly did not contribute to the crash.

HMPC Events

The HMPC noted that, in addition to these past occurrences, a report from the NWS Office in Sacramento titled "Climate of Sacramento, California" revised in 2010 listed the following data in Table 4-10 and Table 4-11 regarding dense fog in the Sacramento area. As can be seen by the tables, dense fog is a prominent natural hazard in Sacramento County.

Table 4-10 Greatest Number of Total Days in a Month with Dense Fog 1949 to 2010

Days	Period	Year		Days	Period	Year
17	December 12-28	1985		9	January 12-20	1965
14	December 23 - January 5	2000		9	9 January 17-25	1961
13	January 13-25	1975		9	November 25-December 3	1949
12	December 9-20	2004		9	February 3-11	1954
11	December 3-13	1962		8	February 3-10	1991
10	December 2-11	1977		8	December 23-30	1989
10	December 27 - January 5	1962		8	January 29-February 5	1962
9	December 23-31	2000		8	December 14-21	1956
9	January 6-14	1986		8	December 14-21	1954
9	February 6-14	1971				

Source: Climate of Sacramento California. 2010

*Table 4-11 Greatest Number of Consecutive Days with Dense Fog 1949 to 2010**

Days	Period		Days	Period
23	January 1961		16	January 1955
22	December 1989		15	January 1975
22	December 1985		15	January 1972
20	December 2000		15	January 1965
20	December 1962		14	December 1986
19	December 1963		14	January 1986
19	January 1958		14	January 1983
18	January 1985		14	January 1964
17	January 2003		14	January 1963
16	December 2004		14	January 1962
16	December 1977			

Source: Climate of Sacramento California. 2010

* Only periods with 14 or more days are tabulated.

Likelihood of Future Occurrence

Highly Likely – Based on input from the HMPC, it is likely that major fog events will continue to occur annually in Sacramento County; thus the future occurrence of severe fog is highly likely.

Climate Change and Fog

It is currently unclear if climate change will have any effect on fog issues in the future. Limited data and research performed for redwood regions in California suggests that the occurrence of summertime fog has declined by 33% over the course of the 20th century. These findings were presented by Johnstone and Dawson in the Proceedings of the National Academy of Sciences.

4.2.5. Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, Lightning)

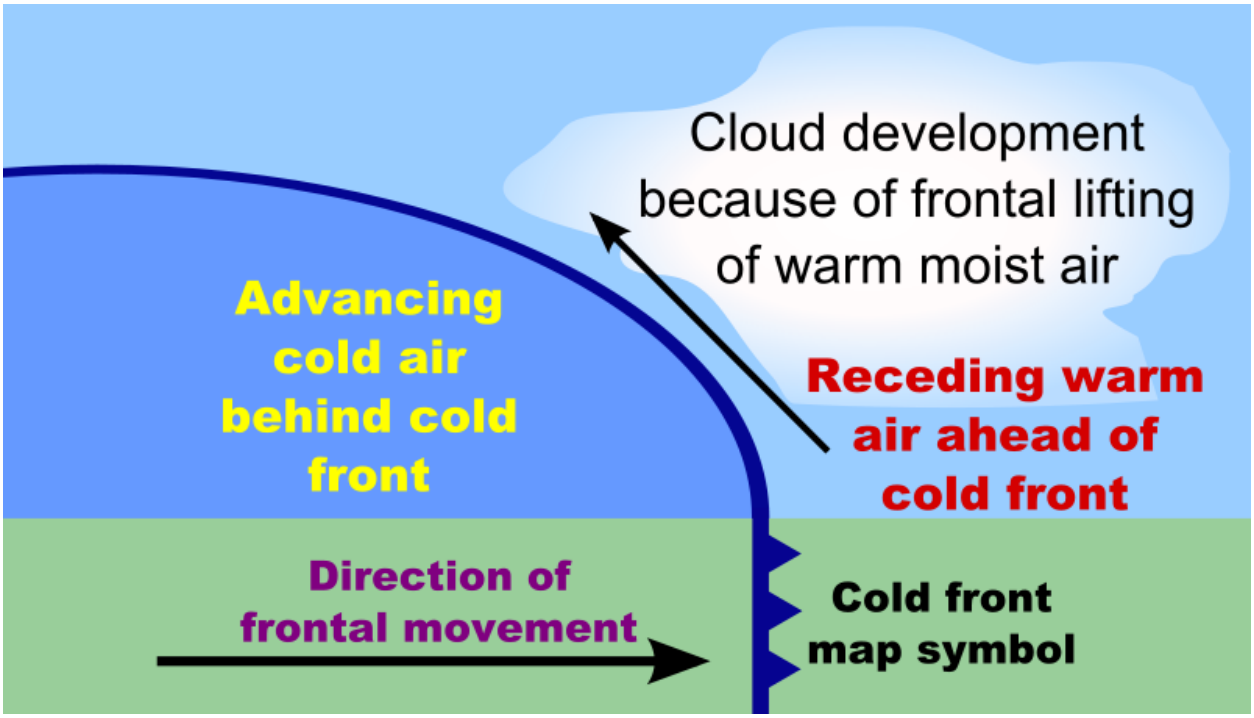
Hazard/Problem Description

Storms in the Sacramento County Planning Area are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado. Heavy precipitation in the Sacramento County area falls mainly in the fall, winter, and spring months.

Heavy Rain and Thunderstorms

The NWS reports that thunderstorms result from the rapid upward movement of warm, moist air (see Figure 4-9). They can occur inside warm, moist air masses and at fronts. As the warm, moist air moves upward, it cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling the long distance through the clouds towards earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at Earth's surface and causes strong winds associated with thunderstorms.

Figure 4-9 Formation of a Thunderstorm



Source: NASA.

According to the HMPC, short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues. With the increased growth of the area, the lack of adequate drainage systems has become an increasingly important issue. In addition to the flooding that often occurs during these storms, strong winds, when combined with saturated ground conditions, can down very mature trees.

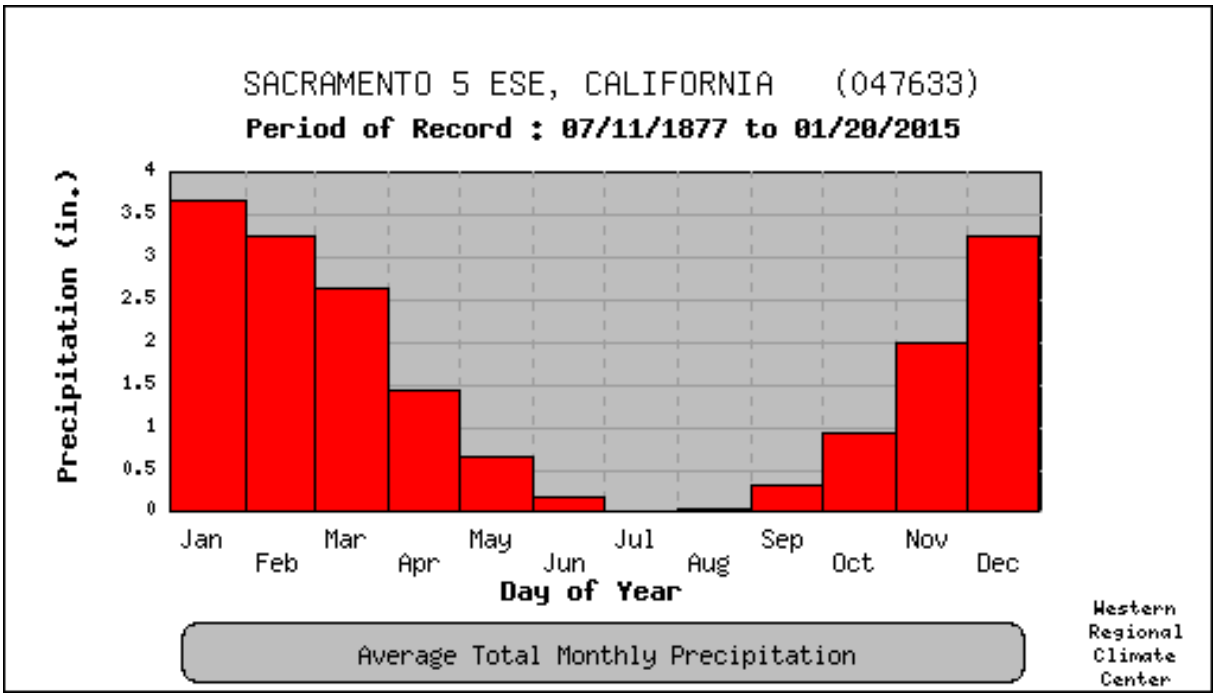
Information from the longest recording weather station in the County is summarized below.

Sacramento County (Sacramento 5 ESE Weather Station, Period of Record 1877 to 2015)

According to the WRCC, average annual precipitation in the County is 18.15 inches per year. The highest recorded annual precipitation is 37.62 inches in 1983; the highest recorded precipitation for a 24-hour period is 5.28 inches on April 20, 1962. The lowest recorded annual precipitation was 11.76 inches in 1976.

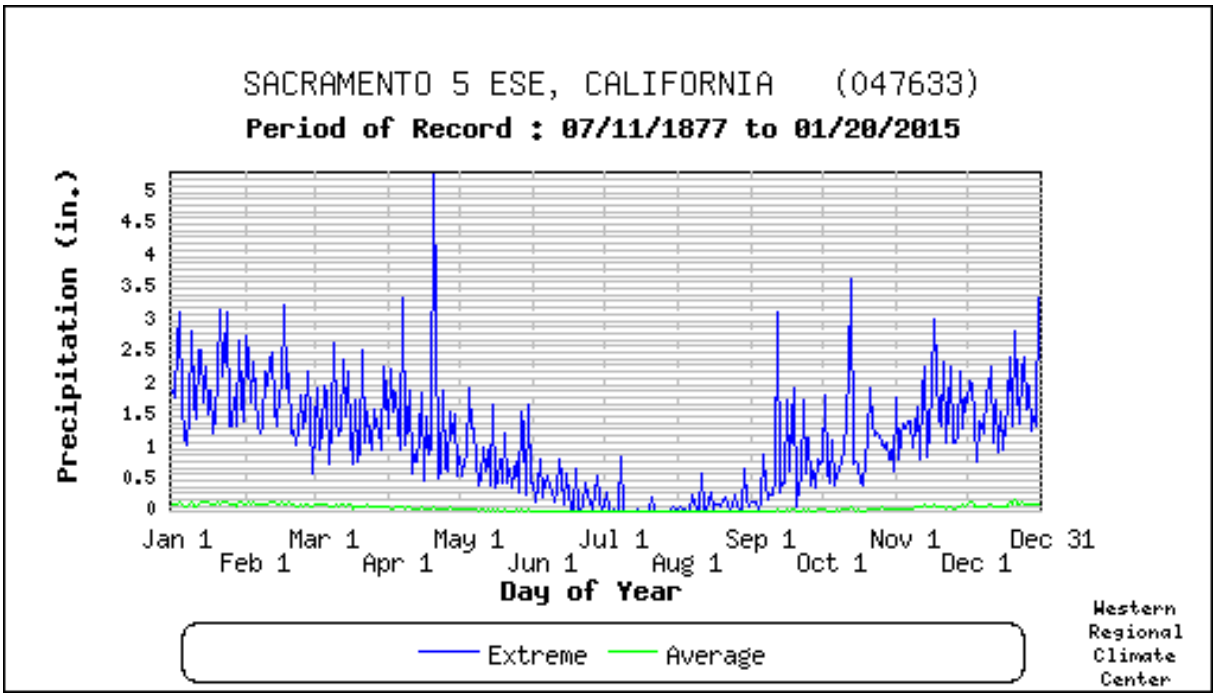
Average monthly precipitation for Sacramento County is shown in Figure 4-10. Daily average and extreme precipitations are shown in Figure 4-11.

Figure 4-10 Sacramento County Monthly Average Total Precipitation



Source: WRCC

Figure 4-11 Sacramento County Daily Precipitation Average and Extremes



Source: WRCC

Hail

Hail is formed when water droplets freeze and thaw as they are thrown high into the upper atmosphere by the violent internal forces of thunderstorms. Hail is sometimes associated with severe storms within the Sacramento County Planning Area. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 miles per hour (mph). Severe hailstorms can be quite destructive, causing damage to roofs, buildings, automobiles, vegetation, and crops.

The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 4-12 indicates the hailstone measurements utilized by the National Weather Service.

Table 4-12 Hailstone Measurements

Average Diameter	Corresponding Household Object
.25 inch	Pea
.5 inch	Marble/Mothball
.75 inch	Dime/Penny
.875 inch	Nickel
1.0 inch	Quarter
1.5 inch	Ping-pong ball
1.75 inch	Golf-Ball
2.0 inch	Hen Egg
2.5 inch	Tennis Ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: NWS

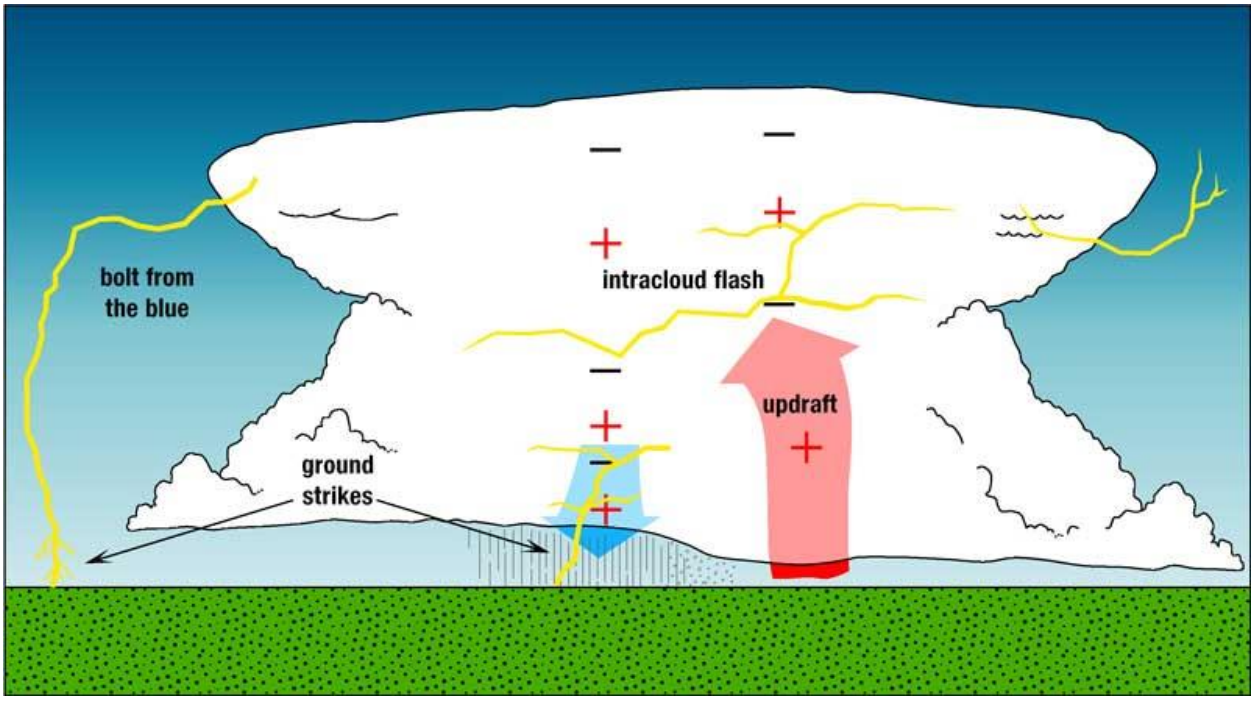
Lightning

Lightning is defined by the NWS as any and all of the various forms of visible electrical discharge caused by thunderstorms. Thunderstorms and lightning are usually (but not always) accompanied by rain. Cloud-to-ground lightning can kill or injure people by direct or indirect means. Objects can be struck directly, which may result in an explosion, burn, or total destruction. Or, damage may be indirect, when the current passes through or near an object, which generally results in less damage.

Intra-cloud lightning is the most common type of discharge. This occurs between oppositely charged centers within the same cloud. Usually it takes place inside the cloud and looks from the outside of the cloud like a diffuse brightening that flickers. However, the flash may exit the boundary of the cloud, and a bright channel, similar to a cloud-to-ground flash, can be visible for many miles.

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, a large minority of flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are also more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat (see Figure 4-12). Positive lightning also has a longer duration, so fires are more easily ignited. And, when positive lightning strikes, it usually carries a high peak electrical current, potentially resulting in greater damage.

Figure 4-12 Cloud to Ground Lightning



Source: NWS

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up multiple events. FEMA federal disaster declarations occurred in 1950, 1955, 1958, 1963, 1969, 1983, 1986, 1989, 1995 (twice), 1997, 1998, 2006. State disaster declarations occurred in 1950, 1955, 1958 (twice), 1963, 1969, 1982 (twice), 1983, 1986, 1989, 1995 (twice), 1996, 1997, 1998, and 2008. More information can be found in Table 4-3 in Section 4.1.2. There have been no USDA secretarial declarations associated with severe storms.

NCDC Events

The NCDC data recorded 33 hail, heavy rain, lightning, and thunderstorm wind incidents for Sacramento County since 1950. A summary of these events is shown in Table 4-13 Specific events in the NCDC database showing damages, deaths, or injuries are detailed below the table; details on notable events follow

Table 4-13 NCDC Severe Weather Events in Sacramento County 1950-12/31/2015

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Hail	7	0	0	0	0	$11,030	$0
Heavy Rain	18	0	0	1	0	$365,000	$50,000
Lightning	1	0	0	0	0	$150,000	$0
Thunderstorm Wind	7	0	0	0	0	$0	$0
Total	**33**	**0**	**0**	**1**	**0**	**$526,030**	**$50,000**

Source: NCDC

- **March 24, 1994** – A strong upper low pressure system and cold front moved over the area, where rainfall amounts of 0.75 to 1.33 inches were common. Numerous reports of street flooding were reported.
- **January 22, 2000** – In about a 48-hour span, downtown Sacramento more than doubled its seasonal precipitation climbing from 3.91 inches to 8.21 inches. Officially for the event, downtown Sacramento received 4.30 inches. On the 24th, Sacramento easily established a new daily precipitation record with 3.11 inches. The previous record for the date was 1.76 inches. Saturated grounds along with breezy conditions were responsible for a tree's collapse which critically injured a Sacramento resident. The same uprooted tree damaged two passenger vehicles and a residence. SMUD reported that the extreme weather caused 1,871 customers to lose power. Over $15,000 in property damage was attributed to this storm.
- **February 11, 2000** – Heavy rain inundated a sewage pump along Greenback Lane in Folsom. This caused water and raw sewage to sweep downhill and into an impoundment on the American River. Over $100,000 in property damage was attributed to this storm.
- **October 9, 2000** – Lightning struck a television antenna, setting the roof ablaze in the City of Elk Grove. Over $150,000 was attributed to this lightning strike.
- **May 9, 2005** – Hail struck 10 miles north of the City of Sacramento. Hail accumulation on Highway 99 resulted in several accidents. Over $10,000 was attributed to this hail storm.
- **April 2, 2006** – Prolonged heavy precipitation with high snow levels resulted in excessive runoff into area river basins. Hardest hit was the San Joaquin River system and the Delta region. Many area reservoirs had minimal flood storage space as per seasonal norms and the large inflows had to be balanced very carefully with downstream releases to protect the fragile San Joaquin levee system. While the bulk of the flooding affected agricultural and rural properties, some local areas adjacent to waterways experienced flooding of homes and many roads were impassable. However, through the efforts of advance flood-fight measures, careful monitoring of levees, and critical water management coordination among federal, state, and local agencies, the system performed as designed and more serious flooding was averted. Over $250,000 in property damage and $50,000 in crop damage were attributed to this storm.

HMPC Events

The HMPC noted that the all-time record for rainfall during any 24-hour period in Sacramento is 7.24 inches on April 19-20, 1880. Streets were described as "having the appearance of miniature rivers." The rainstorm was also reported (colorfully) in such terms as "steady and business-like", "a perfect torrent", and "more like a cataract than an April shower."

The record maximum one-hour rainfall is 1.65 inches, which fell during the evening of April 7, 1935. Thunderstorms in the area were responsible for the downpour with considerable street flooding reported. (Note: Hourly rainfall records are only available after 1903).

January 1862, with 15.04 inches, is the wettest month on record. This took place before official government observations began. Precipitation records at that time were kept by two physicians, Dr. F.M. Hatch, a retired Army Surgeon, and his associate, Dr. T.M. Logan. Their records are believed to be reliable.

The most rainfall ever recorded in one season in Sacramento is 37.62 inches, set during the 1982-83 rainy season, under the influence of a strong El Niño. This followed the wet season of 1981-82 (32.65 inches), making it the wettest two-year period on record in Sacramento. The most recent El Niño outbreak to saturate the Sacramento area was the 1997-98 water year, which received a whopping 32.25 inches of precipitation. Since rainfall records began in 1849-50, only eight other water years have received more.

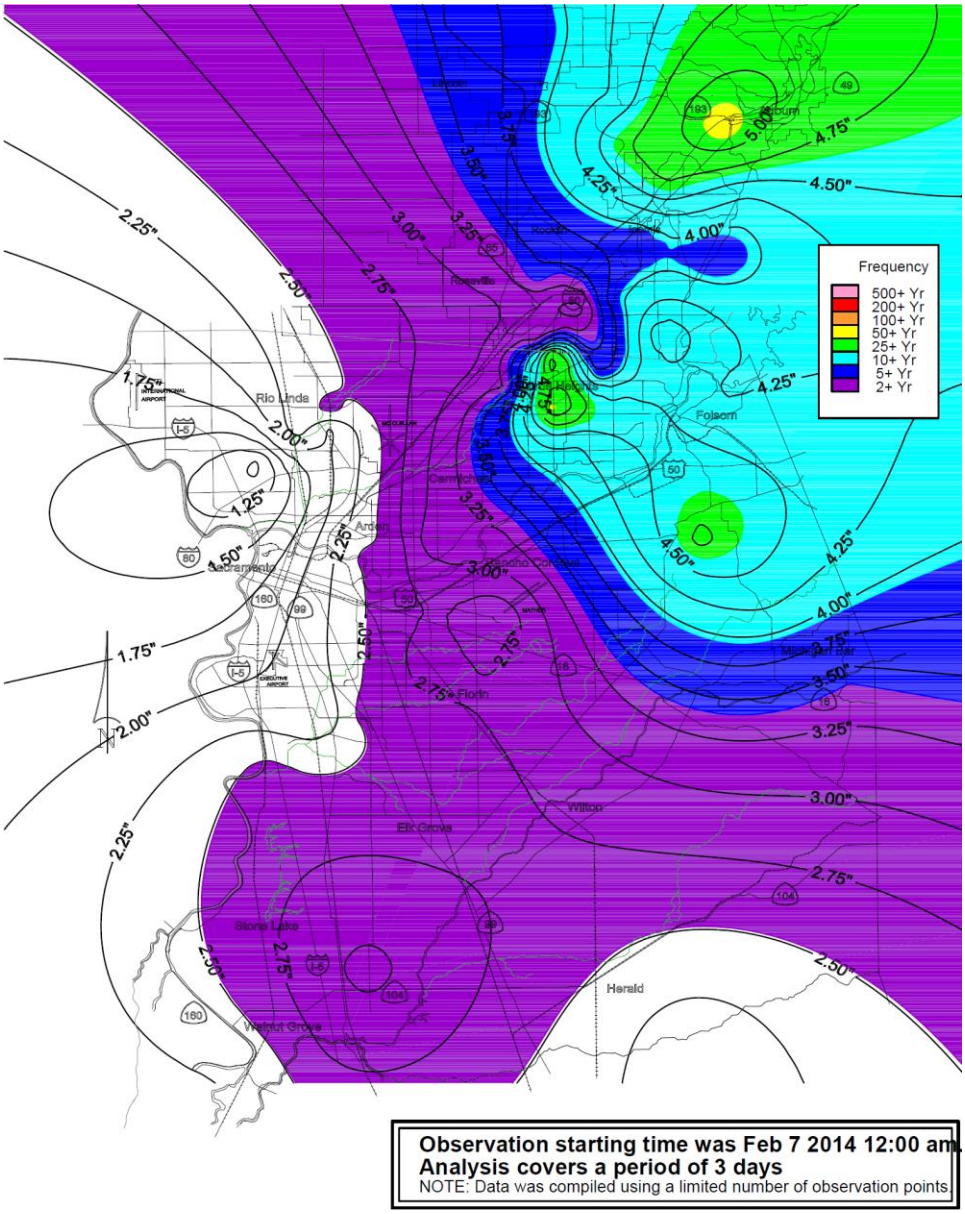
The HMPC also provided storm reports from 2011 to 2015. Reports are triggered for the following reasons:1) 75 drainage complaints Countywide, or 25 complaints in any one County Supervisor's District; 2) any structure flooding; and 3) coverage on the news about impending storms or during the storm. Information from those reports is included below.

- **March 2011** – Rain fell continually throughout the week, but the significant storm event began on the 24th. Rainfall totals only reached approximately 1" to 1.5" countywide on the 24th, but fell with high intensities at times on saturated watersheds which exacerbated impacts on stream levels. High winds helped dislodge debris to clog drain inlets. There were a total of 90 service request calls between 11 am on the 24th to 11 am on the 25th. Most calls were for plugged storm drains. There was one report of a flooded structure, but that was not confirmed.
- **December 2, 2012** – A series of consecutive heavy rainfall events caused creeks and streams to rise rapidly due to ground saturation. Reports of a trailer park flooded on Sunday due to rising creek levels along Arcade Creek. Winding Way (road) was reported as flooded in low lying areas as well. Damages included:
  - ✓ 12 homes (6 - homes confirmed, 6 - homes high probability)
  - ✓ 15 garages (8 - garages confirmed, 5 - garages high probability)
  - ✓ 4 duplexes (eight residences)
  - ✓ 29 apartments (2 within Auburn Villa MHP)
  - ✓ 4 mobile/manufactured homes within Auburn Villa MHP
  - ✓ 16 RVs within Auburn Villa MHP
  - ✓ 30 vehicles
- **May 5-6, 2013** – Redevelopment of thunderstorms that were producing torrential rainfall over the urban areas of Sacramento caused several instances of roadway flooding across the area. Law enforcement reported roadway flooding at Exposition Blvd and Heritage Lane with a vehicle stuck in the roadway,

two vehicles stuck in water near Arden and Hwy 160, roadway flooding near Watt Ave and Marconi Ave, as well as roadway flooding at H Street and 37th Street.

- **February 7-9, 2014** – A large storm occurred in the County. Rainfall totals of up to 3.5" occurred. Upstream of Folsom Dam, 5" fell in the City of Auburn in Placer County. Storm totals and an estimate frequency interval for the storm are shown on Figure 4-13. 73 calls were handled by the County for service requests.

Figure 4-13 February 7-9th Storm Rainfall Totals and Storm Interval



Source: Sacramento County Department of Water Resources 2014 Storm Report

- **February 5 to 9, 2015** – Countywide rainfall totaled approximately 1 inch to 3 inches and the rainfall intensity was equivalent to the 3-year storm event or less. The Department of Water Resources received 47 drainage service requests. The majority of calls were for localized street flooding and plugged drain inlets. No structure flooding was reported at this time. Three self-service sandbag sites were opened

for the storm event, however no sandbags were distributed. Arcade Creek hit monitor stage at Winding Way near the American River College, Cosumnes River hit monitor stage at Michigan Bar (stages in the river are still raising but are not expected to reach flood stage), and the Natomas East Main Drain Canal hit monitor stage at pump station D15. Deer Creek hit flood stage at Scott Road.

- **December 21 and 22, 2015** – Countywide rainfall totaled approximately 0.1 inch to 0.95 inches, and the rainfall intensity was less than a 2-yr event. The Department of Water Resources received 12 drainage service requests. No structure flooding was reported at this time. Cosumnes River hit monitor stage at Michigan Bar and is receding. The Natomas East Main Drain Canal hit monitor stage at pump station D15. Deer Creek hit monitor stage at Scott Road.

Likelihood of Future Occurrence

Highly Likely – Heavy rains and storms are a well-documented seasonal occurrence that will continue to occur annually in the Sacramento County Planning Area.

Climate Change and Heavy Rains and Storms

According to the CAS, while average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. This may bring stronger thunderstorm winds. It is unlikely that hail will become more common in the County. The amount of lightning is not projected to change.

Preliminary Draft - Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan (CAP), Ascent Environmental 2016 Analysis

According to the 2016 Preliminary Draft CAP, which utilized Cal Adapt to model potential climate change impacts to Sacramento County, historic precipitation patterns could be altered. Depending on the location, precipitation events may increase or decrease in intensity and frequency. However, while the projections in California show little change in total annual precipitation, even modest changes could significantly affect California ecosystems that are conditioned to historical precipitation timing, intensities, and amounts. Also noted, reduced precipitation could lead to higher risk of drought and increased precipitation could cause flooding and soil erosion. Based on the Cal-Adapt model, the historical annual average rate of precipitation in Sacramento County is 18 inches. Under the high emission scenario, overall precipitation in Sacramento County is expected to decline over the next century, with annual averages decreasing more substantially under the high emissions scenario. Further, changes in weather patterns resulting from increases in global average temperature could result in a decrease in total amount of precipitation falling as snow. Based on historical data and modeling, under both low- and high-emissions scenarios, Cal DWR projects that the Sierra Nevada snowpack will decrease by 25-40 percent from its historic April 1st average of 28 inches of water content by 2050 and 48 to 65 percent by 2100, respectively.

4.2.6. Severe Weather: Wind and Tornadoes

Hazard/Problem Description

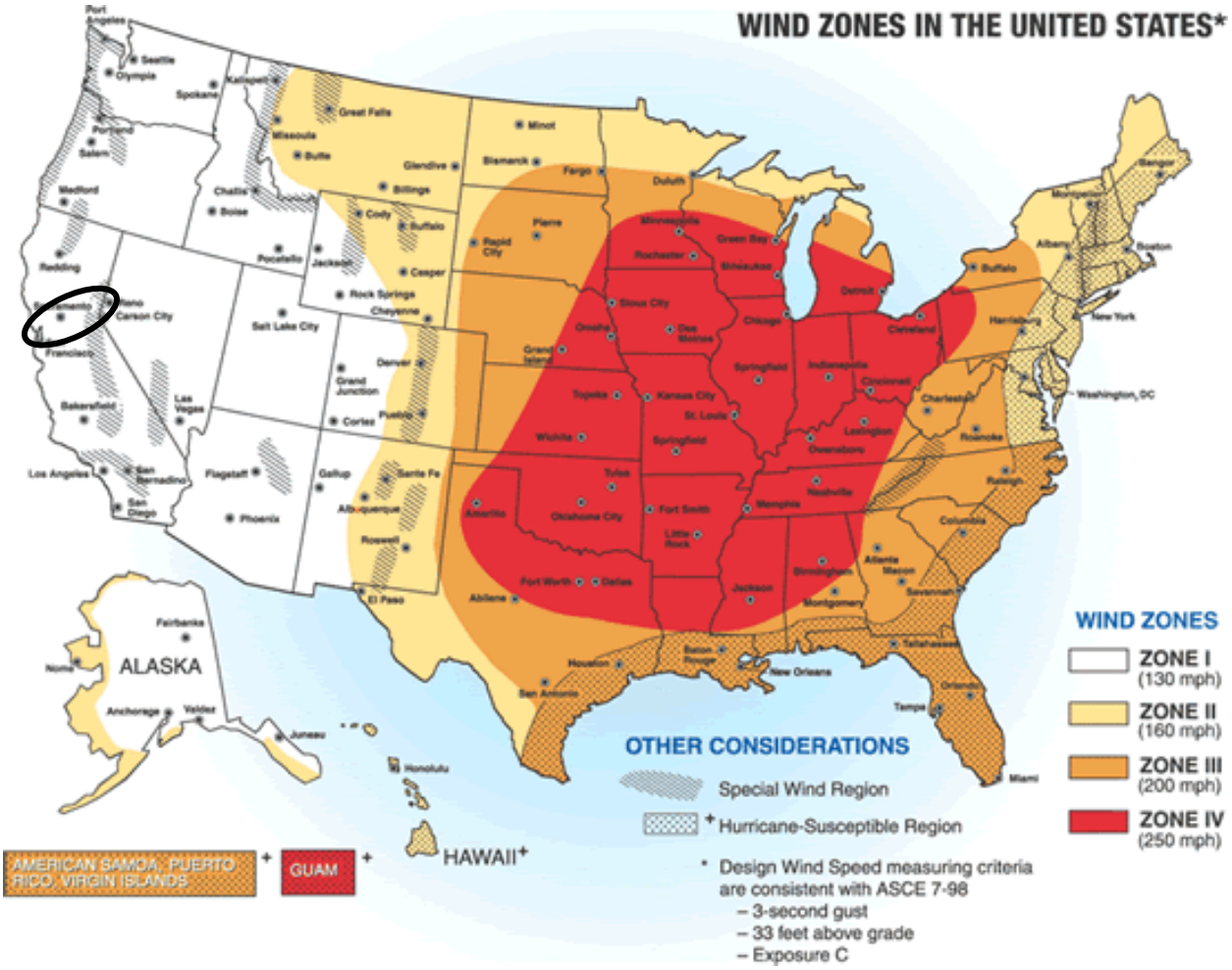
Winds

High winds, often accompanying severe thunderstorms, can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss.

The Planning Area is subject to significant, non-tornadic (straight-line), winds. High winds, as defined by the NWS glossary, are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. These winds may occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms. Straight-line winds may also exacerbate existing weather conditions by increasing the effect on temperature and decreasing visibility due to the movement of particulate matters through the air, as in dust and snow storms. The winds may also exacerbate fire conditions by drying out the ground cover, propelling fuel around the region, and increasing the ferocity of exiting fires. These winds may damage crops, push automobiles off roads, damage roofs and structures, and cause secondary damage due to flying debris.

Figure 4-14 depicts wind zones for the United States. The map denotes that Sacramento County falls into Zone I, which is characterized by high winds of up to 130 mph. Portions of the County also fall into a Special Wind Region.

Figure 4-14 Wind Zones in the United States



Source: FEMA

Tornadoes

Tornadoes and funnel clouds can also occur during these types of storms. Tornadoes are another severe weather hazard that can affect the Sacramento County Planning Area, primarily during the rainy season in the late fall and early spring. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential across a path only 300 yards wide or less as 300-mile-wide hurricanes. Figure 4-15 illustrates the potential impact and damage from a tornado.

Figure 4-15 Potential Impact and Damage from a Tornado

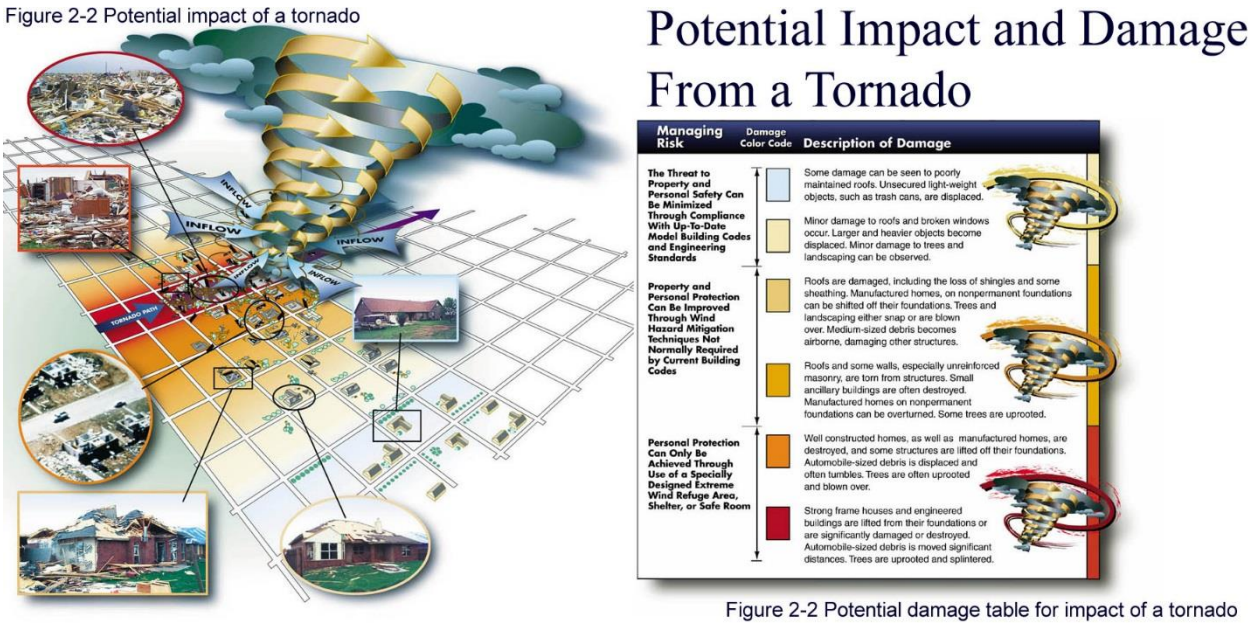


Figure 2-2 Potential damage table for impact of a tornado

Source: FEMA: Building Performance Assessment: Oklahoma and Kansas Tornadoes

Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it takes into account the materials affected and the construction of structures damaged by a tornado. Table 4-14 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 4-15 shows the wind speeds associated with the Enhanced Fujita Scale ratings.

Table 4-14 Original Fujita Scale

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: NOAA Storm Prediction Center, www.spc.noaa.gov/faq/tornado/f-scale.html

Table 4-15 Enhanced Fujita Scale

Enhanced Fujita (EF) Scale	Enhanced Fujita Scale Wind Estimate (mph)
EF0	65-85
EF1	86-110
EF2	111-135
EF3	136-165
EF4	166-200
EF5	Over 200

Source: NOAA Storm Prediction Center, www.spc.noaa.gov/faq/tornado/ef-scale.html

Tornadoes can cause damage to property and loss of life. While most tornado damage is caused by violent winds, the majority of injuries and deaths generally result from flying debris. Property damage can include damage to buildings, fallen trees and power lines, broken gas lines, broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response.

Past Occurrences

Disaster Declaration History

There have not been any FEMA federal or state disaster declarations in the Planning Area associated with high winds or tornadoes. There has been one USDA secretarial disaster declaration for wind/tornado in 2005, which is detailed in Table 4-21 in Section 4.2.7.

NCDC Events

Winds

The NCDC data shows 32 wind incidents for Sacramento County since 1993. These are shown in Table 4-16. Winds that resulted in damage, injuries, or deaths are discussed below the table.

Table 4-16 NCDC Wind Events in Sacramento County 1993 to 12/31/2015

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
High Wind	36	1	0	0	0	$8,842,000	$39,000
Strong Wind	9	0	1	0	2	$2,185,000	$0
Thunderstorm Wind	7	0	0	0	0	$0	$0

Event Type	Number of Events	Deaths	Deaths (indirect	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Total	**52**	**1**	**1**	**0**	**2**	**$0**	**$0**

Source: NCDC

- **February 7, 1998** – Strong winds blew for a second day in a row in the Sacramento and Northern San Joaquin Valleys. The winds were strong enough to push a floating restaurant upstream on the swollen Sacramento River near Sacramento. Power outages left 60,000 customers in Sacramento and 15,000 Solano County customers in the dark for hours. 118 city trees were damaged in Sacramento. In total, $300,000 in property damage was attributed to this wind storm. No injuries or deaths were recorded.
- **November 7, 1998** – Post-frontal winds exceeding 50 mph downed over 400 power lines and trees. Over 125,000 SMUD and PG&E customers temporarily lost power with 90,000 of them in Sacramento County. In addition, $700,000 of damages were reported. No injuries or deaths were recorded.
- **April 3, 1999** – Pre-frontal winds of 40 mph disrupted electrical service for 3,500 PG&E customers. In addition, $59,000 of damages were reported. $20,000 of it was property damage, while $39,000 of crop damage was recorded. No injuries or deaths were recorded.
- **June 17, 2000 –** Sustained winds of 30-40 mph blew through the Carquinez Strait during the afternoon and early evening hours. A motorcyclist traveling on I-680 in nearby Solano County was pushed off the highway near Marshview Road by a stronger gust at approximately 5:25 pm and died of his injuries.
- **October 24, 2000 –** Strong north winds exceeded 40 mph across the interior valley and foothills. More than 20,000 Sacramento Metropolitan Utility District (SMUD) and Pacific Gas & Electric (PG&E) customers were temporarily without power. The winds uprooted trees damaging several homes and vehicles. $40,000 in property damage was attributed to this wind storm. No injuries or deaths were recorded.
- **January 4, 2008** – A 71 mph gust was measured 4 miles west northwest of Elk Grove. A 69 mph wind gust was measured at Sacramento Executive Airport and a 66 mph wind gust was measured at Sacramento International Airport. The State Legislature building had several windows broken and proceedings were forced to be suspended. Many trees were reported down, including an 80 foot oak tree near the intersection of Elm and Hazel in Sacramento. PG&E reported many power poles down throughout the area and thousands of residents and businesses were without power for up to seven days. Several big rigs were reported down by the California Highway Patrol (CHP), including one on I-5 south of River Rd. in Woodland, and another on I-80 east of State Route 113. $7.4 million in property damages were recorded, though not all of them occurred in Sacramento County. No injuries or deaths were recorded.
- **October 27, 2013** – Strong onshore winds brought down large trees for the Southern Sacramento Valley. Sacramento Executive AP peaked at 41mph, Sacramento International AP peaked at 46mph, and Vacaville/Nut Tree peaked at 36mph. Broadcast media reported several large trees down in Sacramento which hit houses, powerlines, and cars. A tree fell on a home near Sac State that caused significant roof damage. $50,000 in property damage was attributed to this wind storm. No injuries or deaths were recorded.
- **December 11, 2014** – Law enforcement, media, and the public reported numerous trees and large branches downed by winds in Sacramento and adjacent suburbs, such as Rosemont, Carmichael, and Florin. These caused local power outages spread across the area. There was a 38 mph gust measured at 7 am at Sacramento Executive Airport, a 40 mph gust at Sacramento International Airport. $500,000 in property damage was attributed to this wind storm. No injuries or deaths were recorded.

- **December 30, 2014 –** Multiple fallen trees caused damage to homes in the Motherlode foothills and in the Sacramento metro area. Trees were reported falling on homes and business in Sacramento, Elk Grove, and Folsom. Fallen trees and branches also caused power outages, with 344,000 customers across northern California impacted. $1,600,000 in property damage was attributed to this wind storm, though not all in Sacramento County. No injuries or deaths were recorded.

Tornado

During the rainy season, the Sacramento County Planning Area is prone to relatively strong thunderstorms, sometimes accompanied by funnel clouds and tornadoes. While tornadoes do occur occasionally, most often they are of F0 or F1 intensity. Documented incidents of tornadoes in the Sacramento County Planning Area from the NCDC Storm Events Database are listed in Table 4-17 and explained in further detail in the text below the table.

Table 4-17 Sacramento County Tornado Events from 1950 – 12/31/2015

Type	# of Events	Property Loss	Crop Loss	Deaths	Injuries
Funnel Cloud	6	$0	$0	0	0
F0	8	$706,000	$0	0	0
F1	3	$500,000	$0	0	0
F2	1	$250,000	$0	0	0
Total	**18**	**$1,456,000**	**$0**	**0**	**0**

Source: NCDC

- **February 7, 1978** – An F2 tornado was reported in Sacramento County. The tornado was 20 yards wide and was on the ground for approximately 1.9 miles. No deaths, no injuries, and $250,000 in damages were attributed to this tornado.
- **March 22, 1983** – An F1 tornado was reported in Sacramento County. The tornado was 50 yards wide and was on the ground for approximately 1 mile. No deaths, no injuries, and $250,000 in damages were attributed to this tornado.
- **April 9, 1988** – An F1 tornado was reported in Sacramento County. The tornado was 30 yards wide and was on the ground for approximately 1 mile. No deaths, no injuries, and $500,000 in damages were attributed to this tornado.
- **April 24, 1998** – A weak tornado (F0) touched down near a large mall in the Sacramento metro area, severely damaging a tree and damaging two cars. No deaths, no injuries, and $10,000 in damages were attributed to this tornado.
- **February 21, 2005** – On 21 February 2005 Presidents' Day, three tornadoes and several funnel clouds (see Figure 4-16) occurred in the Sacramento valley, including two weak (F0) tornadoes in the Sacramento, CA metropolitan area. The Southport, CA and Natomas, CA tornadoes caused nearly $1 million of damage to residential and commercial property. Amazingly, there were no fatalities or serious injuries despite the amount of flying debris, air-borne projectiles, toppled trees, and an over-turned semi-trailer truck.

Figure 4-16 Images from the President's Day Tornado Outbreak in Sacramento County

Source: Sacramento Bee

- **April 8, 2005** – An F0 made two brief touchdowns in Sacramento County, one 8 miles north of the City of Sacramento and another near the Sacramento Metro Airport. The brief touchdown north of the City caused damage to a church roof, residential property fences, and to tree branches. The brief touchdown near the airport was in an open field and caused no damages. In all, no deaths, no injuries, and $25,000 in damages were attributed to this tornado.
- **February 25, 2007** – Clearing skies over an unstable airmass left in the wake of a very cold winter storm provided an environment favorable for weak convective activity. A very weak tornado (EF0) skimmed a residential area just south of downtown Elk Grove shortly after noon. Damage was minimal but consistent in a narrow one mile path. Most of the damage was to small tree branches but also included two power lines tipped, a rooftop solar heating unit damaged, and there was minor damage to fence panels at two locations. No structural damage was noted. No deaths or injuries were attributed to this tornado.
- **February 25, 2011** – An EF0 tornado touched down at the Mather Field Industrial Park, immediately north of Mather Field. The maximum wind speed of the tornado was estimated at 75 mph with a damage path of one third of a mile. The damage path was in a northeast direction. No injuries nor fatalities have been reported. Damage was to a few trees including a large evergreen tree, broken road signs, and broken windows to multiple cars.
- **October 22, 2015** – A tornado touched down in the City of Elk Grove. Supercells developed behind the cold front along a north-south boundary in the middle of the Central Valley, where both instability and shear were large. Reports of tornado damage were at approximately 3:45pm (PST) near Waterman and Grand Line Roads. The estimated damage path length was about a mile with wind speeds estimated at 90-100mph. A sturdy metal roof was bent back, tree trunks that were several feet in diameter were snapped. Dozens of houses were mildly damaged.

HMPC Events

The Planning Team for the County noted the following events since 2011:

- 2012 – October 22nd @ 3:45 – A tornado occurred in Elk Grove, which caused winds of 90-100 mph.
- 2013 – April 8th and 9th – A strong trough that had brought rain and snow to interior northern California, had moved eastward of the area on Monday, April 8th. This brought strong, gusty northerly winds in its wake across the area, mainly the Central Valley, ridge tops, and wind prone mountain canyons. The strongest periods of winds were on Monday, April 8th from late morning into mid-afternoon. Breezy conditions occurred again on Tuesday, April 9th, though winds were not quite as strong. Sustained winds on Monday reached 25-35 mph with gusts as high as around 50 mph. Sustained winds on Tuesday

were 20-30 mph with gusts as high as around 40 mph. Over 20,000 people were reported to have lost power due to falling trees and wind (though not all in Sacramento County).

- 2013 – Oct 3rd & 27th – High winds occurred. Gusts of 35 – 50 mph.
- March 29th – A Pacific front moved through interior Northern California March 28-30th which brought rain and heavy snow to the area. A supercell strengthened in the Central Sacramento Valley that afternoon that eventually produced an EF0 tornado near Nord, CA that evening.
- 2014 – Dec 11th – Heavy rainfall & winds of about 50-60 mph.
- 2014 – Dec 30th – High winds occurred, causing a power outage to about 344,000 people.
- 2015 – December – there was a tornado that formed over Folsom Lake and impacted El Dorado County
- 2016 – January 19th – Part of a tree fell onto Saverien Drive, blocking the right turn lane. This was a result of rainfall and 40 mph winds.

Likelihood of Future Occurrence

Highly Likely – High winds are a well-documented seasonal occurrence that will continue to occur annually in the Sacramento County Planning Area, making future occurrence highly likely. While occasional, tornadoes do occur in the County as well. Combining the likelihoods results in a likelihood of future occurrence of likely.

Climate Change and High Winds/Tornadoes

According to the CAS, while average annual rainfall may increase or decrease slightly, the intensity of individual events is likely to increase during the 21st century. This may bring stronger thunderstorm winds. The number of tornadoes is not projected to change.

4.2.7. Agricultural Hazards

Hazard/Problem Description

Agricultural production in Sacramento County remains a significant contributor to the local economy. In addition to the almost $470 million in annual production value, there are hundreds of jobs directly tied to agricultural production and thousands more that are impacted indirectly in the production, processing, transportation, and marketing of those commodities. It is estimated that there is approximately a four to one ratio for crops grown in this region, so $470 million in production value is actually a $1.88 billion impact on the local economy.

Sacramento County is at risk from severe weather events and insects/pests that, under the right circumstances, can cause severe economic, environmental, or physical harm. Severe weather and insects affect crop production and can result in economic disasters. These hazards can have a major economic impact on farmers, farm workers, packers, and shippers of agricultural products. They can also cause significant increases in food prices to the consumer due to shortages.

Sacramento is also at risk to noxious weeds that can affect both waterways and agricultural crops. These hazards can have major impact on farmers, farm workers, packers, and shippers of products, as well as those who use waterways for recreation or for water supply.

Important Farmland

According to the California Department of Conservation's Farmland Mapping and Monitoring Program (FMPP), as of 2014, the County has approximately 91,568 acres of prime farmland, 43,105 acres of farmland of statewide importance, 15,125 acres of unique farmland, 58,852 acres of farmland of local importance, and 153,452 acres of grazing land. These numbers have been reduced since 2004 due to increased development in the County.

Sacramento County Agriculture Industry

According to the 2015 crop report, 2015 represented the fourth year of severe drought and that is finally demonstrated in the County's crop production value of $469,947,546 which represents a 6.4% decrease from the adjusted 2014 figure of $502,274,000 (a record high). Although the drought did negatively affect the yields of some crops, another major contributing factor to the lower farmgate was the decrease in prices for many commodities in 2015. It should be noted that many of the 2015 lower commodity prices had increased significantly in 2014 so this may be a re-adjustment to more of a normal price. Sacramento County agriculture demonstrated stability in 2015 as the top ten commodities remain the same and their proportion of the County's agricultural value remained stable as well. All but two of the top ten commodities had a decrease in value. The largest decreases were in milk and field corn. Field corn production dropped 25% and the price per ton dropped 12.7% and milk production dropped 8% and its price per unit dropped almost 30%. Pears also showed a significant decrease (-20%) with a drop in both production and price per ton but Sacramento still remains the top pear producing county in California. The top County commodity, wine grapes, increased in acreage but most likely due to the drought decreased a bit in yield and the price decreased slightly as well. Livestock was a bright spot in 2015 with a 60% increase in the value of aquaculture production and it remains in the top ten commodities. Although the price in cattle and calves remained strong and even increased, many cattlemen had already thinned their herds due to the drought (production was down almost 10%) and the cattle were not carrying the weight that they did in 2014 so producers were unable to take advantage of that strong price and turned in a 13% decrease for 2015. The rest of the livestock in the County showed increases in value so that overall, livestock values increased more than 12% over 2014.

A summation of crop values from 2010-2015 is shown in Table 4-18.

Table 4-18 Sacramento County Crop Values 2010 to 2015

INDUSTRY	2010 Value	2011 Value	2012 Value	2013 Value	2014 Value	2015 Value
Apiary Products	$3,000	$51,000	$50,000	$58,000	$230,000	$234,000
Field Crops	$58,543,000	$78,059,000	$81,030,000	$75,565,000	$80,600,000	$74,612,000
Fruit & Nut Crops	$144,270,000	$145,179,000	$198,334,000	$197,863,000	$196,923,000	$189,117,000
Livestock/Poultry	$43,467,000	$59,141,000	$74,804,586	$71,309,055	$89,953,000	$101,314,546
Livestock/Poultry Products	$50,149,000	$63,654,000	$58,884,000	$65,526,000	$76,994,000	$49,916,000
Nursery Products	$28,925,000	$26,457,000	$23,642,000	$24,916,000	$24,229,000	$23,778,000
Seed Crops	$2,275,000	$2,759,000	$5,511,000	$4,811,000	$4,254,000	$4,812,000

INDUSTRY	2010 Value	2011 Value	2012 Value	2013 Value	2014 Value	2015 Value
Vegetable Crops	$28,311,000	$29,911,000	$18,395,000	$18,909,000	$22,195,000	$26,614,000
GRAND TOTALS	**$355,943,000**	**$405,211,000**	**$460,650,586**	**$458,957,055**	**$495,378,000**	**$470,397,546**

Source: Sacramento County Agricultural Commissioner's Reports, 2010-2014

Natural Hazards and Sacramento County Agriculture

According to the HMPC, agricultural losses occur on an annual basis and are usually associated with severe weather events, including heavy rains, floods, heat, and drought. The 2013 State of California Multi-Hazard Mitigation Plan attributes most of the agricultural disasters statewide to drought, freeze, and insect infestations. Other agricultural hazards include fires, crop and livestock disease, and noxious weeds.

Insects and Sacramento County Agriculture

Sacramento County is threatened by a number of insects that, under the right circumstances, can cause severe economic and environmental harm to the agricultural industry. Insects of concern to plants and crops include the Asian citrus psyllid, Caribbean fruit fly, false codling moth, melon fruit fly, guava Fruit fly, gypsy moth, Japanese beetle, Light brown apple moth, Mediterranean fruit Fly, melon fruit fly, Mexican fruit fly, oriental fruit fly, peach fruit fly, red imported fire ant, and striped fruit fly. The Sacramento County Department of Agriculture traps and monitors all of these agricultural pests. Pest detection is a proactive program that seeks to identify exotic, invasive insects. These pests have a wide host ranges and are difficult and costly to manage once established. Early detection is essential for quick and efficient eradication. Public participation is critical to the success of this program, since staff relies on the goodwill of property owners who allow traps to be placed on their properties. The Agriculture Department deploys 7,800 traps annually between spring and fall.

The California Department of Food & Agriculture (CDFA) Pest Eradication staff with the assistance of the California Conservation Corp help to mitigate the impacts of insect pests by providing human resources to assist in state and local eradication efforts, including surveying private yards and business landscapes to detect the Glassy Winged Sharpshooter, stripping citrus fruit infected by the Mexican Fruitfly, removal of citrus trees which have been infected with Huanglongbing (HLB), also known as Citrus Greening, or cleaning and disinfecting backyards infected by the Exotic Newcastle Disease.

Weeds and Sacramento County Agriculture

Noxious weeds, defined as any plant that is or is liable to be troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate, are also of concern. Weeds of concern in the County from the California Invasive Plant Council (Cal IPC) are shown in Table 4-19 and Table 4-20.

Table 4-19 Sacramento County High Priority Weeds

Scientific Name	Common Name	Cal-IPC Rank/ CDFA Rating	Notes
Acroptilon repens	Russian knapweed	Mod/B	Few locations along roadsides and fields in Natomas Area

Scientific Name	Common Name	Cal-IPC Rank/ CDFA Rating	Notes
Arundo donax	Giant reed	High/B	Priority for management in riparian areas.
Centaurea solstitialis	Yellow starthistle	High/C	Management in high quality habitat and recreation areas.
Chondrilla juncea	Skeleton weed	MOD/A	Not a priority for mapping and control in Sacramento or foothill counties according to CDFA, weed of concern for counties around Sacramento
Cuscuta japonica	Japanese dodder	--/A	Active eradication program in place.
Cytisus scoparius	Scotch broom	High/C	Not much of this, keep on priority list, abundant in upstream watersheds.
Dittrichia graveolens	Stinkwort	MOD*/NL	Project priority. This weed is the subject of a mapping and eradication program started in 2009.
Eichornia crassipes	Water hyacinth	High*/C	Priority in Delta waterways, still actively sold in nurseries.
Genista monspessulana	French broom	HIGH/C	Scattered locations, sometimes sold in nursery trade, upstream of American River Parkway.
Lepidium latifolium	Perennial pepperweed	High/B	Heavy infestations in the southern part of the County, spreading along roadsides and through contaminated materials.
Ludwigia spp.	Water primrose	HIGH/NL	Project priority. Eradication target for mosquito and vector control work. Spreading in agricultural ditches and Laguna Creek
Sapium sebiferum	Chinese tallow	MOD*/NL	Starting to naturalize in the American River Parkway, Dry Creek and other riparian areas.
Sesbania punicea	Red sesbania	HIGH*/B	Project priority. Target of active eradication program in Dry Creek, abundant in Steelhead, Robla and Arcade creeks.
Spartium junceum	Spanish broom	High/C	Scattered locations in American River Parkway, sometimes sold in nursery trade.

Source: Sacramento WMA Strategic Plan

Status Definitions

Cal-IPC Ranks (Cal-IPC Inventory Categories):

High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

CDFA Rating definitions:

"A" –A pest of known economic or environmental detriment and is either not known to be established in California or it is present in a limited distribution that allows for the possibility of eradication or successful containment. A-rated pests are prohibited from entering the state because, by virtue of their rating, they have been placed on the of Plant Health and Pest Prevention Services Director's list of organisms "detrimental to agriculture" in accordance with the FAC Sections 5261 and 6461. The only exception is for organisms accompanied by an approved CDFA or USDA live organism permit for contained exhibit or research purposes. If

found entering or established in the state, A-rated pests are subject to state (or commissioner when acting as a state agent) enforced action involving eradication, quarantine regulation, containment, rejection, or other holding action.
"B"–An pest of known economic or environmental detriment and, if present in California, it is of limited distribution. B-rated pests are eligible to enter the state if the receiving county has agreed to accept them. If found in the state, they are subject to state endorsed holding action and eradication only to provide for containment, as when found in a nursery. At the discretion of the individual county agricultural commissioner they are subject to eradication, containment, suppression, control, or other holding action.
"C"–A pest of known economic or environmental detriment and, if present in California, it is usually widespread. C-rated organisms are eligible to enter the state as long as the commodities with which they are associated conform to pest cleanliness standards when found in nursery stock shipments. If found in the state, they are subject to regulations designed to retard spread or to suppress at the discretion of the individual county agricultural commissioner. There is no state enforced action other than providing for pest cleanliness.
"Q"–An organism or disorder suspected to be of economic or environmental detriment, but whose status is uncertain because of incomplete identification or inadequate information.
"D"–An organism known to be of little or no economic or environmental detriment, to have an extremely low likelihood of weediness, or is known to be a parasite or predator. There is no state enforced action.

Table 4-20 Sacramento WMA Weed Watch List

Scientific Name	Common Name	Cal-IPC Rank/ CDFA Rating	Notes
Ailanthus altissima	Tree of Heaven	MOD/C	Concern in natural areas.
Centaurea calcitrapa	Purple starthistle	MOD/B	A few recorded locations, more abundant in Solano County.
Centaurea sulphurea	Sicilian starthistle	--/B	Expanding outside known location in Folsom.
Cynara cardunculus	Artichoke thistle	MOD/B	In southern Delta, could expand north.
Glyceria declinata	Manna grass	MOD/NL	Invading vernal pools.
Lythrum salicaria	Purple loosestrife	HIGH/B	Small populations are not being actively managed.
Robinia pseudoacacia	Black locust	LIMITED/NL	Concern in riparian areas.
Rubus (armeniacus) discolor	Himalaya blackberry	HIGH/NL	Concern in high-value habitats, widespread.
Taeniatherum caput-medusae	Medusahead	HIGH/C	Widespread, concern in high quality rangeland in eastern County.
Tamarisk sp.	Tamarisk	HIGH - VAR/B	Only a few populations on American River Parkway, could become more widespread.
Tribulus terrestris	Puncture vine	NL/C	Concern to bikers, abundant along Sacramento River bike trail.

Source: Sacramento WMA Strategic Plan. Cal-IPC and CDFA rankings are same as in previous table.

Noxious weeds have been introduced in the Planning Area by a variety of means, including through commercial nurseries. An absence of natural controls, combined with the aggressive growth characteristics and unpalatability of many of these weeds, allows these weeds to dominate and replace more desirable native vegetation. Negative effects of weeds include the following:

- Loss of wildlife habitat and reduced wildlife numbers;
- Loss of native plant species;
- Reduced livestock grazing capacity;
- Increased soil erosion and topsoil loss;
- Diminished water quality and fish habitat;

- Reduced cropland and farmland production; and
- Reduced land value and sale potential.

Disasters and Impacts to Sacramento County Agriculture

Economic Impacts

According to the HMPC, the consequences of agricultural disasters to the Planning Area include ruined plant crops, dead livestock, ruined feed and agricultural equipment, monetary loss, job loss, and possible multi-year effects (i.e., trees might not produce if damaged, loss of markets, food shortages, increased prices, possible spread of disease to people, and loss or contamination of animal products). When these hazards cause a mass die-off of livestock, other issues occur that include the disposal of animals, depopulation of affected herds, decontamination, and resource problems. Those disasters related to severe weather may also require the evacuation and sheltering of animal populations. Overall, any type of severe agricultural disaster can have significant economic impacts on both the agricultural community and the entire Planning Area.

According to the USDA, every year natural disasters, such as droughts, earthquakes, extreme heat and cold, floods, fires, earthquakes, hail, landslides, and tornadoes, challenge agricultural production. Because agriculture relies on the weather, climate, and water availability to thrive, it is easily impacted by natural events and disasters. Agricultural impacts from natural events and disasters most commonly include: contamination of water bodies, loss of harvest or livestock, increased susceptibility to disease, and destruction of irrigation systems and other agricultural infrastructure. These impacts can have long lasting effects on agricultural production including crops, forest growth, and arable lands, which require time to mature.

Impact to Waterways

Some of California's most serious weed problems occur in our waterways, lakes and streams. The aquatic plant hydrilla is considered one of the most serious aquatic weed problems in the world and CDFA maintains an intensive program to survey and eradicate this aquatic weed pest. It can quickly take over lakes and streams, crowding out native animals and plants and blocking hydroelectric plants, while impeding water flow and delivery. Its rapid growth and ease of spread by boats makes it critical to detect early and eradicate. Based on estimates from the USDA, the permanent establishment of hydrilla in the Sacramento/San Joaquin Delta would result in at least $200 million in annual losses.

Past Occurrences

USDA Disaster Declaration History

A USDA declaration will result in the implementation of the Emergency Loan Program through the Farm Services Agency. This program enables eligible farmers and ranchers in the affected county as well as contiguous counties to apply for low interest loans. A USDA declaration will automatically follow a major disaster declaration for counties designated major disaster areas and those that are contiguous to declared counties, including those that are across state lines. As part of an agreement with the USDA, the SBA offers

low interest loans for eligible businesses that suffer economic losses in declared and contiguous counties that have been declared by the USDA. These loans are referred to as Economic Injury Disaster Loans.

Disaster declarations from 1982 through 2015 are shown in Table 4-21.

Table 4-21 Sacramento County USDA Designations: 1982-2015

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2015	–	Agricultural	Drought	S3797	–	2/25/2015
2015	–	Agricultural	Drought	S3784	–	2/4/2015
2014	–	Agricultural	Drought	S3743	–	9/17/2014
2014	–	Agricultural	Drought	S3637	–	1/23/2014
2013	–	Agricultural	Wildfire	S3626	–	8/17/2013
2013	–	Agricultural	Drought	S3569	–	8/1/2013
2013	–	Agricultural	Drought	S3558	–	7/31/2013
2012	–	Agricultural	Drought	S3452	–	12/29/2012
2012	–	Agricultural	Drought	S3379	–	9/5/2012
2009	–	Agricultural	Freezing Temperatures	S3109	–	11/25/2010
2008	–	Agricultural	Drought, Unseasonable Frost	S2708	–	7/29/2008
2007	–	Agricultural	Drought	S2563	-	8/9/2007
2007	–	Agricultural	Extremely low temperatures, freezing conditions	S2488	-	1/31/2007
2006	–	Agricultural	Excessive rain and hail	S2322	-	6/26/2006
2005	–	Agricultural	Cold wet weather	S2183	-	12/13/2005
2005	–	Agricultural	Unseasonable rain	S2120	-	8/25/2005
2005	–	Agricultural	Severe high temperatures, low humidity, strong winds	S2113	-	8/18/2005
2003	–	Agricultural	Extreme heat, unseasonable rainfall	S1855	-	12/19/2003
2003	–	Agricultural	Excessive rain, wheat stripe rust	S1812	-	10/23/2003
2002	–	Agricultural	Drought	S1769	-	4/28/2003

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
1998	–	Agricultural	Severe Winter storms, flooding	S1242	-	10/1/1998
1998	–	Agricultural	Severe Winter storms, flooding	M1203 (precursor to DR-1203)	-	2/9/1998
1995	–	Agricultural	Flooding, landslides, mud & debris flows	M1044 (precursor to DR-1044)	-	1/12/1995
1989	–	Agricultural	Earthquake	M-845 (precursor to DR-845)	-	11/4/1989
1988	–	Agricultural	Drought	S401	-	8/1/1989
1982	Rains Causing Agricultural Losses	Agricultural	Storms	GP	10/26/1982	–

Source: USDA, Sacramento County Department of Agriculture

NCDC Events

The NCDC does not track agriculture events. It does note any crop damages that come from severe weather events. These were detailed in Table 4-4 in Section 4.2.1.

HMPC Events

Members of the HMPC noted that in the **1960s** there was a significant infestation of Japanese Beetle near the State Capitol in downtown Sacramento.

In the summer of **1983**, the Sacramento County Agriculture Department and the CDFA initiated a program to eradicate an infestation of the Japanese Beetle in Orangevale, California. One phase of the eradication program consisted of multiple applications of the pesticide carbaryl to foliage for each of the three summers for 1983, 1984, and 1985. The same materials and procedures were used on earlier gypsy moth infestations in the State. During the peak beetle flight season of the summer of 1984, a number of properties were sprayed every 4 to 9 days rather than the normal interval of 14+ days. Eradication efforts were completed in 1986.

In **1999**, in two Oriental Fruit Fly traps, approximately 1 mile apart, 2 Guava Fruit Flies were detected. In response to the finds, 359 additional Oriental Fruit Fly traps were deployed in an effort to pinpoint the source of the insects. These traps covered a 90-square mile area. Though no further Guava Fruit Flies were found, a 9-square mile area was treated in the core area of the find sites.

Since **2000**, Sacramento County has been under quarantine for the Glassy-winged Sharpshooter. The pest was first found in Rancho Cordova and then in Foothill Farms. The sharpshooter feeds by sucking juices from a wide variety of plants. For most plants this is not a problem, however, the sharpshooter may spread

a lethal bacterial disease to grapes. Luckily the 2 quarantine areas were in urban settings and away from the 25,110 acres of grapes in the County. Since discovering the infestations, hundreds of residential and commercial landscapes were treated in an effort to kill the pest before it spread to the vineyards. After 2 years of negative finds in both Rancho Cordova and Foothill Farms, all quarantine designations were removed in 2009. Trapping and visual surveys continue throughout the county to ensure the pest does not return. Eradication efforts over the 10 year period totaled around $6 million

In **2000**, both Gypsy Moth and Japanese Beetle were both found. Gypsy Moth was found in the Carmichael area prompting crews to deploy 100 more traps in a 4 square mile area. No additional Gypsy moths were trapped, however increased trapping in that area continued into 2001. A single Japanese Beetle was recovered from a trap at the former Mather Air Force Base in Rancho Cordova. It is suspected that the beetle "hitch-hiked" on one of the many air cargo planes landing there. Additional traps were deployed, but no further beetles were found.

In **2001**, the Red Imported Fire Ant was detected at an RV area at Cal Expo, in Sacramento County. The discovery was made by an alert RV camper from Texas who recognized the ants and alerted officials. Additional ant colonies were found by the Cal Expo amphitheater. To eradicate the infestation, an attractive bait was applied to the infested areas for worker ants to take back to the colonies. This bait is designed to disrupt the queens' ability to reproduce, and also inhibit the ants' ability to absorb nutrients. This "one-two punch" approach targets the entire colony and not just the ants above ground.

In **2001**, a single Japanese Beetle was recovered from a trap at the former Mather Air Force Base in Rancho Cordova. It is suspected that the beetle "hitch-hiked" on one of the many air cargo planes landing there. Additional traps were deployed, but no further beetles were found.

In **2002**, five Japanese Beetles were trapped at the former Mather Air Force Base in Rancho Cordova. The old base is now used for air cargo planes; some originating in the eastern United States where Japanese beetles are well established. It is thought that the beetles may have "hitch- hiked" in the cargo holds, only to fly out when the planes were unloaded. In response to the discoveries, visual surveys were conducted and 370 additional traps were deployed. As a precaution against any possible low level infestation, limited pesticide treatments were carried out on the Mather property.

In **2003**, inspectors trapped 2 Oriental fruit flies in the Rosemont area of Sacramento. In response to the finds, additional traps were set in an 81 square mile area. Weekly monitoring of the traps revealed no further evidence of the fly. Although the additional traps were removed from the field in late spring 2004, monitoring traps continued to be inspected. Because a specific site could not be determined to be the source of the flies, no pesticide treatments were conducted.

In mid-summer **2004** a single female Japanese beetle was trapped by county ag personnel near the express carrier terminals at Mather Field in Rancho Cordova. The trap was one of over 500 Japanese beetle traps that are placed throughout the County to detect this destructive pest. As all airports are considered high risk sites, trapping levels at Mather Field remained high through the season. An introduced pest of the Eastern United states, Japanese beetles can be attracted to airport lights and fuel odors leading them to become stowaways in the cargo holds of California bound planes. Through a cooperative agreement with

the CDFA, state inspectors will continue to inspect the cargo holds of planes coming from infested eastern states.

In **2005**, Asian Longhorned Beetles (ALB) were discovered in Sacramento. Three exotic tree destroying beetles were found at a warehouse specializing in imported stone products in Sacramento in 2005. Identified as Asian Longhorned Beetles, these insects were stowaways in wooden crating material originating from China. The beetles apparently started their journey in Asia as larvae in hardwood trees that were turned into crating lumber. In nature, ALB larvae bore deep into deciduous hardwood trees such as maple, birch, chestnut, poplar, willow, elm and ash – eventually killing them. Introductions of the beetle in New York, Chicago, and New Jersey have caused the destruction of thousands of trees in efforts to eradicate the pest. The discovery of this destructive pest in California presents a serious threat to the environment. In response to the Sacramento find, Sacramento County Ag Commissioner's staff, along with state and federal ag officials quickly implemented detection and eradication procedures:

- The warehouse and all suspect trace forward packing crates were fumigated
- Visual survey of host trees in 9 square mile area (to be continued through 2008)
- Trapping survey of 9 square mile area (1 season only)
- Systemic pesticide applied preventatively to host trees near find site (for 2 seasons)
- Baited "trap" trees used as detection lures deployed near warehouse (to be continued through 2008)

In **2009**, Sacramento County detection traps intercepted a single Oriental Fruit Fly in Citrus Heights, 3 Oriental Fruit Flies in Elk Grove, and a single Mexican Fruit Fly in the Meadowview area. In cooperation with CDFA and the USDA, three separate delimitation areas were set up and hundreds of additional traps were deployed to determine if full blown infestations existed. Pesticide bait stations were placed in a 9 square mile area in Elk Grove where the 3 Oriental Fruit flies were found. After many weeks of not finding additional fruit flies, the traps were removed from each delimitation area and the threat of quarantine declaration was averted.

In **2010**, the first find of Light Brown Apple Moth in the County (Epiphyas postivittana). While no eradication treatments are currently under way, there are concerns about the impacts of quarantine and growers are taking it upon themselves to make dormant treatments of susceptible plantings such as pears and cherries, to limit pest numbers in the spring.

In **2010**, a lone mated female Oriental Fruit Fly was found in a detection trap in the North Highlands area of Sacramento County in June of 2010. Because the find indicated that there was a breeding population present, a quarantine was imposed and pesticide treatments were prescribed. Properties close to the find site received a ground spray of spinosad while insecticide bait stations were distributed over a 9 square mile area. Though the area under quarantine was mostly urban residential properties, some smaller growers and farmers markets were affected. Growers of host fruit originating within the quarantine boundaries were required to treat their produce weekly for 30 days before it could leave the quarantine area. Farmer's Markets and outdoor vendors were required to safeguard fruit and vegetables while displayed with screens or plastic to avoid fruit fly eggs being laid in host fruit. Hundreds of additional traps were deployed in the area but no further fly finds were made. The quarantine was lifted from the area in November 2010.

In **2010**, one single female Japanese beetle was trapped at a residence in Fair Oaks in August 2010. In response, the California Department of Agriculture (CDFA) placed hundreds of additional traps in the area surrounding the find to determine if a breeding population existed. Japanese beetle is not native to the United States but was accidentally introduced to the eastern states from Japan around 1917. Increased trapping levels will continue for 2 more years to monitor the area.

In **2010**, one male Peach Fruit Fly was discovered in South Sacramento in a detection trap. Bactrocera zonata is known in India and Southeast Asia as a serious pest of tropical and subtropical fruits. It is one of the three most destructive flies in India, causing crop losses of 25 to 100 percent in peach, apricot, guava and figs. Damage to the fruit is similar to that caused by the Mediterranean fruit fly and the Melon fly. It has been reared from 33 different types of fruits, a number of which are important commercial crops. It lowers the yield and quality of such fruits as mango, guava, citrus, eggplant, tomato, apple, peach and loquat. In response to the find, hundreds of additional traps were deployed to determine if a breeding population exists. Traps were monitored until early summer 2011.

In **2011**, two more Japanese Beetles were detected in a Fair Oaks neighborhood just east of the Sunrise Mall. The beetles were caught in 2 of the 50 detection traps that blanketed the area in response to the discovery of a single beetle in 2010. Trap density was increased to 160 traps in an effort to pin down the source of the population.

In **2012**, The Japanese beetle (JB) eradication project in Fair Oaks continued into its third year in 2012 with over 700 detection traps monitoring a 49 square mile area just east of the Sunrise Mall. The infestation was first discovered in 2010 after county detection trappers found a lone JB in a trap at a residential property. Two more beetles were trapped in 2011 and an eradication project was triggered. Properties within 200 meters of each find site were treated twice using a foliar spray for the adult JB's and a soil treatment for the immature grubs. In 2012, officials from both state and county agriculture departments were disappointed to detect 4 more adult beetles in the same general area. 23 more properties were added to the treatment area as the quarantine boundaries expanded. Trap numbers were increased in an effort to pin down the infestation - many property owners had at least 2 traps placed in their yards. Pesticide applications were increased to 5 treatments –repeated every two weeks in hopes of getting a handle on the population.

In **2013**, over 700 Japanese beetle traps were redeployed over 49 square miles in the infested area of Fair Oaks and checked throughout the summer by California Department of Food and Agriculture employees. No Japanese beetles were found. In fact 2013 marks the first summer since 2010 that no Japanese beetles were detected in Fair Oaks.

In **2014**, Japanese beetle and Gypsy moth were detected in Sacramento County. Because of these limited detections, no official quarantines were enacted but continuous monitoring and treatment must occur until no further evidence of either pest is found. If the pests are found in additional areas, quarantine holds may be necessary.

In addition to these specific outbreaks, the HMPC noted that Apple Codling Moth is a recurrent pest problem in Sacramento County Orchards. The HMCP also noted that agriculture events occur yearly, though with varying levels of damages. Finally, members of the HMPC noted that many of the events in the drought section of this plan (Section 4.2.11) affected the agriculture industry in the County.

Likelihood of Future Occurrence

Highly Likely— Due to the high number of recent incidents of severe weather and pests harming agriculture, plants, and humans in the County, it is likely that future damages will occur in Sacramento County. Given the high value of crops in the County, and the high population in the County, agricultural hazards can have large impacts economically and socially.

Climate Change and Agricultural Hazards

According to the CAS, addressing climate change in agriculture will encompass reducing vulnerability through adapting to the ongoing and predicted impacts of climate. Agriculture in California is vulnerable to predicted impacts of climate change, including less reliable water supplies, reduced water quality, increased temperatures, decreased winter freezing, and increased new and existing species of pests and weeds.

4.2.8. Bird Strike

Hazard/Problem Description

The County of Sacramento operates five airports, which have a collective economic impact in excess of $3 billion annually (2008 dollars) and over 5,000 on-site jobs. Four airports comprise the Sacramento County Airport System (SCAS):

- Sacramento International – (SMF) is the region's primary air carrier passenger service airport, accommodating approximately 10 million annual passengers
- Sacramento Executive – (SAC) is a general aviation airport that also serves as a reliever airport for Sacramento International.
- Sacramento Mather – (MHR), formally Mather Air Force Base, serves as the region's primary air cargo airport.
- Franklin Field – (F72) is a small general aviation airport frequently used for flight training.

A fifth airport in the County, McClellan Field, is also operated and maintained by the SCAS. Additionally, there are a number of privately owned airports within Sacramento County, operated for both public and private use, which are not within the purview of the SCAS. The Sacramento airports are in the Pacific flyway for migratory birds and reports more bird strikes annually than any other airport in FAA's Western-Pacific Region (Arizona, California, Hawaii, Nevada).

Sharing both the sky and the airport environment with birds and other wildlife has been a safety and economic concern to aviation personnel since the days of the Wright Brothers. Orville Wright documented the first known bird strike during a flight over a corn field near Dayton, Ohio in 1905. Since Orville and Wilbur Wright's days to the present day, conflicts between wildlife and airplanes have caused damage to aircraft and loss of human life. These conflicts have increased in recent years.

Collisions between wildlife and aircraft (wildlife strikes) are a threat to civil and military aircraft, causing billions of dollars in aircraft damage. Globally, wildlife strikes killed 229 people and destroyed over 210 aircraft between 1988 and 2008. According to the Federal Aviation Administration (FAA) National

Wildlife Database (Wildlife Database), almost 90,000 reported wildlife strikes occurred in the United States 1990 through 2008, with 7,516 strikes in 2008 alone. Birds account for more than 97 percent of wildlife strikes. Most bird strikes happen fairly close to the ground, with sixty percent occurring within 100 feet or less above ground level (AGL), 73 percent at 500 feet AGL or less, and 92 percent at 3,000 feet AGL or less. Reporting of civil aircraft wildlife strikes to the Wildlife Database is voluntary but strongly encouraged. Strike reporting by airlines and airports has gradually increased. While it was historically assumed that only about 20 percent of strikes were reported, the FAA estimates that about 39 percent of the strikes at commercial service airports were reported to the Wildlife Database between 2004 and 2008.

Figure 4-17 Birds Surrounding a Plane after Takeoff

Source: FAA

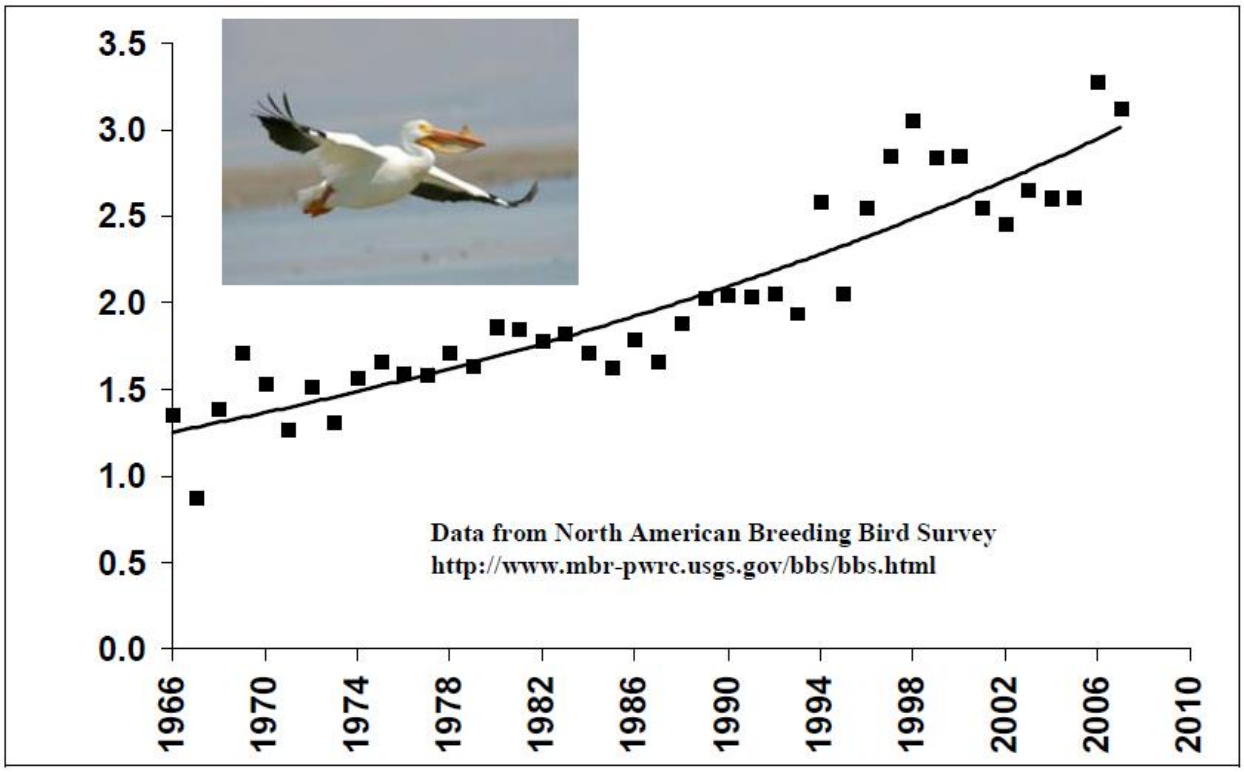
Presently, over $600 million dollars, and over 500,000 hours of aircraft down time, is annually lost due to wildlife strikes (both bird strikes and animal strikes) with civil aircraft in the United States alone. Although the economic costs of wildlife strikes are extreme, the cost in human lives lost when airplanes crash as a result of wildlife strikes is even greater than the economic losses.

Events in early 2009 amplified public awareness of wildlife strikes to aircraft. The dramatic "forced landing" of US Airways Flight 1549 in the Hudson River on January 15, 2009 after Canada geese were ingested in both engines on the Airbus 320 dramatically demonstrated to the public at large that bird strikes are a serious aviation safety issue.

There are many factors effecting today's concern about wildlife and aviation safety, three of these factors are:

- Many populations of wildlife species commonly involved in strikes have increased markedly in the last few decades and adapted to living in urban environments, including airports. For example, from 1980 to 2007, the resident (non-migratory) Canada goose population in the USA and Canada increased at a mean rate of 7.3 percent per year. Other species showing significant mean annual rates of increase included bald eagles (4.6 percent), wild turkeys (12.1 percent), turkey vultures (2.2 percent), American white pelicans (2.9 percent), double-crested cormorants (4.0 percent), and sandhill cranes (5.0 percent). Thirteen of the 14 bird species in North America with mean body masses greater than 8 lbs have shown significant population increases over the past three decades. An example of this is shown in Figure 4-18, which shows the American white pelican population in North America increased at a mean annual rate of 4.3 percent from 1966-2007.

Figure 4-18 American White Pelican Population from 1966-2007



Source: North American Breeding Bird Survey

- Concurrent with population increases of many large bird species, air traffic has increased substantially since 1980. In 2009, the Federal Aviation Administration reported that passenger enplanements in the US had increased from about 310 million in 1980 to 750 million in 2008 (3.2 percent per year), and commercial air traffic had increased from about 18 million aircraft movements in 1980 to 28 million in 2008 (1.6 percent per year). US commercial air traffic is predicted to continue growing at a rate of about 1.3 percent per year to 35 million movements by 2025.
- Commercial air carriers have replaced their older three- or four-engine aircraft fleets with more efficient and quieter, two-engine aircraft. In 1965, about 90 percent of the 2,100 USA passenger aircraft had

three or four engines. In 2005, the USA passenger fleet had grown to about 8,200 aircraft, and only about 10 percent had three or four engines (U.S. Department of Transportation 2009). With the steady advances in technology over the past several decades, today's two-engine aircraft are more powerful than yesterday's three- and four-engine aircraft, and they are more reliable. However, in the event of a multiple ingestion event (e.g., the US Airways Flight 1549 incident on January 15, 2009), aircraft with two engines may have vulnerabilities not shared by their three or four engine-equipped counterparts. Additionally, previous research has indicated that birds are less able to detect and avoid modern jet aircraft with quieter turbofan engines than older aircraft with noisier engines.

These results in a majority of wildlife strikes occur within the immediate airport environment (FAA manual). As a result of these factors, experts within the FAA, USDA, and U.S. Navy and U.S. Air Force expect the risk, frequency, and potential severity of wildlife-aircraft collisions to grow over the next decade.

Land-use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife strikes. The FAA is looking to avoid potential facilities and areas that attract hazardous wildlife and threaten aviation safety. These facilities include:

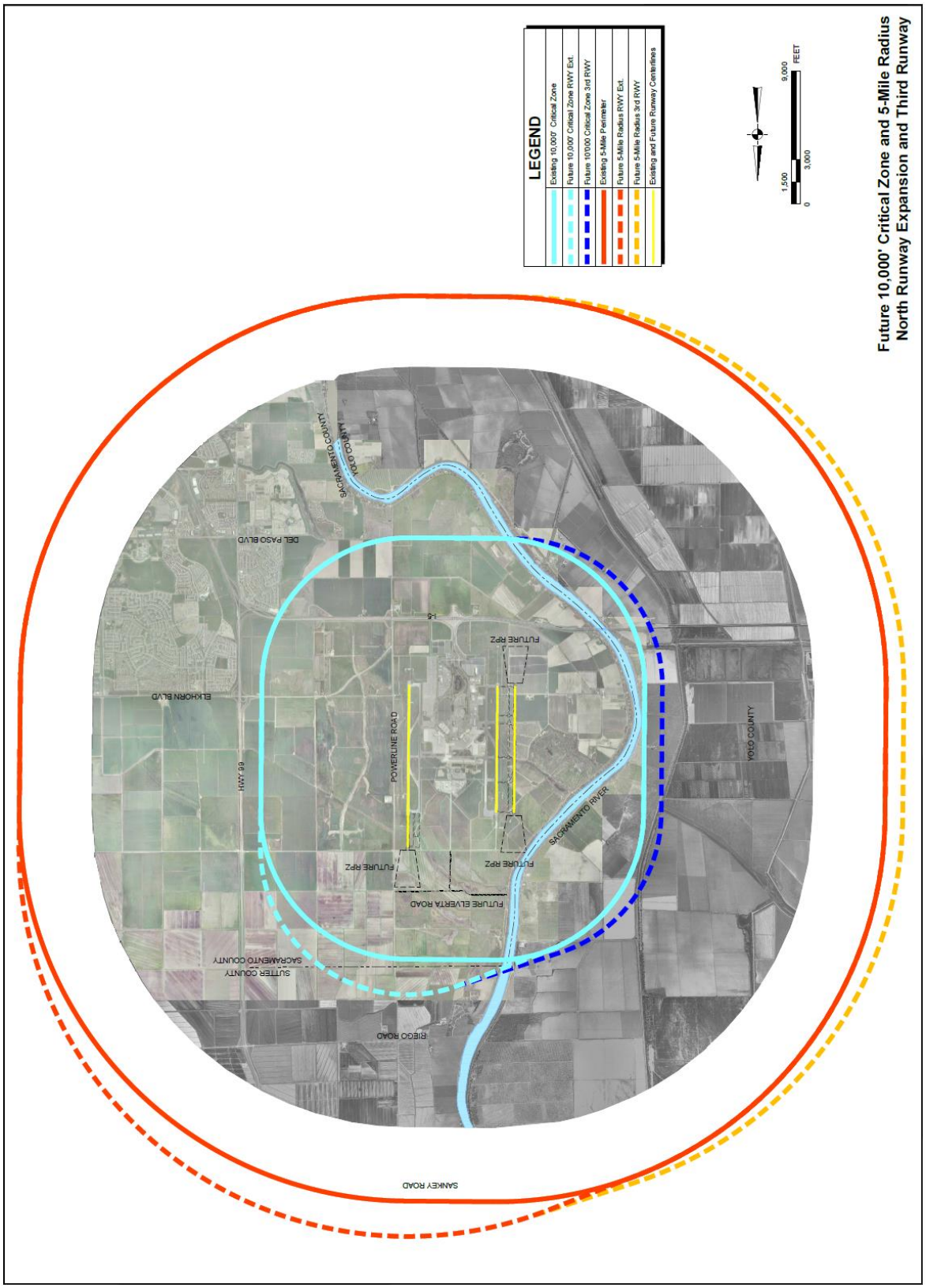
- Waste Disposal Operations
- Water Management Facilities
- Wetlands
- Dredge Spoil Containment Areas
- Agricultural Activities
- Golf Courses, Landscaping, and other Large Grassy Areas

These areas are all known to attract birds, both migratory and native species. Because of this, the FAA recommends the minimum separation criteria outlined below for land-use practices that attract hazardous wildlife to the vicinity of airports.

- Airports Serving Piston-Powered Aircraft – Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 5,000 feet at these airports for any of the hazardous wildlife attractant.
- Airports Serving Turbine-Powered Aircraft – Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 10,000 feet at these airports for any of the hazardous wildlife attractant.
- Protection of Approach, Departure, and Circling Airspace – For all airports, the FAA recommends a distance of 5 statute miles between the farthest edge of the airport's AOA and the hazardous wildlife attractant if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace.

The County of Sacramento has mapped the minimum separation criteria areas for the Sacramento International Airport. The map can be found in Figure 4-19.

Figure 4-19 Sacramento International Airport Separation Distances



Source: Sacramento County Airport System

Past Occurrences

Disaster Declaration History

There have been no disasters related to bird strike in Sacramento County.

NCDC Events

The NCDC does not track bird strike events. They are tracked by the FAA.

FAA Events

The FAA data shows 2,812 bird strike incidents for Sacramento County since 1990. These are shown in Table 4-22. Significant strikes are discussed in greater detail below the table.

Table 4-22 Bird Strikes in Sacramento Airports between 1/1/1990 and 4/1/2015

Airport	Number of Bird Strikes
Sacramento International	2,607
Mather Field	129
Sacramento Executive	43
Franklin Field	1
McClellan Field	32
Total	**2,812**

Source: FAA Wildlife Strike Database

Many of these instances below were sourced from a report titled "Some Significant Wildlife Strikes To Civil Aircraft In The United States, January 1990 – November 2015" released by the USDA on November 10, 2010. Between 2010 and 2012 (the most recent publication available), instances of bird strike were sourced from "Wildlife Strikes to Civil Aircraft in the United States 1990–2012," released by the FAA in September 2013.

January 8, 1996 – Shortly after takeoff, a Boeing 737 ingested a bird in #2 engine during climb. Vibration increased and crew throttled back and returned to land. One fan blade separated and other blades were damaged by re-ingestion of broken blade fragments. The engine was replaced.

November 22, 1996 - Several gulls were ingested just after takeoff causing the engine on a McDonnell Douglas MD-80 to lose power. The engine was shut down and an emergency was declared. The plane was forced to land much heavier than usual because of a full fuel load. There were no injuries and passengers were transferred to a replacement jet. Fan blades and engine were damaged. Runway was closed for approximately ½ hour.

February 25, 2000 – During a takeoff run, a Boeing 737 struck an unknown bird. The aircraft returned to the airport after a bird strike on takeoff. The pilots heard a loud bang and the plane suddenly yawed. The air cooler was plugged and 7 fan blades were damaged.

December 8, 2004 – A McDonnell Douglas MD-80 struck a Northern Pintail while climbing after takeoff. Passengers reported seeing a flock of geese at time of strike. The radome was dented, and over 1/3 of surface and wing was punctured and dented. Identification of the bird was performed by the Smithsonian, Division of Birds. Cost of repairs estimated at $200,000.

December 28, 2005 – While climbing after takeoff, a Boeing 737 struck an unknown bird. The pilot saw a large white bird fly by, heard a loud pop, then the left engine began vibrating. The aircraft returned to the airport. All fan blades were replaced. Passengers were put on other flights. Cost of repairs was $210,400.

December 22, 2009 – Four bird strikes in 14 hours were recorded at the Sacramento Airport. The weekend may have been the bumpiest on record at the Sacramento International Airport. Each of the strikes hit four different airline carriers, and two of the planes had to be grounded for repairs. Sacramento has a staff of wildlife biologists that try to prevent strikes, even shooting birds when necessary in accordance with the provisions of a depredation permit issued by the United States Fish and Wildlife Service, but many of the strikes happened beyond the airport's property. All of the weekend's strikes occurred while pilots were on their approach for landing; one plane was five miles out, another was nine miles out, and a third was 13 miles out. The California Fish and Game states that every year at this time, roughly four million birds fly through the skies surrounding the Sacramento Airport.

January 5, 2010 - Two bird-aircraft strikes were reported at the Sacramento airport. Airport officials in Sacramento say birds hit two passenger jets in separate incidents but caused no damage to the planes. The first bird strike was reported around noon Tuesday after birds hit the nose of a Southwest Airlines flight during landing. The plane arrived safely. The second incident happened around 1 p.m. after birds flew into the windshield of another Southwest Airlines flight en route to Las Vegas. The plane returned to Sacramento for inspection. A windshield wiper was replaced and the plane departed.

January 14, 2010 - A US Airways flight leaving from Sacramento International Airport struck a bird while departing Thursday. An airport spokeswoman said two fan blades on the plane were damaged as the plane was departing to Phoenix. No passengers were injured and the plane landed safely in Sacramento.

February 18, 2010 – A Cessna 208 hit a large bird during approach. The aircraft briefly rolled to the right but landed safely. Significant damage was done to the leading edge of right wing. The landing light housing and skin of the wing showed damage. Some control loss due to the aileron control cables being pushed out of position. The aircraft was taken out of service for 80 hours and the cost of repairs was $80,000.

September 1, 2010 – An Airbus A-320 was struck by a bird immediately after takeoff. A great blue heron was ingested in #1 engine at rotation and aircraft returned to land. A piece of plastic from the engine was found on the runway. The runway was closed for full sweep for foreign object damage (FOD). Only small pieces of bird were found. Engine had damage to two fan blades.

January 21, 2012 – Two engines of a Boeing 737 were damaged when geese were struck during climb out. The aircraft returned to land after declaring an emergency. Fan blades were damaged in both engines Passengers were rebooked on other flights.

January 24, 2013 – The aircraft had multiple strikes on climb-out, declared an emergency due to vibration in the #2 engine. They returned to land safely. The #2 engine had significant fan blade damage and the #1

engine had bird remains. ID by Smithsonian, Division of Birds. Time out of service was 24 hours. Cost of repairs reported as $20,000 and other costs $25,000.

November 22, 2014 – Pilot saw a flock of large birds on seven mile final. Strike occurred on right side of the radome just below the First Officer causing a 2- foot dent. Engine ingestion. Aircraft was out of service for one day.

December 3, 2014 – Major bird strike while on approach. Blood smears, feathers and bird remains were visible on the nose, windshield, leading edge of both wings, flaps and in both engines. Remains were embedded in the nose. Time out of service was 8 days.

December 12, 2014 – Hit a flock of birds on approach. Ingested at least one bird into the #2 engine. Emergency declared due to compressor stalls, asymmetrical thrust and flames coming from back of engine.

HMPC Events

The HMPC noted that since 2011 Sacramento County Department of Airports facilities have recorded 868 wildlife strikes in the FAA Wildlife Strike Database. Sacramento International Airport had 779 wildlife strikes and 51 have been damaging. Sacramento Executive Airport had 10 wildlife strikes and three were damaging. Mather Airport had 63 wildlife strikes and one was damaging. McClellan Airfield had 16 wildlife strikes and one was damaging. Franklin Field has not had a wildlife strike since 2011.

There have been no injuries reported from the strikes and no deaths have occurred.

Department of Airports estimates the cost to repair damaged aircraft during that period has been in the tens of millions of dollars, mostly due to damage caused to commercial aircraft engines. Those costs are borne entirely by the aircraft operators and are not customarily reported to the department.

Likelihood of Future Occurrence

Highly Likely— Based on FAA data, 2,812 bird strike incidents over a 26-year period (1990-2015) equates to 108.2 reported bird strikes in Sacramento County each year. This equates to a 100 percent chance of a bird strike event in any given year.

Climate Change and Bird Strike

According to the US Fish and Wildlife Service (FWS), changes in climate shift bird migratory patterns. According to the Office of Environmental Health Hazard Assessment's Indicators of Climate Change Report in California, climate change is shifting the timing of bird migration in California, with some bird species arriving earlier in the springtime. Sacramento is currently in the Pacific Flyway bird migration route.

4.2.9. Climate Change

Hazard/Problem Description

Climate change is the distinct change in measures of weather patterns over a long period of time, ranging from decades to millions of years. More specifically, it may be a change in average weather conditions such as temperature, rainfall, snow, ocean and atmospheric circulation, or in the distribution of weather around the average. While the Earth's climate has cycled over its 4.5 billion year age, these natural cycles have taken place gradually over millennia, and the Holocene, the most recent epoch in which human civilization developed, has been characterized by a highly stable climate – until recently.

This LHMP is concerned with human-induced climate change that has been rapidly warming the Earth at rates unprecedented in the last 1,000 years. Since industrialization began in the 19th century, the burning of fossil fuels (coal, oil, and natural gas) at escalating quantities has released vast amounts of carbon dioxide and other greenhouse gases responsible for trapping heat in the atmosphere, increasing the average temperature of the Earth. Secondary impacts include changes in precipitation patterns, the global water cycle, melting glaciers and ice caps, and rising sea levels. According to the Intergovernmental Panel on Climate Change (IPCC), climate change will "increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems" if unchecked.

Through changes to oceanic and atmospheric circulation cycles and increasing heat, climate change affects weather systems around the world. Climate change increases the likelihood and exacerbates the severity of extreme weather – more frequent or intense storms, floods, droughts, and heat waves. Consequences for human society include loss of life and injury, damaged infrastructure, long-term health effects, loss of agricultural crops, disrupted transport and freight, and more. Climate change is not a discrete event but a long-term hazard, the effects of which communities are already experiencing.

Climate change adaptation is a key priority of the State of California. The 2013 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and earlier runoff of both snowmelt and rainwater in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing. Data suggests that the effects of climate change have already been felt in the Sacramento region.

Past Occurrences

Disaster Declaration History

Climate change has never been directly linked for any declared disasters.

NCDC Events

The NCDC does not track climate change events

HMPC Events

Past flooding, wildfire, levee failure, and drought disasters may have been exacerbated by climate change, but it is impossible to make direct connections to individual events. Unlike earthquake and floods that occur over a finite time period, climate change is a slow onset, long term hazard, the effects of which some communities may already be already experiencing, but for which little empirical data exists. Further, given the science, it is likely that measurable effects may not be seriously experienced for years, decades, or may be avoided altogether by mitigation actions taken today.

However, the 2013 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing. This data suggests that the effects of climate change has been occurring in the Sacramento region.

Likelihood of Future Occurrence

Highly Likely – Climate change is virtually certain to continue without immediate and effective global action. According to NASA, 2016 is on track to be the hottest year on record, and 15 of the 17 hottest years ever have occurred since 2000. Without significant global action to reduce greenhouse gas emissions, the Intergovernmental Panel on Climate Change (IPCC) concludes in its Fifth Assessment Synthesis Report (2014) that average global temperatures is likely to exceed 1.5 C by the end of the 21st century, with consequences for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges.

Climate Scenarios

The United Nations IPCC developed several greenhouse gas (GHG) emissions scenarios based on differing sets of assumptions about future economic growth, population growth, fossil fuel use, and other factors. The emissions scenarios range from "business-as-usual" (i.e., minimal change in the current emissions trends) to more progressive (i.e., international leaders implement aggressive emissions reductions policies). Each of these scenarios leads to a corresponding GHG concentration, which is then used in climate models to examine how the climate may react to varying levels of GHGs. Climate researchers use many global climate models to assess the potential changes in climate due to increased GHGs.

Key Uncertainties Associated with Climate Projections

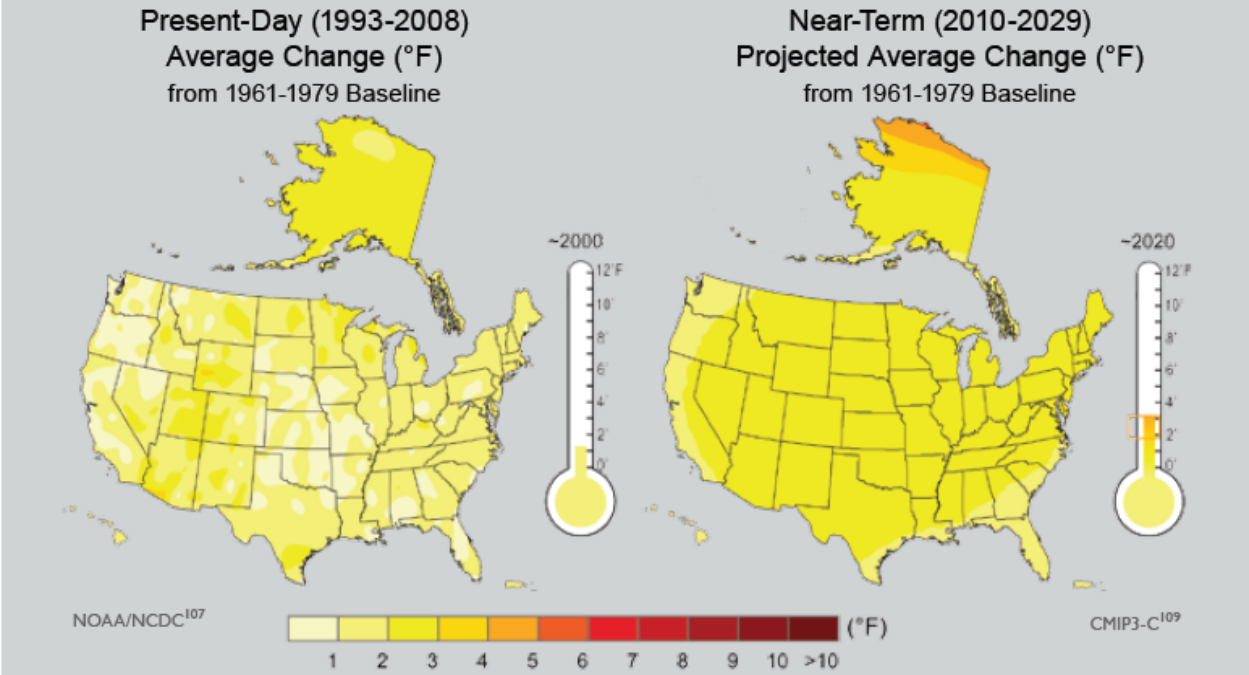
- Climate projections and impacts, like other types of research about future conditions, are characterized by uncertainty. Climate projection uncertainties include but are not limited to:
  - ✓ Levels of future greenhouse gas concentrations and other radiatively important gases and aerosols,
  - ✓ Sensitivity of the climate system to greenhouse gas concentrations and other radiatively important gases and aerosols,

- ✓ Inherent climate variability, and
- ✓ Changes in local physical processes (such as afternoon sea breezes) that are not captured by global climate models.

Even though precise quantitative climate projections at the local scale are characterized by uncertainties, the information provided can help identify the potential risks associated with climate variability/climate change and support long term mitigation and adaptation planning.

The following maps (shown in Figure 4-20 and Figure 4-21) are excerpts from the Global Climate Change Impacts report that show the magnitude of the observed and projected changes in annual average temperature. It is important to discuss these projected temperature changes, as heat is a major driver of climate and climate related phenomena. The map for the period around 2000 shows that most areas of the United States have warmed 1 to 2°F compared to the 1960s and 1970s. Although not reflected in these maps of annual average temperature, this warming has generally resulted in longer warm seasons and shorter, less intense cold seasons. The average warming for the country as a whole is shown on the thermometers adjacent to each map. By the end of the century, the average U.S. temperature is projected to increase by approximately 7 to 11°F under the higher emissions scenario and by approximately 4 to 6.5°F under the lower emissions scenario.

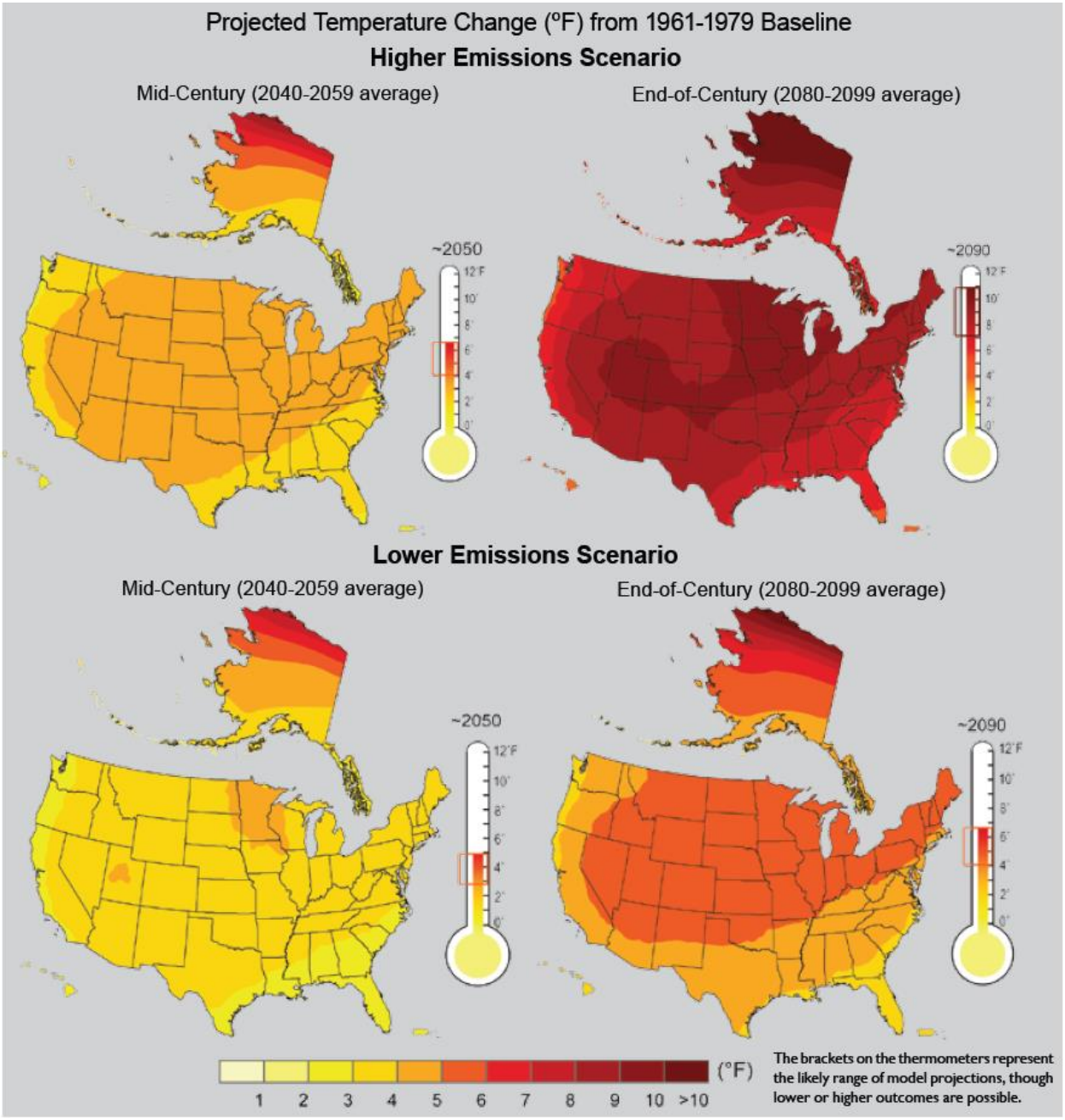
Figure 4-20 Present and Near Term Average Temperature Changes



The maps and thermometers on this page and the next page show temperature differences (either measured or projected) from conditions as they existed during the period from 1961-1979. Comparisons to this period are made because the influence on climate from increasing greenhouse gas emissions has been greatest during the past five decades. The present-day map is based on the average observed temperatures from 1993-2008 minus the average from 1961-1979. Projected temperatures are based on results from 16 climate models for the periods 2010-2029, 2040-2059, and 2080-2099. The brackets on the thermometers represent the likely range of model projections, though lower or higher outcomes are possible. The mid-century and end-of-century maps show projections for both the higher and lower emission scenarios.[91] The projection for the near-term is the average of the higher and lower emission scenarios[91] because there is little difference in that timeframe.

Source: Source: USGCRP (2009). Global Climate Change Impacts in the United States

Figure 4-21 Projected Average Temperature Changes



Source: (USGCRP (2009). Global Climate Change Impacts in the United States

Local Climate Change Projections

According to the California Natural Resource Agency (CNRA), Climate change is already affecting California and is projected to continue to do so well into the foreseeable future. Current and projected changes include increased temperatures, seal level rise, a reduced winter snowpack altered precipitation patterns, and more frequent storm events. Over the long term, reducing greenhouse gases can help make these changes less severe, but the changes cannot be avoided entirely. Unavoidable climate impacts can

result in a variety of secondary consequences including detrimental impacts on human health and safety, economic continuity, ecosystem integrity and provision of basic services.

The CNRA's 2009 Climate Adaptation Strategy (CAS) delineated how climate change may impact and exacerbate natural hazards in the future, including wildfires, extreme heat, floods, drought, and levee failure:

- Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in Sacramento and the rest of California, which are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.
- Higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.
- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff from the landward side, while accelerating sea-level rise will produce higher storm surges during coastal storms. Together, these changes may increase the probability of floods and levee and dam failures in the Sacramento-San Joaquin Delta, along with creating issues related to salt water intrusion.
- Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.
- Sea-level rise will increase erosion, threatening public and private property and structures and causing social, economic, and resource losses.

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. The APG: Understanding Regional Characteristics provides environmental and socioeconomic information for 11 climate impact regions. The Sacramento County Planning Area falls within the northern portion of the Bay-Delta Region. Cal-Adapt Projections for the Bay Delta Region are shown in Table 4-23.

Table 4-23 Summary of Cal-Adapt Climate Projections for the Bay-Delta Regions

Effect	Ranges
Temperature Change 1990 - 2100	Winter: 6° to 7°F increase in average temperatures Summer: 7° to 9°F increase in average temperatures (Modeled high temperatures – average of all models; high carbon emissions scenario)

Effect	Ranges
Precipitation	Precipitation across the region is projected to decline by approximately 3 to 5". The most dramatic decline of 5" is projected around Richmond while most other areas are projected to experience a decline of 4", although Stockton may only experience a 3" decline in precipitation. (CCSM3 climate model; high carbon emissions scenario)
Sea Level Rise	The portions of the Delta Region in close proximity of the San Francisco Bay are projected to be increasingly susceptible to 1.4---meter sea level rise. Solano County is anticipated to experience a 13% increase in estimated acreage of land vulnerable to a 100---year flood event. This indicator rises to 40% in Contra Costa County and 59% in Sacramento Count. Most flooding is projected to occur in areas around Suisun City, Pittsburg, Benicia, Richmond, and Vallejo.
Wildfire Risk	Portions of western and northern Yolo County, north western Solano, southern Contra Costa and eastern San Joaquin and Sacramento Counties are projected to experience limited increases in potential area burned by wildfire. There are moderately high increases projected for the far eastern areas of San Joaquin County. (GFDL model, high carbon emissions scenario)

Source: Public Interest Energy Research (2011). Cal---Adapt. Retrieved from: http://cal---adapt.org]

The Preliminary Draft – Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan (CAP) developed by Ascent Environmental, utilized Cal Adapt a climate change scenario planning tool developed by the California Energy Commission (CEC) and the University of California Berkeley Geospatial Innovation Facility. Cal-Adapt downscales global climate stimulation model data to local and regional resolution under two emissions scenarios: the A-2 scenario represents a high, future GHG emissions scenario, and the B-1 scenario represents a lower future GHG emissions scenario. This CAP includes information on both emissions scenarios in developing a vulnerability assessment for the Sacramento County Planning Area. Climate Change vulnerability data from the vulnerability assessment conducted by Ascent Environmental is included in each of the hazard specific sections, where applicable.

4.2.10. Dam Failure

Hazard/Problem Description

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped and fail. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failures can also result from any one or a combination of the following causes:

- Earthquake;
- Inadequate spillway capacity resulting in excess overtopping flows;
- Internal erosion caused by embankment or foundation leakage, or piping or rodent activity;
- Improper design;
- Improper maintenance;
- Negligent operation; and/or
- Failure of upstream dams on the same waterway.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Electric generating facilities and transmission lines could also be damaged and affect life support systems in communities outside the immediate hazard area. Associated water supply, water quality and health concerns could also be an issue. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

In general, there are three types of dams: concrete arch or hydraulic fill, earth and rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously; the flood wave builds up rapidly to a peak then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach; a flood wave will build gradually to a peak and then decline until the reservoir is empty. And, a concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

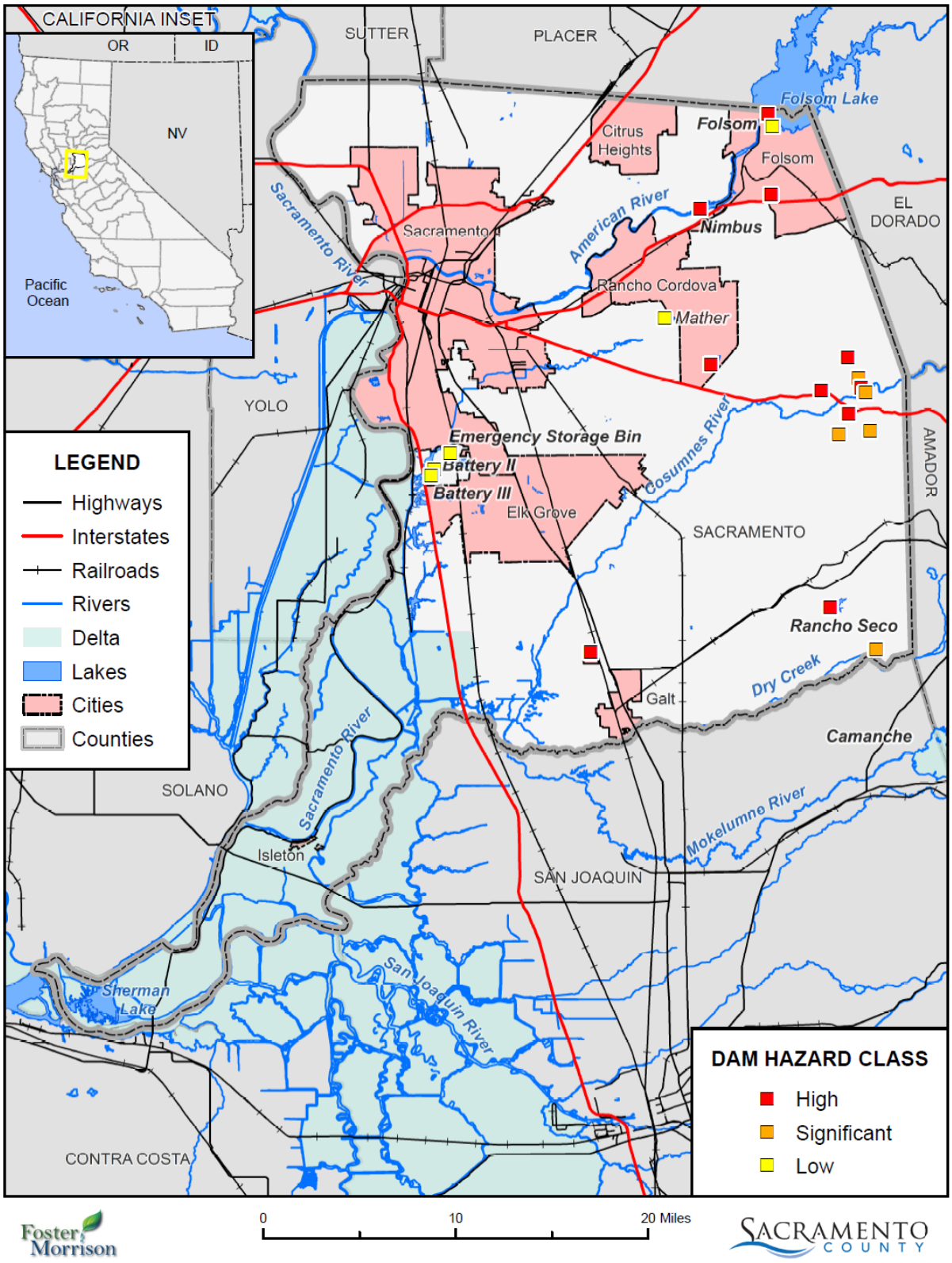
The California Department of Water Resources Division of Safety of Dams (DSOD) has jurisdiction over impoundments that meet certain capacity and height criteria. Embankments that are less than six feet high and impoundments that can store less than 15 acre-feet are non-jurisdictional. Additionally, dams that are less than 25 feet high can impound up to 50 acre-feet without being jurisdictional. The Cal DWR DSOD assigns hazard ratings to large dams within the State. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in three categories that identify the potential hazard to life and property:

- High hazard indicates that a failure would most probably result in the loss of life
- Significant hazard indicates that a failure could result in appreciable property damage
- Low hazard indicates that failure would result in only minimal property damage and loss of life is unlikely

According to data provided by Sacramento County, Cal DWR, and Cal OES, there are 27 dams in Sacramento County constructed for flood control, storage, electrical generation, and recreational purposes. Of the 27 dams, 16 are rated as High Hazard, 5 as Significant Hazard, 5 as Low Hazard, and 1 was not rated.

Table 4-24 identifies the 27 dams located in the Sacramento County Planning Area. Figure 4-22 illustrates the locations of identified dams.

Figure 4-22 Sacramento County Dam Inventory



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table 4-24 Sacramento County Dam Inventory

Name	Significance	Owner	River	Nearest City/ Distance (mi)	Mapped	Structural Height (ft)	Maximum Storage (acre-ft)
Battery I	Low	Sacramento Regional County Sanitation District	Unnamed	N/A	Y	N/A	N/A
Battery II	Low	Sacramento Regional County Sanitation District	Unnamed	N/A	Y	15	315
Battery III	Low	Sacramento Regional County Sanitation District	Unnamed	N/A	Y	12	847
Blodgett	High	Private	Laguna Creek	Mather AFB 2 miles	Y	24	599
Calero	High	Private	Crevis Creek	Rancho Murieta 3 miles	Y	55	3,375
Chesbro	Significant	Private	Consumnes River	Rancho Murieta 2 miles	Y	79	1,500
Clementia	High	Private	Tributary of Consumnes River	Rancho Murieta 0 miles	Y	33	1,510
Emergency Storage Basin	Low	Sacramento Regional County Sanitation District	Laguna Creek	N/A	Y	13	629
Folsom	High	Department of Interior	American River	Folsom 1 mile	Y	340	1,120,000
Folsom Mormon Island Auxiliary Dam	High	Department of Interior	Blue Ravine	Folsom 2 miles	N	110	1,120,000
Folsom Dike 7	High	Department of Interior	Green Valley	Folsom 1 mile	N	25	1,120,000
Folsom Dike 8	High	Department of Interior	Green Valley	Folsom 1 mile	N	15	1,120,000
Folsom Left Wing	High	Department of Interior	American River	Folsom 1 mile	N	145	1,120,000

Name	Significance	Owner	River	Nearest City/ Distance (mi)	Mapped	Structural Height (ft)	Maximum Storage (acre-ft)
Folsom Right Wing	High	Department of Interior	American River	Folsom 1 mile	N	145	1,120,000
Galt	High	City of Galt	Consumnes River	Rancho Murieta 2 miles	Y	16	155
Granlees	Significant	Consumnes Irrigation Association	Tributary of Dry Creek	N/A	Y	17	75
Hamel	Significant	Private	Morrison Creek	N/A	Y	26	350
Mather	Low	USAF	Tributary of Consumnes River	Rancho Murieta 2 miles	Y	N/A	N/A
Michigan Bar No. 1	High	Private	Tributary of Consumnes River	Rancho Murieta 2 miles	Y	17	897
Michigan Bar No. 2	High	Private	Consumnes River	Rancho Murieta 1 miles	Y	36	56
Mills	High	Private	Consumnes River	Rancho Murieta 2 miles	Y	23	315
Mount Stoneman	Low	Folsom Prison	Tributary of American River	Folsom 2 miles	Y	73	40
Nimbus	High	Department of Interior	American River	Fair Oaks 3 miles	Y	87	8,800
Rancho Seco	High	Sacramento Municipal Utilities	Hadselville Creek	Clay 4 miles	Y	58	4,350
Schneider	Significant	Private	Tributary of Arkansas Creek	Rancho Murieta 4 miles	Y	22	226
Van Vleck	Significant	Private	Arkansas Creek	Rancho Murieta 7 miles	Y	30	2,600
Willow Hill	High	City of Folsom	American River	Folsom 3 miles	Y	24	175

Source: Cal OES and the National Performance of Dams Program

*One Acre Foot=326,000 gallons

There are 25 additional facilities located outside of Sacramento County, shown in Table 4-25, classified as high or significant hazard dams. Of these, there are 8 high hazard dams located in neighboring counties with the potential to impact the Sacramento County Planning Area.

Table 4-25 High and Significant Hazard Dams Outside Sacramento County

Dam Name Dam ID County	Hazard Class	Owner	Dam Height	Storage (acre-feet)*	Stream	Nearest Community/Distance
Oroville CA00035 Butte	High	California Department of Water Resources	770	3,540,000	Feather River	Oroville 3 miles
Miner's Ranch CA00275 Butte	High	Oroville Wyandotte Irrigation District	90	815	Kelly Ridge Canal	Kelly Ridge 1 mile
Camanche Main CA00 73 San Joaquin	High	East Bay Municipal Utility District	171	431,000	Mokelumne River	Clements 4 miles
Shasta CA10186 Shasta	High	Department of the Interior	602	4,661,860	Sacramento River	Redding 9 miles
Pardee CA00164 Border of Calaveras and Amador Counties	High	East Bay Municipal Utility District	350	198,000	Mokelumne River	Jackson 8 miles
CSP Mule Creek CA01195 Amador	High	State Department of Corrections	51	630	Offstream	Ione 2 miles
Jackson Creek CA00867 Amador	High	Jackson Valley Irrigation District	168	24,000	Jackson Creek	Buena Vista 1 mile
Camp Far West CA00227 Yuba	High	South Sutter Water District	185	104,000	Bear River	Sheridan 5 miles
Preston CA00012 Amador	Significant	Amador Reg. Sanit. Authority	40	37	Tributary of Mule Creek	Ione 1 mile
Preston Forebay CA00006 Amador	Significant	Amador Reg. Sanit. Authority	40	37	Offstream	Ione 2 miles
Wallace CA01314 Calaveras	Significant	Private	19	700	Tributary of Bear Creek	Wallace 0 miles
Ferrario CA00626 Calaveras	Significant	Private	25	384	Tributary of Bear Creek	Wallace 4 miles

Dam Name Dam ID County	Hazard Class	Owner	Dam Height	Storage (acre-feet)*	Stream	Nearest Community/Distance
Cameron Park CA01199 El Dorado	Significant	Cameron Park Community Services District	29	880	Deer Creek	Cameron Park 1 mile
Barnett CA00998 El Dorado	Significant	Private	18	187	Barnett Creek	Shingle Springs 2 miles
Williamson #1 CA00608 El Dorado	Significant	Private	42	260	Tributary of Weber Creek	Shingle Springs 6 miles
Holiday Lake CA00910 El Dorado	Significant	Holiday Lake Community Service District	39	220	Sawmill Creek	Frenchtown 2 miles
Crystal Lake CA01282 El Dorado	Significant	Private	32	296	Tributary of Deer Creek	Shingle Springs 4 miles
Schubin CA01045 El Dorado	Significant	Private	55	315	Tributary of Webber Creek	Shingle Springs 7 miles
Indian Creek CA00997 El Dorado	Significant	Private	36	757	Indian Creek	Rescue 4 miles
Hinkle CA01192 Placer	Significant	San Juan Suburban Water District	20	200	Tributary of American River	Orangevale 2 miles
Kokila CA00544 Placer	Significant	Pacific Gas and Electric	42.5	1,520	Tributary of South Yuba River	Washington 25 miles
Vicini CA01093 Amador	Significant	Private	19	290	Tributary of Willow Creek	Indian Hill 8 miles
Woodbridge CA00285 San Joaquin	Significant	Woodbridge Irrigation District	35	5,064	Mokelumne River	Woodbridge 0 miles
Davis #2 CA00656 San Joaquin	Significant	Private	26	2,220	Tributary of Calaveras River	Linden 4 miles

Source: National Performance of Dams Database

*One Acre Foot=326,000 gallons

Cal OES provides local jurisdictions with hazard information based on data from the U.S. Bureau of Reclamation and the Department of Water Resources. Included in this information is a series of dam inundation maps for Sacramento County. Detailed inundation maps from Cal OES and County mapping projects are available at the Sacramento County Department of Water Resources

The American River Flood Control System and Folsom Dam

The American River Flood Control System consists of the Folsom Dam, Nimbus Dam, an auxiliary dam at Mormon Island, eight earth-filled dikes, and four miles of levees on the north bank of the American River (from Howe Avenue to Arden Way). The System receives runoff from the American River Watershed which contains about 2,100 square miles of the western slope in the Sierra Nevada. Since its completion in 1956, Folsom Dam has stopped three potentially catastrophic floods from occurring. The Flood of 1986 exceeded Folsom's design for flooding by almost 20 percent. An initial reconnaissance report, "American River Investigation, January 1988" concluded that Folsom Dam and the American River levees are only capable of handling a 70-year flood event. Recommendations were to increase the carrying capacity of the American River below Nimbus Dam, modifying the Folsom Dam spillage, increasing storage capacity at Folsom Lake and for greatest protection (200-year level) construct a new upstream storage facility. Work on that project is underway, and is actually ahead of the scheduled 2020 completion. This is primarily due to the drought conditions that lowered lake levels during construction.

Mercury and Dams

In addition, the HMPC noted that a problem with methylated mercury that could be tied to dam failure in Sacramento County. Of note was the Alder Creek Miners Dam. This dam was built in about 1890-1910 in Alder Creek upstream of Folsom Blvd and is owned by the City of Folsom enveloped by property now owned by AeroJet. In order to develop upstream, the dam must be refurbished or removed. The dam is considered to be below certification standards. While not a high or medium significance dam, the Alder Creek dam would pose risk to downstream communities should it fail. More information on mercury can be found in Section 4.2.14.

Past Occurrences

Disaster Declaration History

There have been no disasters declarations related to dam failure in Sacramento County.

NCDC Events

There have been no NCDC dam failure events in Sacramento County.

HMPC Events

Based on input provided by the HMPC, a search of the National Performance of Dams database data shows two dam failure incidents for Sacramento County since 1994, both related to the Folsom Dam. However, these incidents were not actually dam failures, were quite limited in scope, and since the incidents occurred, improvements to the Folsom Dam system have been made and are continuing. These two events are further described below:

July 17, 1995 – At the Folsom Dam, a spillway gate (gate #3 – see Figure 4-23) of Folsom Dam failed, increasing flows into the American River significantly. The spillway was repaired and the U.S. Bureau of Reclamation carried out an investigation of the water flow patterns around the spillway using numerical

modeling. No flooding occurred as a result of the partial failure, but due to the location of the dam in proximity to the City of Folsom, possible flooding was a major concern.

Figure 4-23 July 17, 1995 Folsom Dam Incident

Source: US Bureau of Reclamation

May 15, 1997 – Cavitation damage to river outlet works occurred at Folsom Dam. Damage was discovered just downstream of gate #3. The damage consisted of a hole in the floor of the conduit measuring approximately 42 feet long, 15 feet wide, and 6 feet deep. Subsequent inspections of the other conduits revealed similar damage downstream of gate #4. Also, the beginning of cavitation damage was found downstream of gate #2. Minor damage was found in the other five conduits. No flooding was associated with this damage.

Likelihood of Future Occurrence

Unlikely—The County remains at risk to dam breaches/failures from numerous dams under a variety of ownership and control and of varying ages and conditions. Given the number and types of dams in the County, the potential exists for future dam issues in the Sacramento County Planning Area.

Climate Change and Dam Failure

Increases in the volume and intensity of precipitation, as well as warmer and earlier springs accelerating the timing and rate of snow melt, could increase the potential for dam failure and uncontrolled releases in Sacramento County.

4.2.11. Drought and Water Shortage

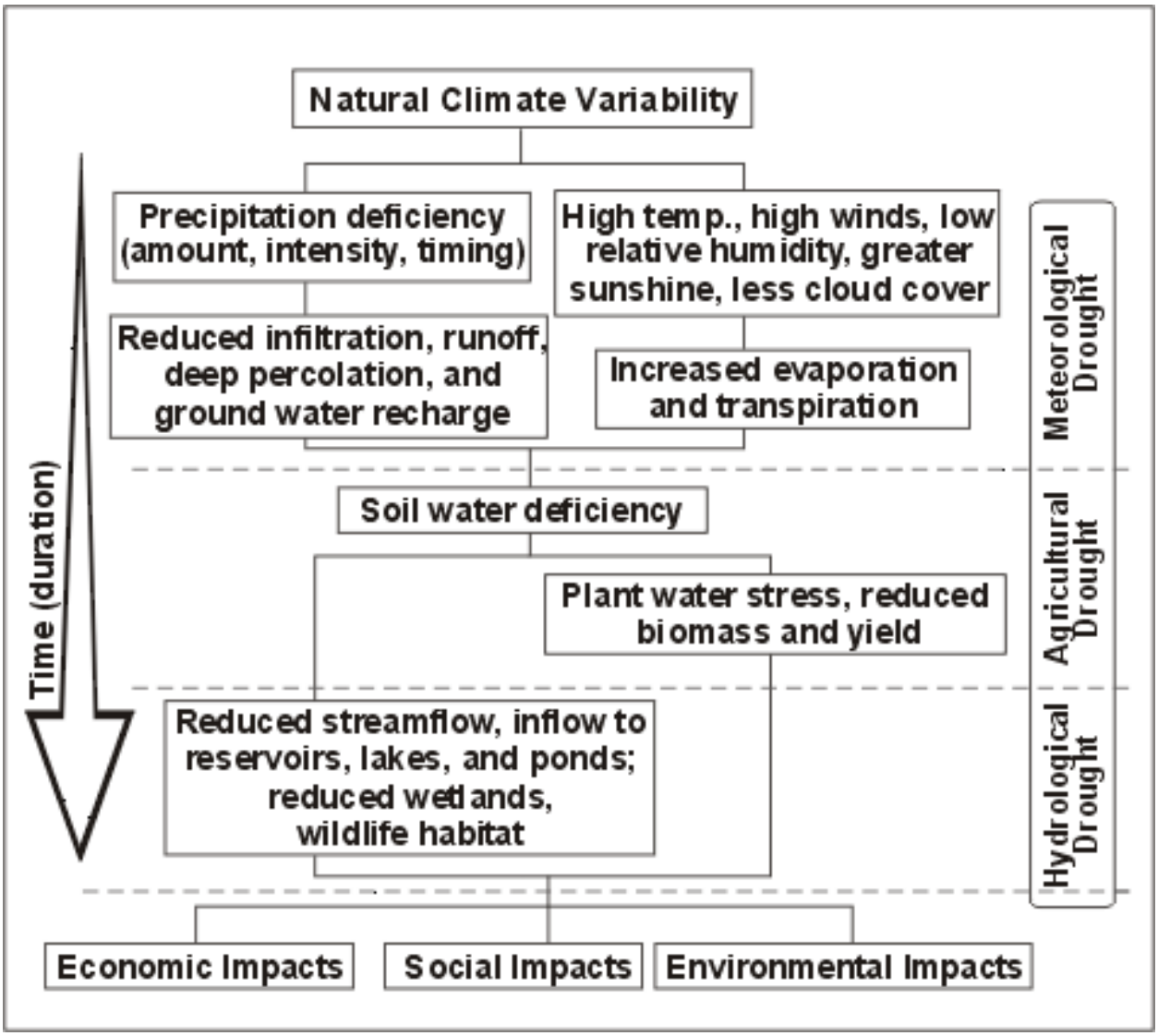
Hazard/Problem Description

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends. Water districts normally require at least a 10-year planning horizon to implement a multiagency improvement project to mitigate the effects of a drought and water supply shortage.

Drought is a complex issue involving (see Figure 4-24) many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

- Meteorological drought is usually defined by a period of below average water supply.
- Agricultural drought occurs when there is an inadequate water supply to meet the needs of the state's crops and other agricultural operations such as livestock.
- Hydrological drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- Socioeconomic drought occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

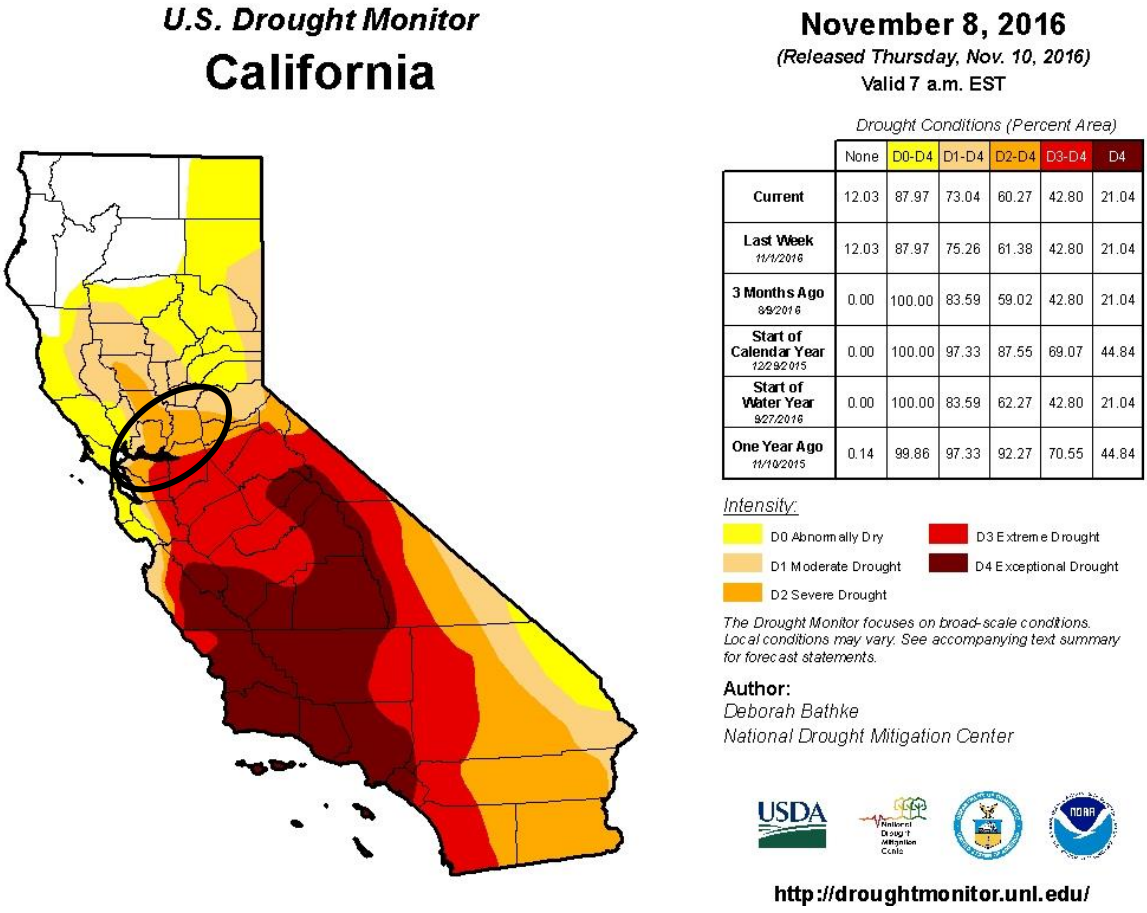
Figure 4-24 Causes and Impact of Drought



Source: National Drought Mitigation Center (NDMC)

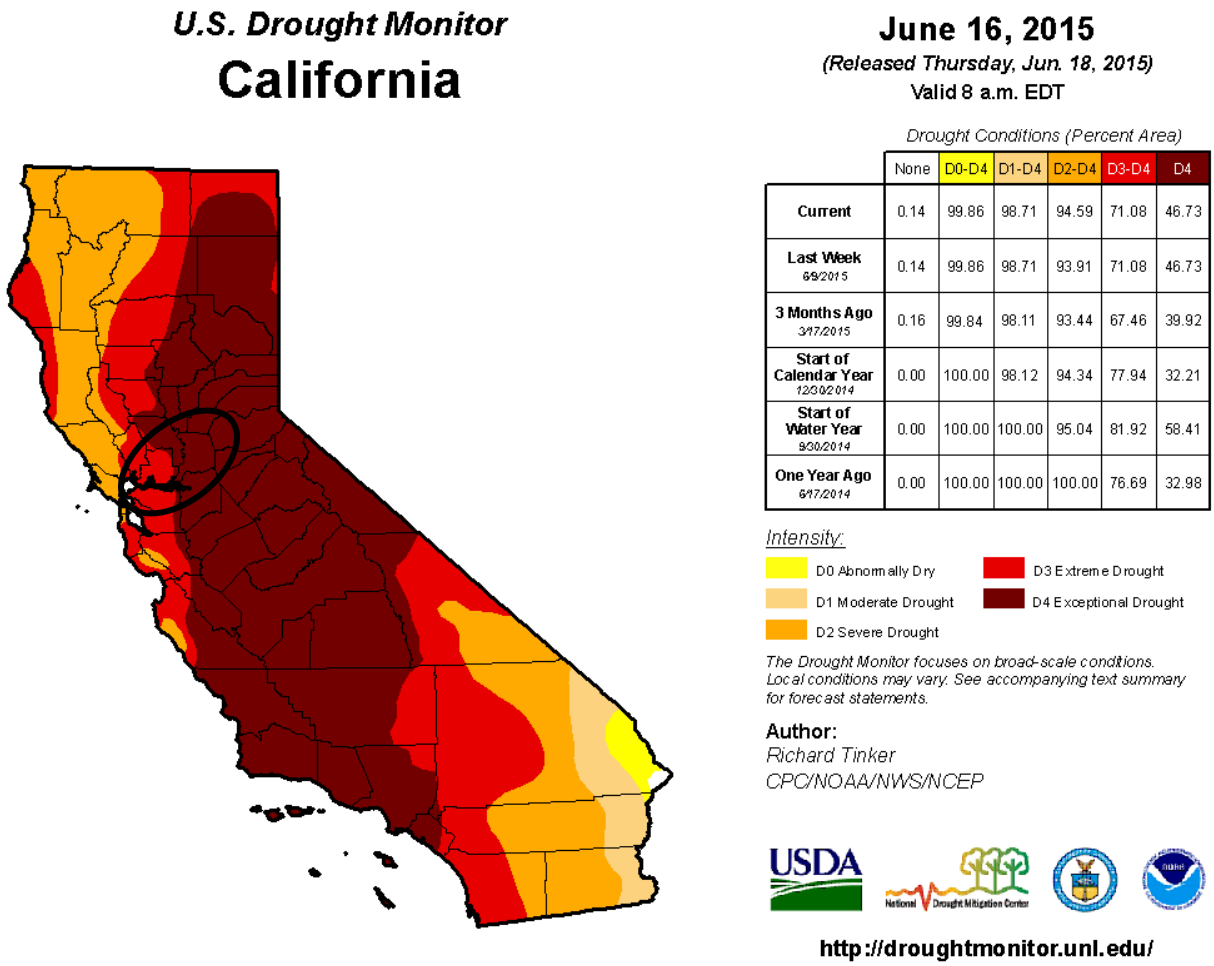
Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the NDMC, and the USDA's Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The final outcome of each Drought Monitor is a consensus of federal, state, and academic scientists who are intimately familiar with the conditions in their respective regions. A snapshot of the drought conditions in California and the Planning Area can be found in Figure 4-25. Drought snapshots in 2015 and early 2016 are shown in Figure 4-26.

Figure 4-25 Current Drought Status in Sacramento County



Source: US Drought Monitor

Figure 4-26 Previous Drought Status in California



Source: US Drought Monitor

Cal DWR says the following about drought:

> *One dry year does not normally constitute a drought in California. California's extensive system of water supply infrastructure—its reservoirs, groundwater basins, and inter-regional conveyance facilities—mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.*

The drought issue in California is further compounded by water rights. Water is a commodity possessed under a variety of legal doctrines. The prioritization of water rights between farming and federally protected fish habitats in California contributes to this issue

Drought is not initially recognized as a problem because it normally originates in what is considered good weather, which typically includes a dry late spring and summer in Mediterranean climates, such as in California. This is particularly true in Northern California where drought impacts are delayed for most of the population by the wealth of stored surface and ground water. The drought complications normally appear more than a year after a drought begins. In most areas of California, ranchers that rely on rainfall to support forage for their livestock are the earliest and most affected by drought. Even below normal water years could affect ranchers depending on the timing and duration of precipitation events. It is difficult to quantitatively assess drought impacts to Sacramento County because not many county-specific studies have been conducted. Some factors to consider include the impacts of fallowed agricultural land, habitat loss and associated effects on wildlife, and the drawdown of the groundwater table. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. The State has conducted some empirical studies on the economic effects of fallowed lands with regard to water purchased by the State's Water Bank; but these studies do not quantitatively address the situation in Sacramento County. It can be assumed, however, that the loss of production in one sector of the economy would affect other sectors.

The drawdown of the groundwater table is one factor that has been recognized to occur during repeated dry years. Lowering of groundwater levels results in the need to deepen wells, which subsequently lead to increased pumping costs. These costs are a major consideration for residents relying on domestic wells and agricultural producers that irrigate with groundwater and/or use it for frost protection. Some communities in higher elevations with shallow bedrock do not have a significant source of groundwater.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in the Planning Area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Also, during a drought, allocations go down and water costs increase, which results in reduced water availability. Voluntary conservation measures are a normal and ongoing part of system operations and actively implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding and erosion.

Water Shortage

Sacramento County relies on a combination of surface and groundwater for their water supply. Snowmelt originating from the Sierra Nevada Mountains is a key source of surface water for the Sacramento Planning Area. The Sacramento, American, Consumnes, and Mokelumne rivers provide municipal, agricultural, and recreational uses to Sacramento County and depend on the spring and summer snowmelt in the Sierra Nevada for their flows. The network of dams constructed in Northern California to support the State Water Project and the Central Valley Project help provide California and Sacramento with water security during droughts. Sacramento County also sits over the north central portion of the California's Great Valley Groundwater Basin, which provides approximately 50 percent of all municipal and agricultural water supply in the County. Groundwater recharge occurs primarily from the American and Cosumnes rivers, with additional recharge from the Sacramento River and local streams. Groundwater stores are directly linked to surface water in the County and snowmelt in the Sierra Nevada.

Thus, Sacramento County, generally has sufficient groundwater and surface water supplies to mitigate even the severest droughts of the past century. Many other areas of the State, however, also place demands on these water resources during severe drought. For example, Northern California agencies, including those from Sacramento County, were major participants in the Governor's Drought Water Bank of 1991, 1992 and 1994.

Past Occurrences

Drought Disaster Declaration History

There has been one state declaration and one federal declaration related to drought and water shortage in Sacramento County since 1950.

- Drought State of Emergency – Governor's Proclamation January 17, 2014 (details below)
- 2008 Central Valley Drought (California State Declaration GP 2008-03)
- 1977 Drought (Federal Emergency Management Declaration EM-3023)

There have also been 12 USDA Secretarial Disaster Declarations since 1982. The USDA declarations are included in Table 4-21 in Section 4.2.7.

2014 Governor's Drought Declaration

California's ongoing response to its five-year drought has been guided by a series of executive orders issued by Governor Edmund G. Brown Jr. that are listed below beginning with the most recent and continuing in reverse chronological order:

- **Executive Order B-37-16, May 9, 2016**: The Governor's latest drought-related executive order established a new water use efficiency framework for California. The order bolstered the state's drought resilience and preparedness by establishing longer-term water conservation measures that include permanent monthly water use reporting, new urban water use targets, reducing system leaks and eliminating clearly wasteful practices, strengthening urban drought contingency plans and improving agricultural water management and drought plans.
- **Executive Order B-36-15, November 13, 2015**: This executive order called for additional actions to build on the State's ongoing response to record dry conditions and assist recovery efforts from 2015's devastating wildfires.
- **Executive Order B-29-15, April 1, 2015**: Key provisions included ordering the State Water Resources Control Board (Board) to impose restrictions to achieve a 25-percent reduction in potable urban water usage through February 28, 2016; directing the California Department of Water Resources (DWR) to lead a statewide initiative, in partnership with local agencies, to collectively replace 50 million square feet of lawns and ornamental turf with drought tolerant landscapes, and directing the California Energy Commission to implement a statewide appliance rebate program to provide monetary incentives for the replacement of inefficient household devices.
- **Executive Order B-28-14, December 22, 2014**: The order cited paragraph 9 of the January 17, 2014 Proclamation and paragraph 19 of the April 25, 2014 Proclamation (both are linked below) and extended the operation of the provisions in these paragraphs through May 31, 2016.
- **Executive Order B-27-14, October 6, 2014**: The order directed State agencies to assist local governments in their response to wildfires during California's drought conditions.

- **Executive Order B-26-14, September 18, 2014**: The order facilitated efforts to provide water to families in dire need as extreme drought continued throughout California.
- Proclamation of a **Continued State of Emergency, April 25, 2014**: The order strengthened the State's ability to manage water and habitat effectively in drought conditions and called on all Californians to redouble their efforts to conserve water.
- **Drought State of Emergency, January 17, 2014**: The Governor proclaimed a State of Emergency and directed State officials to take all necessary actions to make water immediately available. Key measures in the proclamation included:
  - ✓ Asking all Californians to reduce water consumption by 20 percent and referring residents and water agencies to the Save Our Water campaign – www.saveourwater.com – for practical advice on how to do so;
  - ✓ Directing local water suppliers to immediately implement local water shortage contingency plans;
  - ✓ Ordering the Board to consider petitions for consolidation of places of use for the State Water Project and Central Valley Project, which could streamline water transfers and exchanges between water users;
  - ✓ Directing DWR and the Board to accelerate funding for projects that could break ground in 2014 and enhance water supplies;
  - ✓ Ordering the Board to put water rights holders across the state on notice that they may be directed to cease or reduce water diversions based on water shortages;
  - ✓ Asking the Board to consider modifying requirements for releases of water from reservoirs or diversion limitations so that water may be conserved in reservoirs to protect cold water supplies for salmon, maintain water supplies and improve water quality.

NCDC Drought Events

There has been 19 NCDC drought events in Sacramento County. These are shown on Table 4-26. All of these events were from January 2014 to the end of 2015.

Table 4-26 Sacramento County Drought Events, 1993 to 12/31/2015

Date	Event Type	Deaths Direct	Injuries Direct	Property Damage	Crop Damage	Injuries Indirect	Deaths Indirect
1/1/2014	Drought	0	0	0	0	0	0
3/1/2015	Drought	0	0	0	0	0	0
4/1/2015	Drought	0	0	0	0	0	0
5/1/2015	Drought	0	0	0	0	0	0
5/1/2015	Drought	0	0	0	0	0	0
6/1/2015	Drought	0	0	0	0	0	0
6/1/2015	Drought	0	0	0	0	0	0
7/1/2015	Drought	0	0	0	0	0	0
7/1/2015	Drought	0	0	0	0	0	0
8/1/2015	Drought	0	0	0	0	0	0
8/1/2015	Drought	0	0	0	0	0	0

Date	Event Type	Deaths Direct	Injuries Direct	Property Damage	Crop Damage	Injuries Indirect	Deaths Indirect
9/1/2015	Drought	0	0	0	0	0	0
9/1/2015	Drought	0	0	0	0	0	0
10/1/2015	Drought	0	0	0	0	0	0
10/1/2015	Drought	0	0	0	0	0	0
11/1/2015	Drought	0	0	0	0	0	0
11/1/2015	Drought	0	0	0	0	0	0
12/1/2015	Drought	0	0	0	0	0	0
12/1/2015	Drought	0	0	0	0	0	0

Source: NCDC

HMPC Drought Events

Historically, California has experienced multiple severe droughts. According to Cal DWR, droughts exceeding three years are relatively rare in Northern California, the source of much of the State's developed water supply. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large northern California reservoirs. Table 4-27 compares the 1929-34 drought in the Sacramento and San Joaquin Valleys to the 1976-77, 1987-92, and 2007-09 droughts. Figure 4-27 depicts California's Multi-Year Historical Dry Periods, 1850-2000. Figure 4-28 depicts runoff for the State from 1900 to 2015. This gives a historical context for the 2014-2015 drought to past droughts.

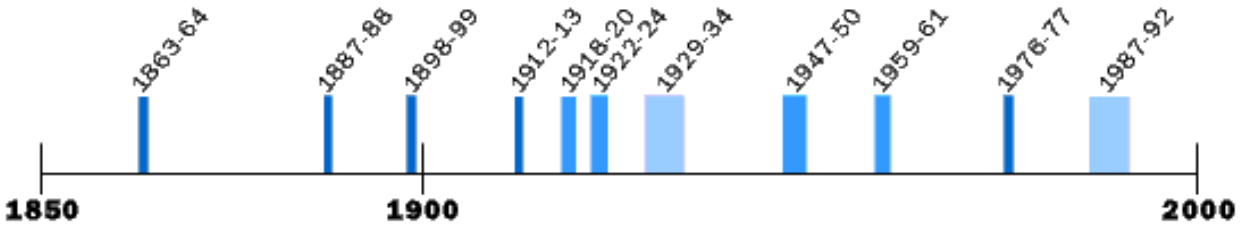
Table 4-27 Severity of Extreme Droughts in the Sacramento and San Joaquin Valleys

Drought Period	Sacramento Valley Runoff		San Joaquin Valley Runoff	
	(maf*/yr)	(percent Average 1901-96)	(maf*/yr)	(percent Average 1906-96)
1929-34	9.8	55	3.3	57
1976-77	6.6	37	1.5	26
1987-92	10.0	56	2.8	47
2007-09	11.2	64	3.7	61

Source: California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources. Available at: http://www.water.ca.gov/drought/docs/DroughtReport2010.pdf

*maf=million acre feet

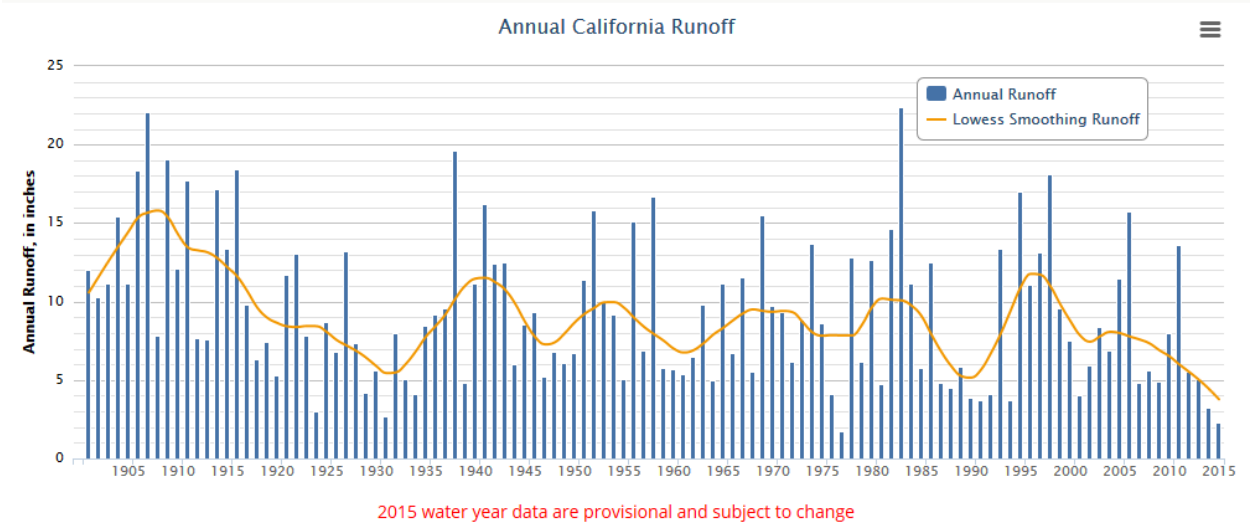
Figure 4-27 California's Multi-Year Historical Dry Periods, 1850-2000



Source: California Department of Water Resources, www.water.ca.gov/

Notes: Dry periods prior to 1900 estimated from limited data; covers dry periods of statewide or major regional extent

Figure 4-28 Annual California Runoff –1900 to 2015



Source: California DWR

The HMPC identified the following droughts as having significant impacts on the Planning Area:

- **2011 through to current.** Significant crop loss and loss of jobs related to agriculture. See agriculture hazards for specific information on damages.
- Construction of a $40 million temporary barrier at West False River in the Sac-San Joaquin Delta was installed to keep salt water from contaminating drinking water to Bay Area residents.
- **2014** – On January 17, 2014 the governor declared a State of Emergency for drought throughout California. This declaration came on the heels of a report that stated that California had the least amount of rainfall in its 163-year history. Californians were asked to voluntarily reduce their water consumption by 20 percent. Drought conditions worsened through 2014 and into 2015. On April 1, 2015, following the lowest snowpack ever recorded, Governor Brown announced actions that will save water, increase enforcement to prevent wasteful water use, streamline the State's drought response, and invest in new technologies that will make California more drought resilient. The Governor directed the State Water Resources Control Board to implement mandatory water reductions in cities and towns across California to reduce water usage by 25 percent. This savings amounts to approximately 1.5 million acre-feet of water through the end of 2015.
- **March 2015 –** An extremely dry March followed a below normal February for most areas. This continued the 4th consecutive year of drought for the region. Mountain snowfall was very limited for the month. This along with record warmth over the area resulted in the lowest snow pack levels on record for the time of year. By the end of March, the snow pack was only about 5 percent of normal levels. Melting snow pack supplies about a third of the annual water supply for California. Reservoirs across the area by the end of March were already well below normal levels.
- **April 2015** – The long-term drought continues as April was yet another below normal month for precipitation for much of the area. There was some mountain snowfall, but this did little to improve the snow pack, which remained at the lowest levels on record. By the end of April, the snow pack was only about 4 percent of normal levels. As a result, reservoirs across the area by the end of April remained well below normal levels with little or no spring rise, due to the lack of snow melt.

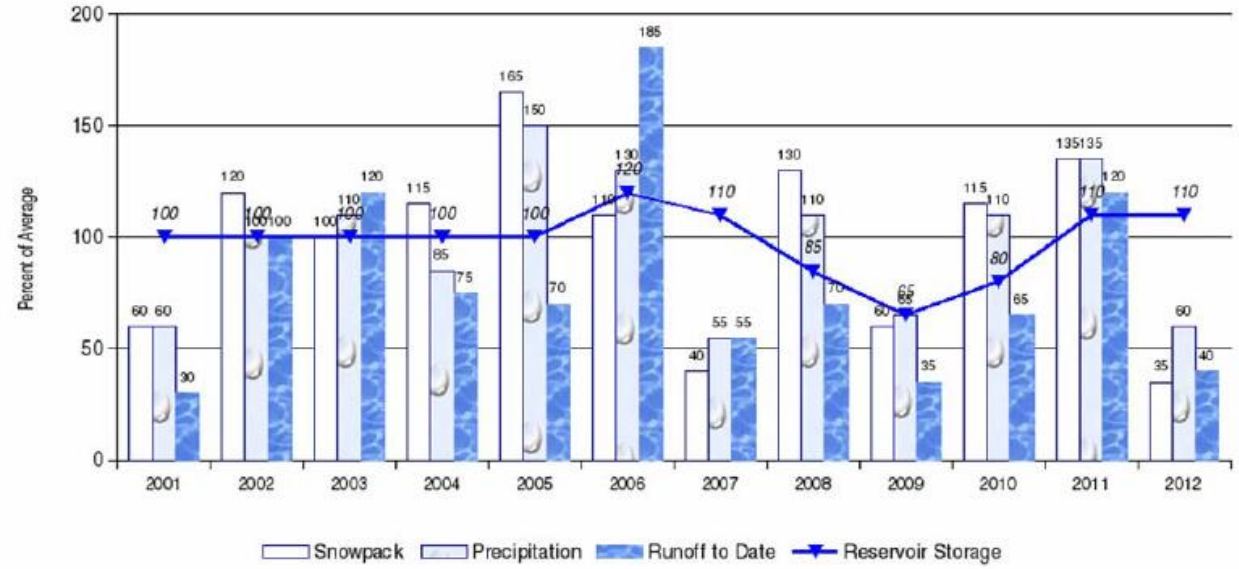
- **May 2015** – The long-term drought continues as May was yet another below normal month for precipitation for much of the area. There was some mountain precipitation in the form of rain, but much of it was focused along and east of the crest. Snow pack was at the lowest levels on record and by the end of the month was virtually nonexistent. As a result, reservoirs across the area by the end of the month were at well below normal levels and were already beginning to drop.
- **June 2015** – The long-term drought continued through June with yet another below normal month for precipitation for much of the area. There was some mountain rain, but much of it was focused along and east of the crest. Without a snow pack, reservoirs across the area by the end of the month were at well below normal levels and were continuing to drop. NOAA – As a result of continuing drought, emergency legislation appropriated over $1 Billion in additional funds for drought related projects".
- **July 2015** – The long-term drought continued through July. While quite a few mountain locations received greater than normal precipitation due to moisture from the monsoon and from ex-hurricane Dolores, this made little impact on the drought overall. The main affects were in decreasing fire activity in areas where locally heavy rain fell. Without a snow pack, reservoirs across the area by the end of the month were continuing to drop well below normal levels.
- **August 2015 –** The long-term drought continued through August with little change. Without a snow pack for late spring/early summer, reservoirs across the area by the end of the month were continuing to drop well below normal levels. All major reservoirs across the state were less than 40% of capacity by the end of the month. Folsom Lake was down to 20% of capacity, approaching near-record low levels for August, seen last in 1977. A UC Davis Center for Watershed Sciences report – (due to drought) showed statewide drought impact in 2015 at $2.7 Billion and loss of more than 21,000 jobs. Approx. 743,642 boxes of food distributed to 300k households that suffered unemployment from the drought.
- **September 2015 –** The long-term drought continued through September with little change. Reservoirs across the area were continuing to drop well below normal levels. All major reservoirs across the state were less than 40% of capacity. Folsom Lake was down to 18% of capacity, approaching near-record low levels for September, seen last in 1977.
- **October 2015 –** The long-term drought continued through October with little change. Reservoirs across the area were continuing to drop well below normal levels. All major reservoirs across the state were less than 40% of capacity. Folsom Lake was down to 16% of capacity, approaching near all-time record low levels, set in 1977.
- **November 2015 –** The long-term drought continued through November. Widespread precipitation returned to the area with several events, but reservoirs across the area continued to drop well below normal levels. All major reservoirs across the state were 30% or less of capacity. Folsom Lake was down to 14% of capacity, breaking the all-time record low set in 1977. Lake Oroville came close to a record low, but did not reach it.
- **December 2015 –** The long-term drought continued through December, though there was near normal precipitation in the mountains and above normal snow pack by the end of the month. Reservoirs across the area began to slowly fill but continued to be well below normal levels.
- **January 2016 –** The long-term drought continued through January, though precipitation amounts for the month were much better than in recent years, about 150-200% of normal. This built an above normal snow pack for the northern Sierra and southern Cascades by the end of the month. Reservoirs across the area continued to increase but generally remained below normal levels. Folsom Lake was an exception to this, rising to 104% by the end of January after a record low late in the fall. The Department of Water Resources increased water delivery projections from 10 percent early in the month to 15 percent of full water allotments by the end of the month, due to the increased reservoir levels.

- **February 2016 –** Long term drought continued through the month of February. After a relatively wet January, a period of extremely dry and warm conditions returned for most of February. This prevented the snow pack for the northern Sierra and southern Cascades from growing much, and actually decreased it in some locations by the end of the month, down to around 90% of normal, 85% for the whole state. Reservoirs across the area continued to increase but generally remained below normal levels. Folsom Lake was an exception to this, rising to 111% by the end of February. The Department of Water Resources increased water delivery projections to 30% of requests, up from a 15% estimate in late January. However, the dry conditions through the month prevented a larger anticipated increase.
- **March 2016 –** Long term drought continued through the month of March, but with significant improvements in mountain snow pack and most reservoir levels. After a period of extremely dry and warm conditions for most of February, a pattern of moist westerly flow brought a series of unusually wet storms in March. This added significantly to the snow pack for the northern Sierra and southern Cascades. Snow pack increased to around 97% of normal for those areas, while on average the whole state was 86%. Reservoirs across interior northern California continued to increase, with the two largest rising to above normal levels. Lake Shasta was 109% of normal by the end of the month, Lake Oroville was 114%. Folsom Lake was 110% of normal and had to make flood control releases. In contrast, Don Pedro and New Melones remained below normal. The Department of Water Resources increased water delivery projections to 45% of requests, up from a 30% estimate in late February.
- **April 2016 –** Long term drought impacts continued through the month of April, but near seasonal values for Northern and Central Sierra mountain snow pack and the "Big 3" northern reservoir levels meant some good news. The very active March resulted in much above average precipitation numbers which helped top off the reservoirs. In fact, they had to do some flood control releases on Folsom as it was above historical levels. Reservoirs across interior northern California continued to increase, with the three largest rising to above normal levels. Lake Shasta was 108% of normal by the end of the month, Lake Oroville was 118% and Folsom Lake was 113% of normal. In contrast, Don Pedro and New Melones remained below normal at 67% and 26% respectively. On April 21st, the Department of Water Resources increased water delivery projections to the State Water Project to 60%, up from a 45% estimate in late March.
- **May 2016** – Long term drought impacts continued through the month of May, though the largest of the reservoirs in northern interior California were at or above normal levels due to a significant mountain snowpack melting. Lake Shasta was 107% of normal by the end of the month, Lake Oroville was 111%, Folsom Lake was 101%, and Don Pedro was 99%. New Melones continued to lag behind the other significant area reservoirs and was only 41% of normal. On April 21st, the Department of Water Resources increased water delivery projections to the State Water Project to 60%, up from the 45% estimate in late March. Groundwater aquifers recharged much more slowly than the surface reservoirs, with many in the Central Valley still falling toward record levels.

Water Shortage Events

Figure 4-29 illustrates several indicators commonly used to evaluate water conditions in California. The percent of average values are determined by measurements made in each of the ten major hydrologic regions. The chart describes water conditions in California between 2001 and 2012. The chart illustrates the cyclical nature of weather patterns in California. Snow pack and precipitation increased between 2005 and 2006, began decreasing in late 2006, and began to show signs of recovery in 2009.

Figure 4-29 Water Supply Conditions, 2001 to 2012



Source: 2013 State of California Hazard Mitigation Plan

Since 2012, snowpack levels in California have dropped dramatically. 2015 estimates place snowpack as 5 percent of normal levels. Snowpack measurements have been kept in California since 1950 and nothing in the historic record comes close to 2015's severely depleted level. The previous record for the lowest snowpack level in California, 25 percent of normal, was set both in 1976-77 and 2013-2014. In "normal" years, the snowpack supplies about 30 percent of California's water needs, according to the California Department of Water Resources.

With a reduction in water, water supply issues based on water rights becomes more evident. Some agricultural uses, such as grapes and walnuts, are severely impacted through limited water supply. Drought and water supply issues will continue to be a concern to the Planning Area. Irrigation of agricultural lands continues to be a concern in the Planning Area.

Likelihood of Future Occurrence

Drought

Likely—Historical drought data for the Sacramento County Planning Area and region indicate there have been 6 significant droughts in the last 89 years. This equates to a drought every 14.8 years on average or a 6.7 percent chance of a drought in any given year. However, based on this data and given the multi-year length of droughts, the HMPC determined that future drought occurrence in the Planning Area are likely.

Water Shortage

Occasional – Recent historical data for water shortage indicates that Sacramento County may at some time be at risk to both short and prolonged periods of water shortage. Based on this it is possible that water shortages will affect the County in the future should extreme drought conditions continue. However, to date, most of Northern California and Sacramento County have continued to have good, consistent water

supply. Most of the Planning Area's supply comes from surface water, with groundwater resources also being used in some areas.

Climate Change and Drought and Water Shortage

Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies. The CAS stresses the need for public policy development addressing long term climate change impacts on water supplies. The CAS notes that climate change is likely to significantly diminish California's future water supply, stating that:

> *California must change its water management and uses because climate change will likely create greater competition for limited water supplies needed by the environment, agriculture, and cities.*

The regional implications of declining water supplies as a long-term public policy issue are recognized in a Southern California Association of Governments July 2009 publication of essays examining climate change topics. In one essay, Dan Cayan observes:

> *In one form or another, many of Southern California's climate concerns radiate from efforts to secure an adequate fresh water supply…Of all the areas of North America, Southern California's annual receipt of precipitation is the most volatile – we only occasionally see a "normal" year, and in the last few we have swung from very wet in 2005 to very dry in 2007 and 2008….Southern California has special challenges because it is the most urban of the California water user regions and, regionwide, we import more than two-thirds of the water that we consume.*

Members of the HMPC noted a report published in Science magazine in 2015 that stated:

> *Given current greenhouse gas emissions, the chances of a 35+ year "megadrought" striking the Southwest by 2100 are above 80 percent.*

The HMPC also noted a report from the Public Policy Institute of California that thousands of Californians – mostly in rural, small, disadvantaged communities – already face acute water scarcity, contaminated groundwater, or complete water loss. Climate change would make these effects worse.

Preliminary Draft - Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan (CAP), Ascent Environmental 2016 Analysis

According to the 2016 Preliminary Draft Sacramento County CAP, based on historical data and modeling, under the low- and high-emissions scenarios, Cal DWR projects that the Sierra Nevada snowpack will decrease by 25-40 percent from its historic April 1st average of 28 inches of water content by 2050 and 48 to 65 percent by 2100, respectively. With a projected decrease in overall precipitation, including precipitation falling as snow and increased average temperatures, drought conditions may increase and both groundwater and surface water supplies may be impacted.

4.2.12. Earthquake

Hazard/Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The Richter Magnitude Scale is used to quantify the magnitude or strength of the seismic energy released by an earthquake. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface (see Table 4-28). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4-28 Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors; by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, and great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.

MMI	Felt Intensity
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: Multi-Hazard Identification and Risk Assessment, FEMA 1997

California is seismically active because it sits on the boundary between two of the earth's tectonic plates. Most of the state - everything east of the San Andreas Fault - is on the North American Plate. The cities of Monterey, Santa Barbara, Los Angeles, and San Diego are on the Pacific Plate, which is constantly moving northwest past the North American Plate. The relative rate of movement is about two inches per year. The San Andreas Fault is considered the boundary between the two plates, although some of the motion is taken up on faults as far away as central Utah.

Earthquake Hazards

Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, hazmat incidents, fires, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction. This section briefly discusses issues related to types of seismic hazards.

Ground Shaking

Groundshaking is motion that occurs as a result of energy released during faulting. The damage or collapse of buildings and other structures caused by groundshaking is among the most serious seismic hazards. Damage to structures from this vibration, or groundshaking, is caused by the transmission of earthquake vibrations from the ground to the structure. The intensity of shaking and its potential impact on buildings is determined by the physical characteristics of the underlying soil and rock, building materials and workmanship, earthquake magnitude and location of epicenter, and the character and duration of ground motion. Much of the County is located on alluvium which increases the amplitude of the earthquake wave. Ground motion lasts longer and waves are amplified on loose, water-saturated materials than on solid rock. As a result, structures located on alluvium typically suffer greater damage than those located on solid rock.

Seismic Structural Safety

Older buildings constructed before building codes were established, and even newer buildings constructed before earthquake-resistance provisions were included in the codes, are the most likely to be damaged during an earthquake. Buildings one or two stories high of wood-frame construction are considered to be the most structurally resistant to earthquake damage. Older masonry buildings without seismic reinforcement (unreinforced masonry) are the most susceptible to the type of structural failure that causes injury or death.

The susceptibility of a structure to damage from ground shaking is also related to the underlying foundation material. A foundation of rock or very firm material can intensify short-period motions which affect low-rise buildings more than tall, flexible ones. A deep layer of water-logged soft alluvium can cushion low-rise buildings, but it can also accentuate the motion in tall buildings. The amplified motion resulting from softer alluvial soils can also severely damage older masonry buildings.

Other potentially dangerous conditions include, but are not limited to: building architectural features that are not firmly anchored, such as parapets and cornices; roadways, including column and pile bents and abutments for bridges and overcrossings; and above-ground storage tanks and their mounting devices. Such features could be damaged or destroyed during strong or sustained ground shaking.

Liquefaction Potential

Liquefaction is a process whereby soil is temporarily transformed to a fluid form during intense and prolonged ground shaking. Due to the damage liquefaction poses to the levees in Sacramento County, a separate, more detailed discussion of liquefaction can be found in Section 4.2.13.

Settlement

Settlement can occur in poorly consolidated soils during ground shaking. During settlement, the soil materials are physically rearranged by the shaking to result in a less stable alignment of the individual minerals. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils or improperly founded or poorly compacted fill. These areas are known to undergo extensive settling with the addition of irrigation water, but evidence due to ground shaking is not available.

Other Hazards

Earthquakes can also cause seiches, landslides, and dam and levee failures. A seiche is a periodic oscillation of a body of water resulting from seismic shaking or other factors that could cause flooding. Earthquakes may cause landslides, particularly during the wet season, in areas of high water or saturated soils. Finally, earthquakes can cause dams and levees to fail (see Section 4.2.9 Dam Failure and Section 4.2.17 Levee Failure).

Faults

A fault is defined as "a fracture or fracture zone in the earth's crust along which there has been displacement of the sides relative to one another." For the purpose of planning there are two types of faults, active and inactive. Active faults have experienced displacement in historic time, suggesting that future displacement may be expected. Inactive faults show no evidence of movement in recent geologic time, suggesting that these faults are dormant.

Two types of fault movement represent possible hazards to structures in the immediate vicinity of the fault: fault creep and sudden fault displacement. Fault creep, a slow movement of one side of a fault relative to the other, can cause cracking and buckling of sidewalks and foundations even without perceptible ground shaking. Sudden fault displacement occurs during an earthquake event and may result in the collapse of

buildings or other structures that are found along the fault zone when fault displacement exceeds an inch or two. The only protection against damage caused directly by fault displacement is to prohibit construction in the fault zone.

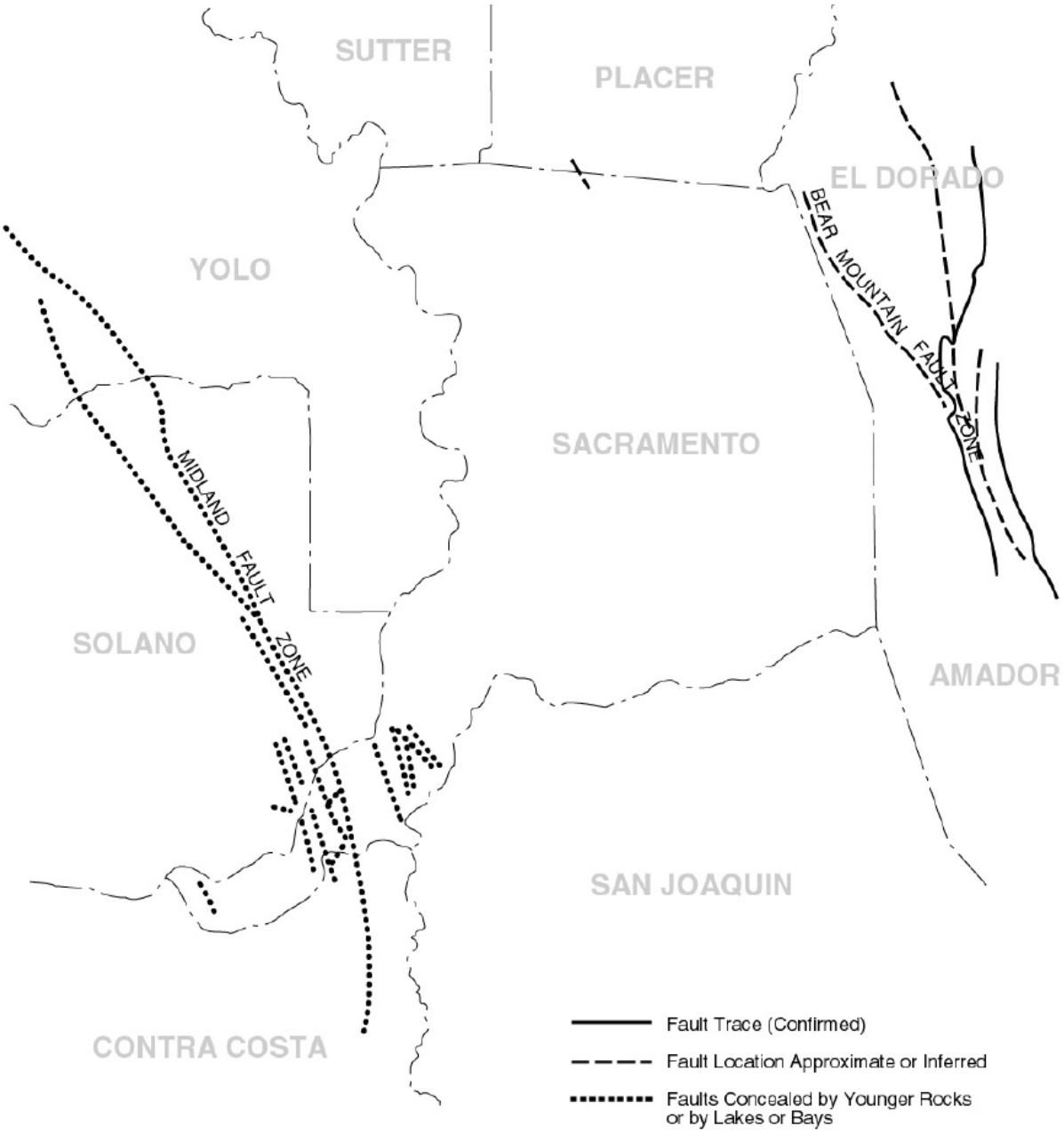
Geological literature indicates that no major active faults transect the County; however, there are several subsurface faults in the Delta. The Midland fault, buried under alluvium, extends north of Bethel Island in the Delta to the east of Lake Berryessa and is considered inactive but possibly capable of generating a near 7.0 (Richter Scale) earthquake. This figure is speculative based on a 1895 earthquake measuring 6.9 on the Richter Scale with an epicenter possibly in the Midland Fault vicinity. However, oil and gas companies exploring the area's energy potential have identified several subsurface faults, none of which show any recent surface rupture. A second, presumably inactive, fault is in the vicinity of Citrus Heights near Antelope Road. This fault's only exposure is along a railroad cut where offsetting geologic beds can be seen. Neither the lateral extent of the trace, the magnitude of the offset, nor the age of faulting has been determined. To the east, the Bear Mountain fault zone trends northwest-southeast through Amador and El Dorado Counties. Geologists believe this series of faults has not been active in historic time. Table 4-29 and Figure 4-30 identify the faults in close proximity to Sacramento County.

Table 4-29 Historically Active Faults in the Vicinity of Sacramento County

Maximum Richter Scale Reading	Approximate Distance from West Sacramento (Miles)	Historical Seismicity	Probable Intensity
San Andreas	80	1906 (8.25)*	7.5
Vaca	35	1892 (6.5-7)	6.0
Hayward	60	1836, 1868 (7.25)	6.5-7
Calaveras	50	1861 (6.5-7)	6.5-7
Concord-Green Valley	45	1955 (5.4; small events on Green Valley; creep on Concord)	6.0
Midland	20	Possible source of major historic earthquake (1895?)	6.9
Dunnigan Hills	18	Unknown	6.0
Foothill Fault System	25	Oroville 1975	6.0

Source: Lighthouse Marina EIR/EIS, by E D A W, Inc., November, 1985.

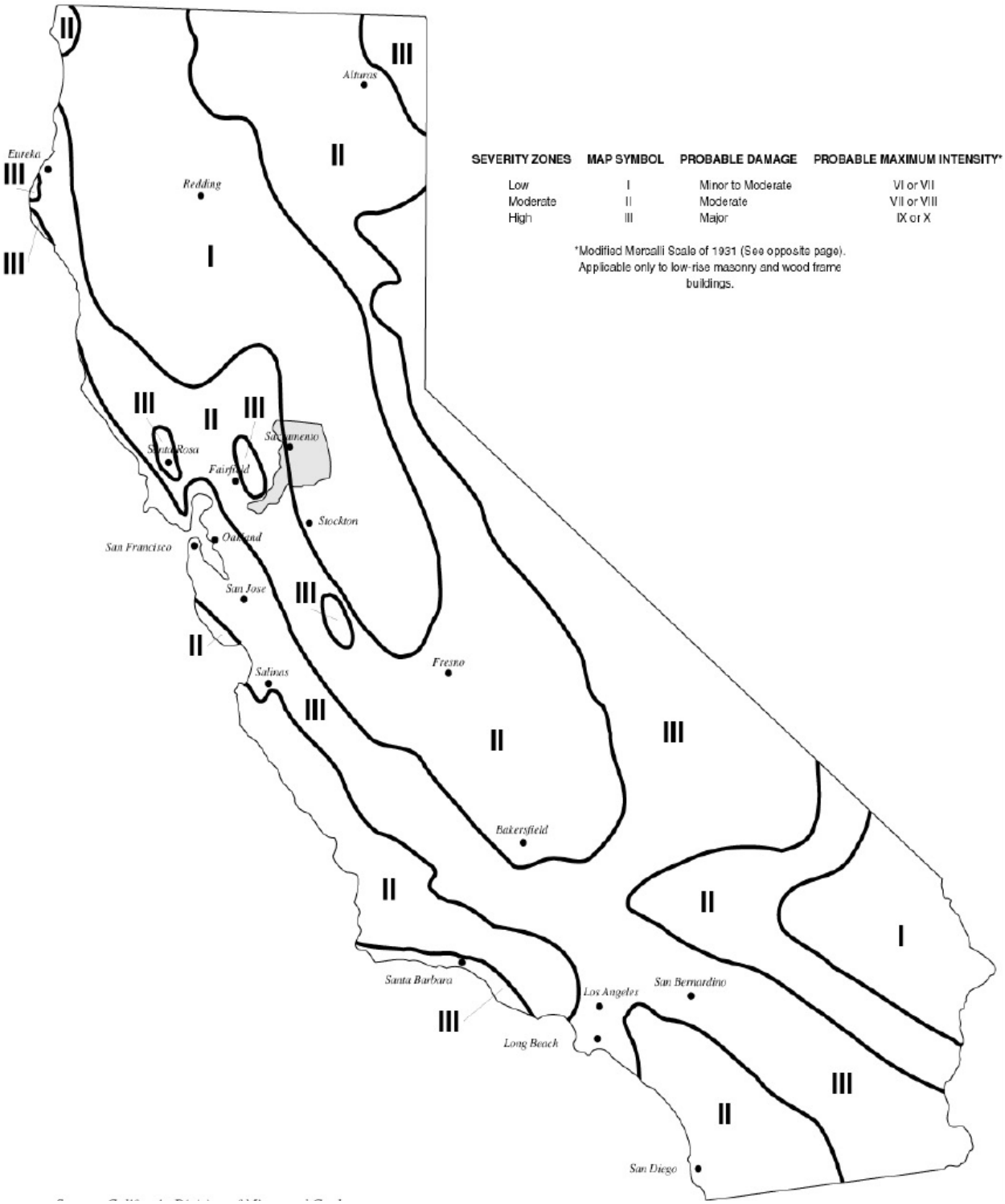
Figure 4-30 Faults in the Vicinity of Sacramento County



Source: Sacramento County General Plan Background Report

Maps indicating the maximum expectable intensity of groundshaking for the County are available through several sources. The California Division of Mines and Geology has prepared a map of the state showing the eastern and central portions of the County in a relatively low intensity groundshaking zone while the western portion of the County is in a relatively moderate groundshaking zone (Figure 4-31). More information on groundshaking can be found in the vulnerability discussion of earthquake in Section 4.3.8.

Figure 4-31 Maximum Expectable Earthquake Intensity



Source: California Division of Mines and Geology

The HMPC noted that Lake County's earthquake was on a previously unknown fault. While fault maps developed by the California Geological Survey (CGS) and the US Geological Survey (USGS) are thorough, a chance remains of an earthquake on an unknown fault in the County.

Past Occurrences

Disaster Declaration History

There have been two disaster declarations in the County related to earthquake:

- 2014 Earthquake (Federal Emergency Management Disaster Declaration EM 4193)
- 1989 Loma Prieta Earthquake (Federal Disaster Declaration DR-845; USDA Disaster Declaration M-845)

NCDC Events

Earthquake events are not tracked by the NCDC database.

USGS Events

The USGS National Earthquake Information Center database contains data on earthquakes in the Sacramento County area. Table 4-30 shows the approximate distances earthquakes can be felt away from the epicenter. According to the table, a magnitude 5.0 earthquake could be felt up to 90 miles away. The USGS database was searched for magnitude 5.0 or greater on the Richter Scale within 90 miles of the City of Sacramento. These results are detailed in Table 4-31.

Table 4-30 Approximate Relationships between Earthquake Magnitude and Intensity

Richter Scale Magnitude	Maximum Expected Intensity (MM)*	Distance Felt (miles)
2.0 - 2.9	I – II	0
3.0 - 3.9	II – III	10
4.0 - 4.9	IV – V	50
5.0 - 5.9	VI – VII	90
6.0 - 6.9	VII – VIII	135
7.0 - 7.9	IX – X	240
8.0 - 8.9	XI – XII	365

*Modified Mercalli Intensity Scale.
Source: United State Geologic Survey, Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.

*Table 4-31 Magnitude 5.0 Earthquakes within 90 Miles of Sacramento County**

Date	Richter Magnitude	Location
8/1/1975	5.8	59 miles
8/2/1975	5.1	59 miles

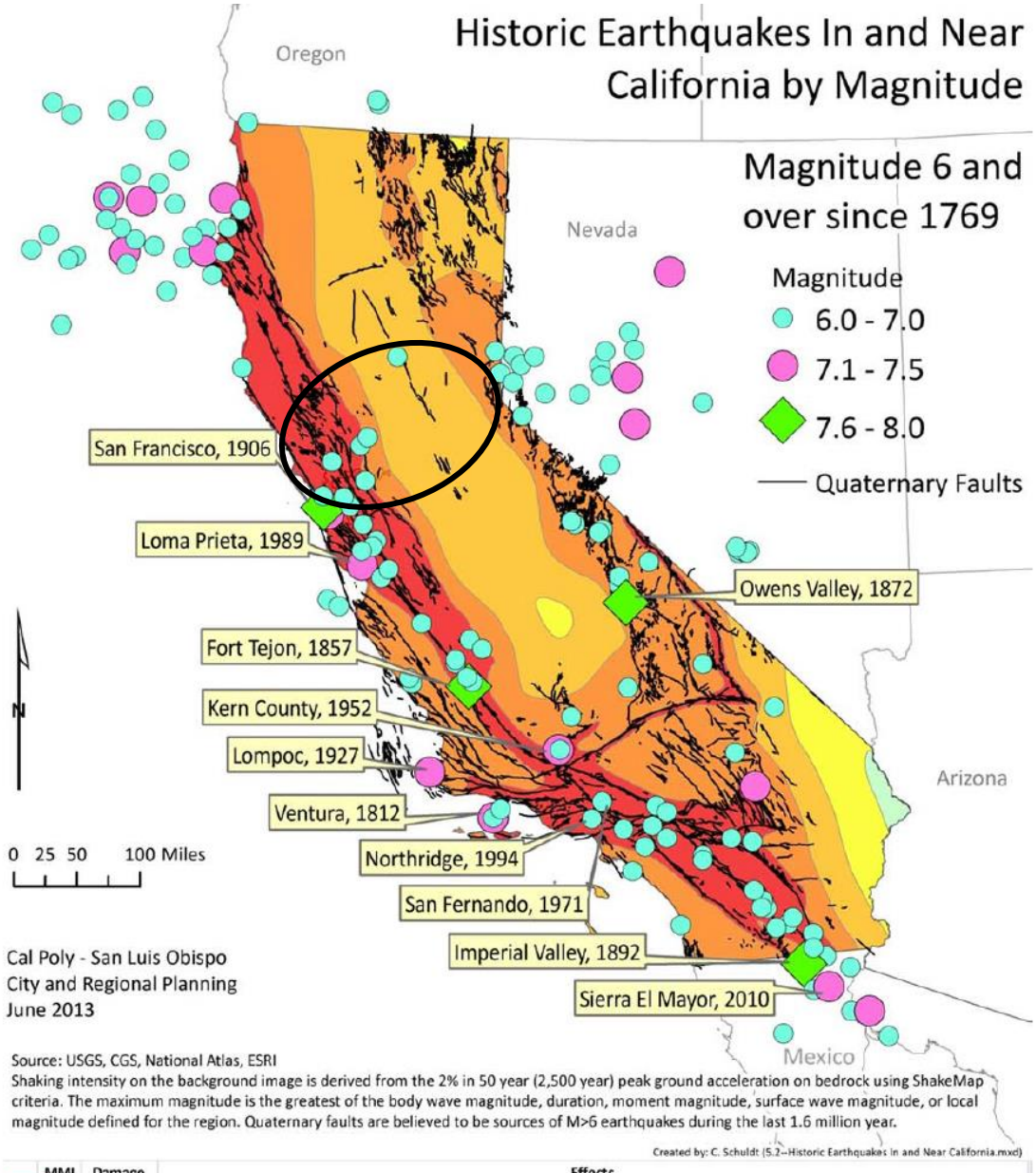
Date	Richter Magnitude	Location
8/2/1975	5.1	58 miles
9/4/1978	5.2	88 miles
1/24/1980	5.8	51 miles
1/27/1980	5.8	57 miles
11/28/1980	5.2	73 miles
4/24/1984	6.2	85 miles
3/31/1986	5.7	73 miles
6/13/1988	5.4	81 miles
9/3/2000	5.0	51 miles
10/31/2007	5.6	78 miles
8/24/2014	6.0	51 miles

Source: USGS

*Search dates 1/1/1950- May 1, 2016

Figure 4-32 shows major historical earthquakes in California from 1769 to 2013.

Figure 4-32 Historic Earthquakes in California and Sacramento County



MMI	Damage	Effects
X	Very Heavy	Some well-built, wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
IX	Heavy	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
VIII	Moderate to Heavy	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
VII	Moderate	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly-built or badly designed structures; some chimneys broken.
VI	Light	Felt by all, many frightened. Some heavy furniture moved; a few instance of fallen plaster. Damage slight.
V	Very Light	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.

Source: 2013 State of California Multi-Hazard Mitigation Plan

HMPC Events

Historically, major earthquakes have not been an issue for Sacramento County. However, minor earthquakes have occurred in or near the County in the past. The HMPC has identified several earthquakes that were felt by area residents and/or caused damaging shaking in the County. Details on some of these events follow.

- The greatest amount of groundshaking experienced in the County occurred on **April 21, 1892**, when an earthquake shook Yolo County between Winters and Vacaville. While the damage in Yolo County was severe, the damage in Sacramento County was substantially less. Damage to buildings in Sacramento was limited to statuary falling from building tops and cracks in chimneys.
- The **1906** San Francisco earthquake generated little shaking in Sacramento County and damage locally was limited to minor cracks in a local post office and jail.
- A **December 16, 1954** earthquake near Fairview Peak, Nevada measured 7.1 on the Richter Scale. The earthquake caused some damage in Sacramento, while virtually no damage occurred in Reno, Nevada.
- On **August 1, 1975**, a moderate earthquake (magnitude 5.7) occurred near Oroville on the Cleveland Hills fault. This earthquake was felt in Sacramento County, although no direct damage was reported.
- Sacramento County suffered little damage from the **October 17, 1989** Loma Prieta earthquake, which was felt over an area covering 400,000 square miles from Los Angeles to the California-Oregon border. The earthquake measured 7.1 on the Richter Scale; the epicenter was located along the San Andreas fault beneath the Santa Cruz Mountains, about 60 miles southeast of San Francisco. In contrast to Sacramento County, the San Francisco Bay region suffered over $6 billion in property damage and 62 lives were lost. The Loma Prieta earthquake resulted in a federal disaster declaration (DR-845) for the area around San Francisco, including Sacramento County.
- **2014 Napa Earthquake** – A magnitude 6.0 earthquake occurred 51.1 miles west/southwest of the City of Sacramento. Damage estimates in the County were negligible. The County was included in a disaster declaration for this earthquake.

There have been many earthquakes in Northern California since 2011. Most were at a magnitude of 1.5 – 3.0. those closest to Sacramento Valley were; 1.8 magnitude in Antioch, 2.4 in Rio Vista and 6.0 magnitude in American Canyon.

Likelihood of Future Occurrence

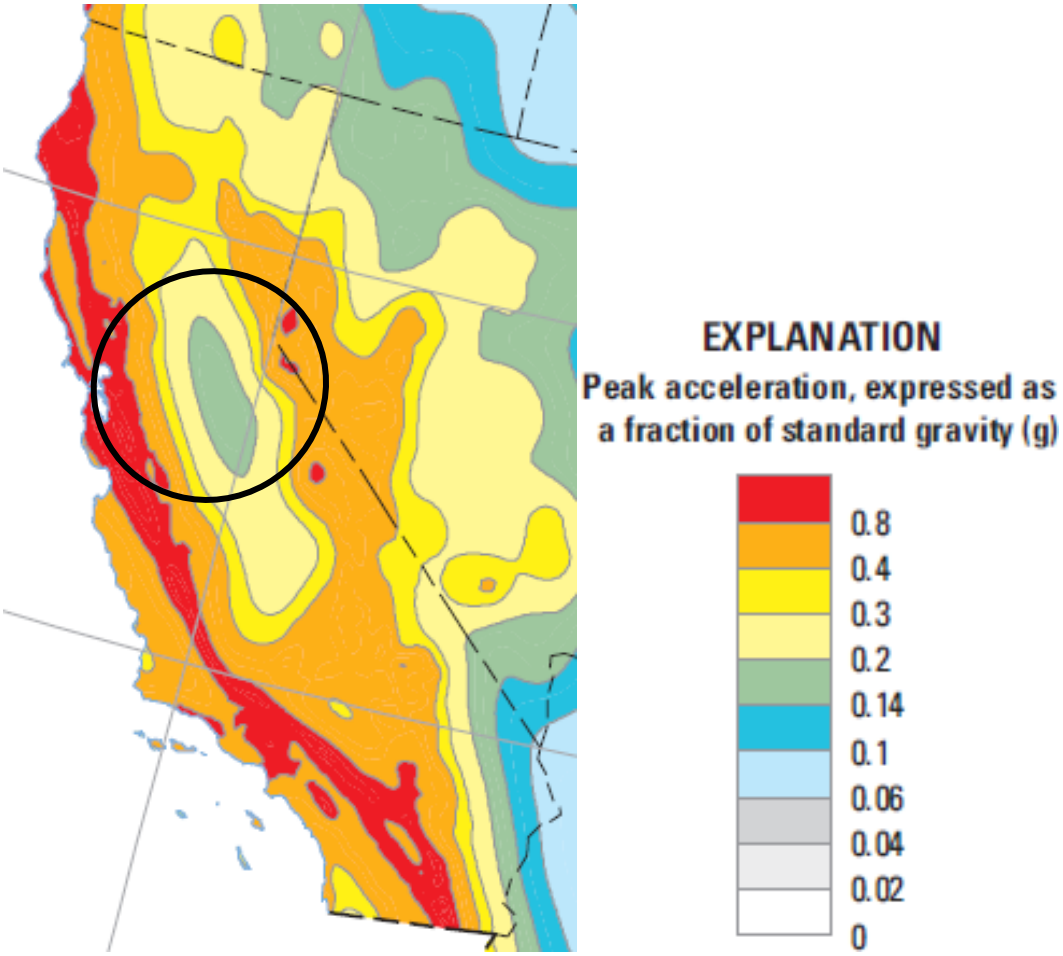
Occasional—No major earthquakes have been recorded within the county; although the county has felt ground shaking from earthquakes with epicenters located elsewhere. Based on historical data and the location of the Sacramento County Planning Area relative to active and potentially active faults, the Planning Area will experience an earthquake occasionally.

Mapping of Future Occurrences

Maps indicating the maximum expectable intensity of groundshaking for the County are available through several sources. The USGS issues National Seismic Hazard Maps as reports every few years. These maps provide various acceleration and probabilities for time periods. Figure 4-33 depicts the peak horizontal acceleration (%g) with 10% probability of exceedance in 50 years (a 500-year event) for the planning region. The figure demonstrates that the County falls in the 14%g (grey) to 20%g area. This data indicates

that the expected severity of earthquakes in the region is somewhat limited, as damage from earthquakes typically occurs at peak accelerations of 30%g or greater.

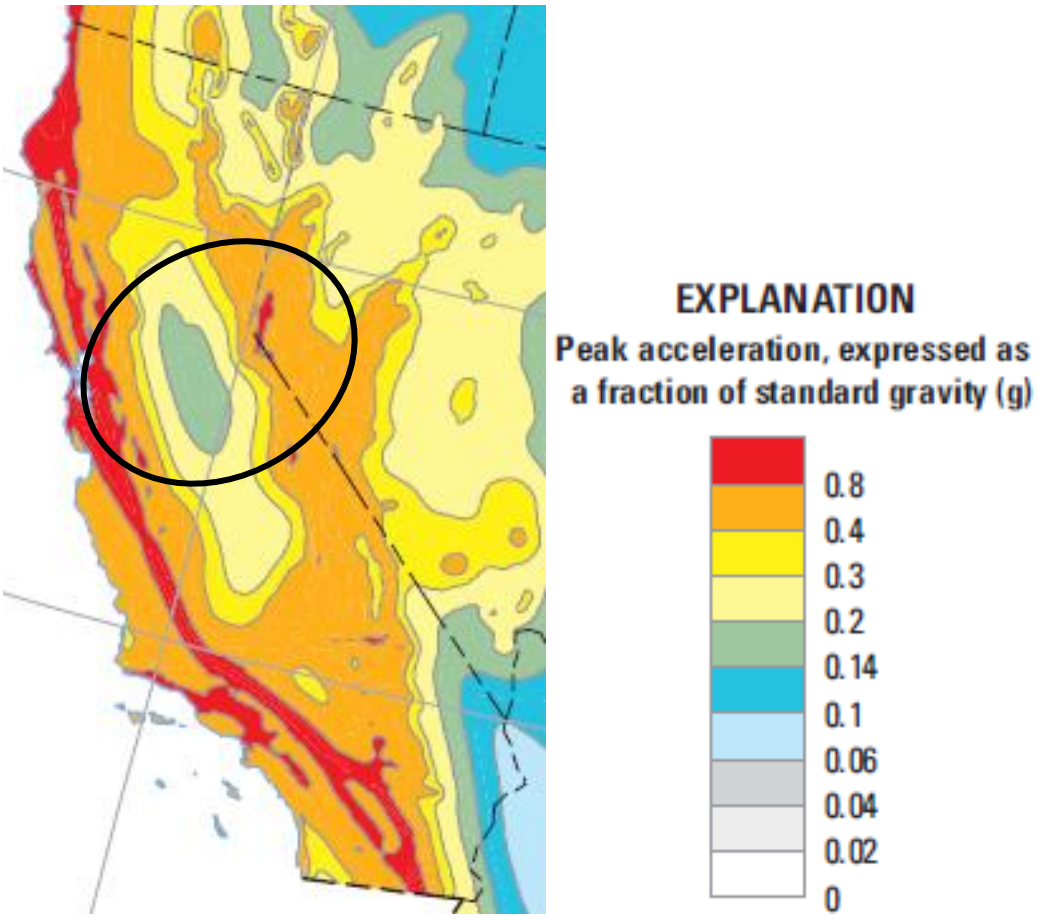
Figure 4-33 Peak Horizontal Acceleration with 10% Probability of Occurrence in 50 Years



Source: USGS National Seismic Hazard Maps

Figure 4-34 depicts the peak horizontal acceleration (%g) with 2% probability of exceedance in 50 years (a 2,500-year event) for the County. The figure demonstrates that the County falls in the 14%g (grey) to 20%g area. This data indicates that the expected severity of earthquakes in the region is moderate, as damage from earthquakes typically occurs at peak accelerations of 30%g or greater.

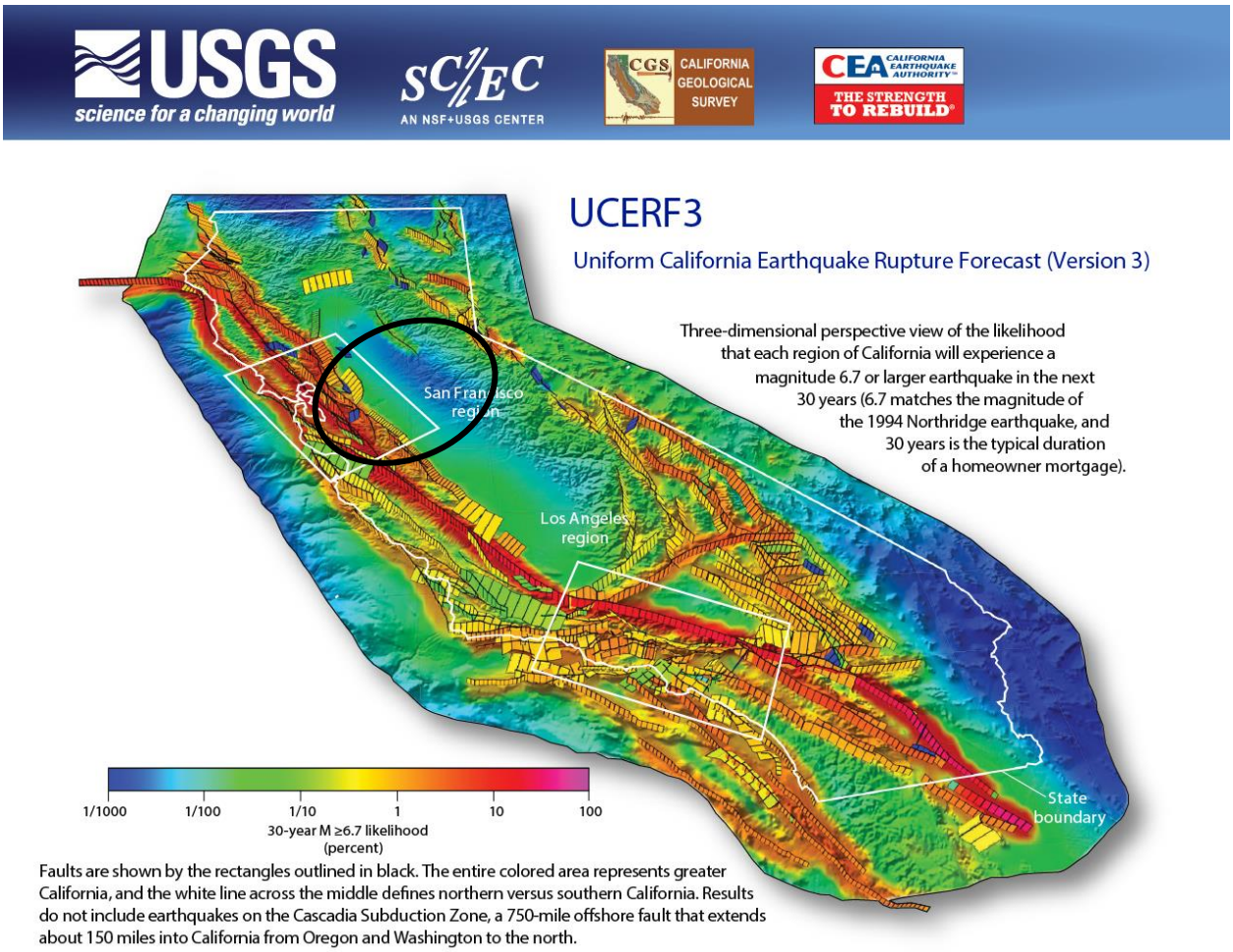
Figure 4-34 Peak Horizontal Acceleration with 2% Probability of Occurrence in 50 Years



Source: USGS National Seismic Hazard Maps

In 2014, the USGS and the CGS released the time-dependent version of the Uniform California Earthquake Rupture Forecast (UCERF III) model. The UCERF III results have helped to reduce the uncertainty in estimated 30-year probabilities of strong ground motions in California. The UCERF map is shown in Figure 4-35 and indicates that Sacramento County has a low to moderate risk of earthquake occurrence, which coincides with the likelihood of future occurrence rating of occasional.

Figure 4-35 Probability of Earthquake Magnitudes Occurring in 30 Year Time Frame



Source: United States Geological Survey Open File Report 2015-3009

Climate Change and Earthquake

Climate change is unlikely to increase earthquake frequency or strength.

4.2.13. Earthquake: Liquefaction

Hazard/Problem Description

Liquefaction can be defined as the loss of soil strength or stiffness due to a buildup of pore-water pressure during a seismic event and is associated primarily with relatively loose, saturated fine- to medium-grained unconsolidated soils. Seismic ground shaking of relatively loose, granular soils that are saturated or submerged can cause the soils to liquefy and temporarily behave as a dense fluid. If this layer is at the surface, its effect is much like that of quicksand for any structure located on it. If the liquefied layer is in the subsurface, the material above it may slide laterally depending on the confinement of the unstable mass. Liquefaction is caused by a sudden temporary increase in pore-water pressure due to seismic densification or other displacement of submerged granular soils. Liquefiable soil conditions are not uncommon in

alluvial deposits in moderate to large canyons and could also be present in other areas of alluvial soils where the groundwater level is shallow (i.e., 50 feet below the surface). Bedrock units, due to their dense nature, are unlikely to present a liquefaction hazard.

Liquefaction during major earthquakes has caused severe damage to structures on level ground as a result of settling, titling, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation. Also of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted.

Typical effects of liquefaction include:

- Loss of bearing strength—the ground can liquefy and lose its ability to support structures.
- Lateral spreading—the ground can slide down very gentle slopes or toward stream banks riding on a buried liquefied layer.
- Sand boils—sand-laden water can be ejected from a buried liquefied layer and erupt at the surface to form sand volcanoes; the surrounding ground often fractures and settles.
- Flow failures—earth moves down steep slope with large displacement and much internal disruption of material.
- Ground oscillation—the surface layer, riding on a buried liquefied layer, is thrown back and forth by the shaking and can be severely deformed.
- Flotation—light structures that are buried in the ground (like pipelines, sewers and nearly empty fuel tanks) can float to the surface when they are surrounded by liquefied soil.
- Settlement—when liquefied ground re-consolidates following an earthquake, the ground surface may settle or subside as shaking decreases and the underlying liquefied soil becomes more dense.

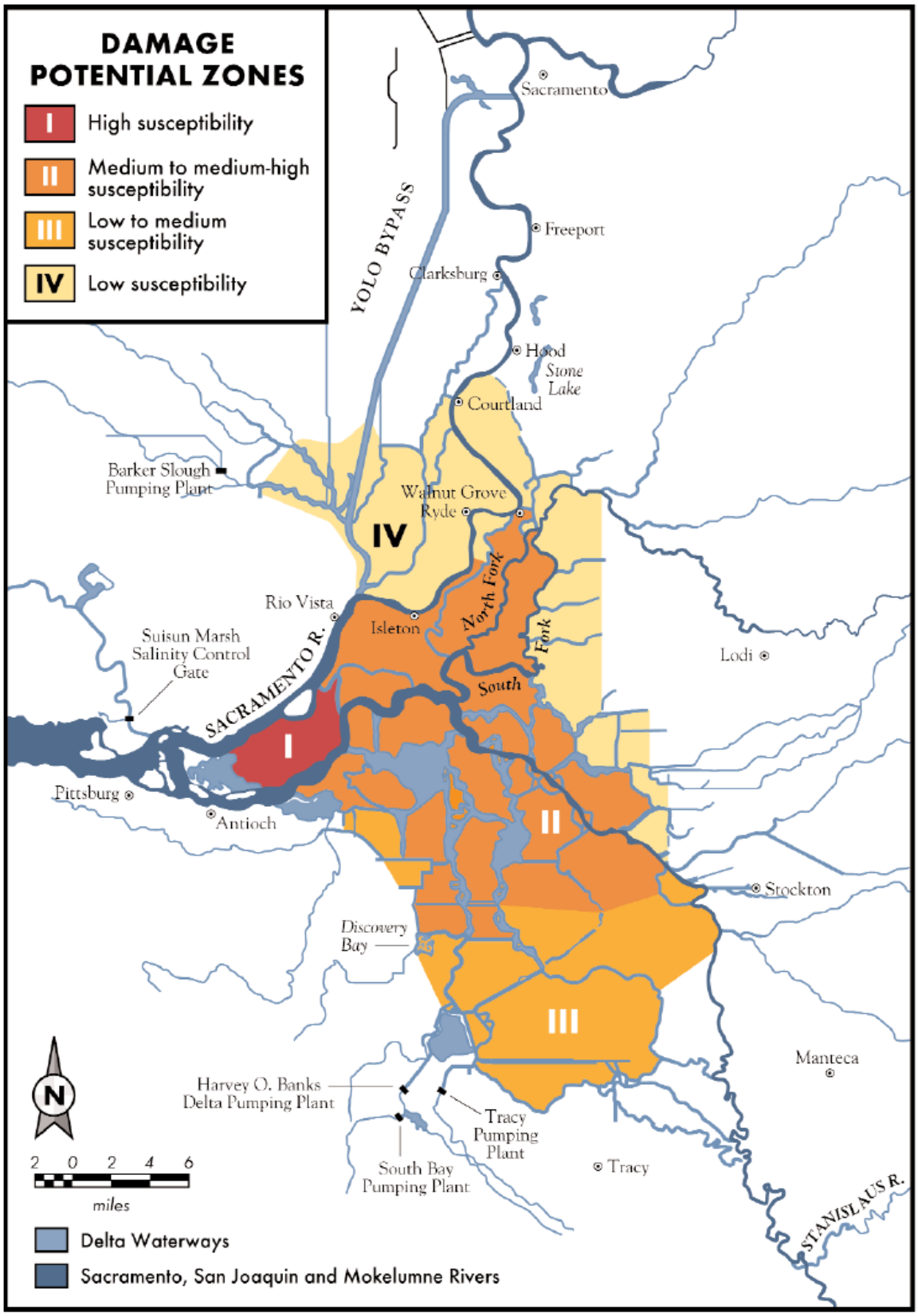
In Sacramento County, the Delta and areas of downtown Sacramento are at risk to liquefaction. The Delta sits atop a blind fault system on the western edge of the Central Valley. Moderate earthquakes in 1892 near Vacaville and in 1983 near Coalinga demonstrate the seismic potential of this structural belt. The increasing height of the levee system has prompted growing concern about the seismic stability of the levees. The concern is based on the proximity of faulting, the nature of the levee foundations, and the materials used to build the levees. Many levees consist of uncompacted weak local soils that may be unstable under seismic loading. The presence of sand and silt in the levees and their foundations indicates that liquefaction is also a possibility.

Although there have been no significant quakes in or closely adjacent to the Delta since high levees were originally constructed, there are at least five major faults within the vicinity of the Delta capable of generating peak ground acceleration values that would likely lead to levee failures. More information on earthquakes and the faults affecting the Sacramento County area can be found in Section 4.2.12.

A preliminary analysis of the risk of levee failure due to seismicity was prepared for the CALFED Levee System Integrity Program. Based on standard methods and local expertise, it was estimated the magnitude and recurrence intervals of peak ground accelerations throughout the Delta. Two competing fault models were evaluated for this study, producing a wide range of potential accelerations. Then, based on local knowledge and limited geotechnical information, Damage Potential Zones were established for the Delta

(Figure 4-36). The zones of highest risk lie in the central and west Delta where tall levees are constructed on unstable soils that are at high risk of settling or liquefaction during an earthquake.

Figure 4-36 Delta Area - Potential Damage Due to Liquefaction and Levee Collapse



This report estimated recurrence intervals for ground accelerations and the number of potential levee failures in each Damage Potential Zone. It is useful to examine their estimates of the number of failures that might occur during a 100-year event, or an event with a 0.01 probability of being equaled or exceeded in any given year. Based on their estimates, it is a roughly 50-50 chance that 5 to 20 levee segments will fail during a 100-year event in the Delta. This does not imply that 5 to 20 islands will flood, but just that 5 to 20 levee segments will fail. The loss of 5 to 20 levee segments in the Delta constitutes considerable and abrupt landscape change, since island flooding is likely to be widespread and persistent for a long period of time.

In sum, liquefaction may pose a serious threat to levees, especially as levees are built larger and higher to deal with continuing island subsidence. Levee failure, depending on the extent, could have disastrous effects on agriculture, natural gas supply, fisheries, and salt water intrusion of the San Francisco Bay. Water supply to California could be affected for years. A greater discussion of levee failure can be found in Section 4.2.15.

Past Occurrences

Disaster Declarations

There have been no disaster declarations due to earthquake based liquefaction.

NCDC Events

The NCDC does not track earthquakes.

HMPC Events

Sacramento County has two areas that have been suggested as posing potential liquefaction problems - the downtown area and the Delta. While there is little published geologic information on the liquefaction potential of Delta soils, a geological and seismological study in 1972 indicated that the Housing and Redevelopment Agency building site located downtown at the intersection of 7th and I Streets has a potential for liquefaction. This study also concluded that potential liquefaction problems may exist throughout the downtown area where loose sands and silts are present below the ground water table.

Although no historic examples of seismically induced levee failure are known in the Delta, the modern levee network has not been subjected to strong shaking. Levees were either smaller or non-existent in 1906 when the region was strongly shaken by the great San Francisco earthquake.

Likelihood of Future Occurrences

Occasional – Due to the presence of faults in the area, and the ever increasing height of levees protecting the Delta, there is concern that liquefaction could be a cause of levee failure. Embankment and foundation materials for most Delta levees are substandard, adding to the risk of failure during seismic events. The U.S. Geological Survey estimates that an earthquake of magnitude 6.7 or greater has a 62 percent probability of occurring in the San Francisco Bay Area between 2003 and 2032. Such an earthquake is

capable of causing multiple levee failures in the Delta Region which could result in fatalities, extensive property damage and the interruption of water exports from the Delta for an extended period of time.

4.2.14. Flood: 100/200/500-year

Hazard/Problem Description

Flooding is the rising and overflowing of a body of water onto normally dry land. History clearly highlights floods as one of the most frequent natural hazards impacting Sacramento County. Floods are among the most costly natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

Health Hazards from Flooding

Certain health hazards are also common to flood events. While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and other livestock are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e. coli and other disease causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated

throughout the building and breathed in by the occupants. If a city or county water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

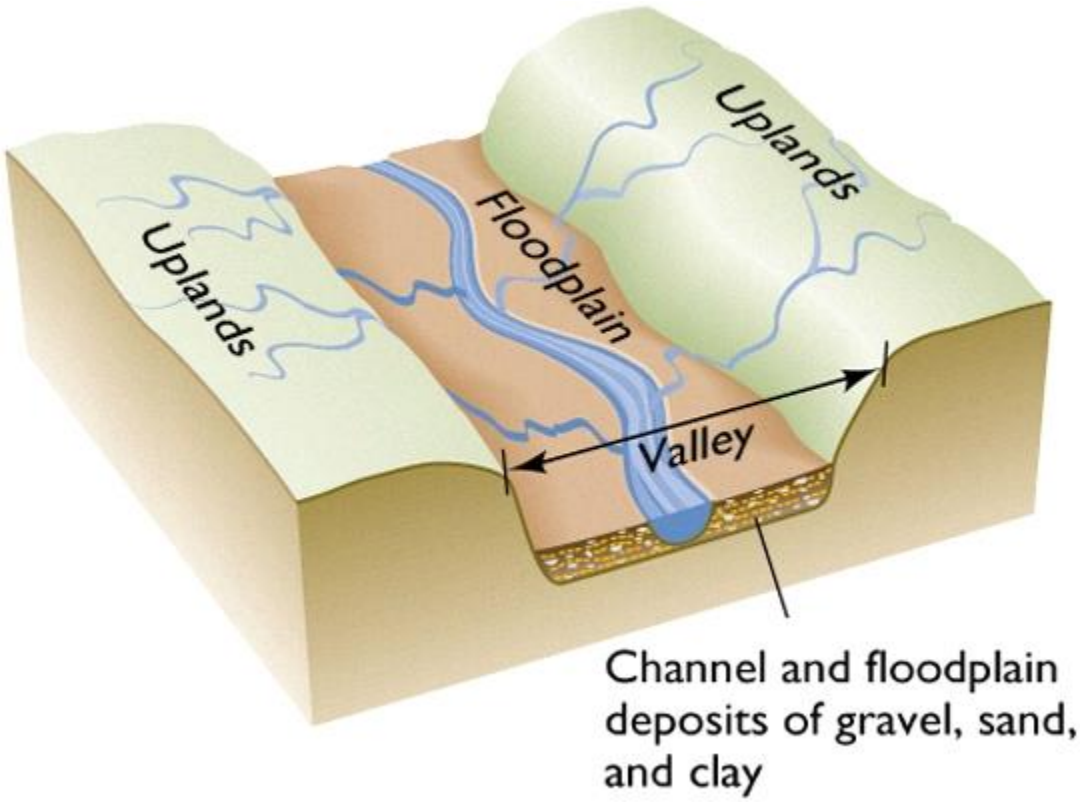
Warning and Evacuation Procedures

Sacramento County and its incorporated communities have a variety of systems and procedures established to protect its residents and visitors to plan for, avoid, and respond to a hazard event including those associated with floods and wildfires. This includes Pre-Disaster Public Awareness and Education information which is major component in successfully reducing loss of life and property in a community when faced with a potentially catastrophic incident. Much of this information is not specific to a given hazard event and is always accessible to the public on local County and City websites. Specific warning and evacuation systems and procedures include information relative to: Flood Forecasting (e.g., California Data Exchange Center), ALERT System, Warning Systems, dam protocols, evacuation procedures, and sheltering in place. Additional information on these warning and evacuation procedures as well as post-disaster mitigation policies and procedures can be found in Section 4.4, Capabilities, of this Risk Assessment and in the Emergency Management discussions in Appendix C.

Floodplains

The area adjacent to a channel is the floodplain (see Figure 4-37). Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage, the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a one percent chance in any given year of being equaled or exceeded. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the National Flood Insurance Program. The 200-year flood is one that has 0.5% chance of being equaled or exceeded each year. The 500-year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Figure 4-37 Floodplain Schematic



Source: FEMA

The Sacramento County Planning Area is susceptible to various types of flood events as described below.

- **Riverine flooding** – Riverine flooding, defined as when a watercourse exceeds its "bank-full" capacity, generally occurs as a result of prolonged rainfall, or rainfall that is combined with snowmelt and/or already saturated soils from previous rain events. This type of flood occurs in river systems whose tributaries may drain large geographic areas and include one or more independent river basins. The onset and duration of riverine floods may vary from a few hours to many days and is often characterized by high peak flows combined with a large volume of runoff. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. In the Sacramento County Planning Area, riverine flooding can occur anytime from November through April and is largely caused by heavy and continued rains, sometimes combined with snowmelt, increased outflows from upstream dams, and heavy flow from tributary streams. These intense storms can overwhelm the local waterways as well as the integrity of flood control structures. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions. The warning time associated with slow rise riverine floods assists in life and property protection
- **Flash flooding** – Flash flooding describes localized floods of great volume and short duration. This type of flood usually results from a heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the winter and spring. Flash floods often require immediate evacuation within the hour and thus early threat identification and warning is critical for saving lives.

- **Localized/Stormwater flooding** – Localized flooding problems are often caused by flash flooding, severe weather, or an unusual amount of rainfall. Flooding from these intense weather events usually occurs in areas experiencing an increase in runoff from impervious surfaces associated with development and urbanization as well as inadequate storm drainage systems.

The area is also at risk to flooding resulting from levee failures and dam failures. Dam failure flooding is discussed separately in Section 4.2.9 of this document; Levee failure flooding are discussed separately in Section 4.2.17 of this document. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reach.

Mercury in Waterways in Sacramento County

As a result of historical releases of mercury associated with gold mining in Sacramento County, as well as in areas throughout watersheds upstream of Sacramento County, mercury contamination is a significant hazard to County residents and visitors, as well as wildlife. The State Resources Agency, as well as Cal EPA and US EPA, have recognized this contamination. The Sacramento-San Joaquin Delta, the American River, Lake Natoma, and numerous water bodies that are tributaries to them, are designated through the Clean Water Act 303d listing process as impaired water bodies due to mercury levels found in fish that so high that they are hazardous both to the human population and to wildlife. Additional water bodies in and near Sacramento are likely to be added to the 303d list in the future due to mercury contamination. Fish consumption advisories developed by the State Dept. of Public Health and the Office of Environmental and Health Hazard Assessment warn people not to eat certain types of fish caught in these waters.

Various factors in the Sacramento region can affect the amount of mercury that enters the food chain and poses a hazard to human health and the environment. Some of these factors may be subject to some level of influence by human activity. Factors that affect the hazard caused by mercury include but are not limited nutrient levels, sediment transport, streambed modification, food chain and ecological effects, fish consumption practices, management of water levels, water exports and diversions, irrigation practices, salinity, oxygen concentrations, wetland restoration and management practices, flooding of Delta islands, dredging, reservoir management, stormwater and wastewater discharges and treatment processes, source control and pollution prevention activities, and levels of mercury in sediments, water bodies, and discharges.

Major Sources of Flooding

California has 10 hydrologic regions. Sacramento County sits in the Sacramento and San Joaquin hydrologic region.

- The Sacramento River hydrologic region covers approximately 17.4 million acres (27,200 square miles). The region includes all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa counties. Small areas of Alpine and Amador counties are also within the region. Geographically, the region extends south from the Modoc Plateau and Cascade Range at the Oregon border, to the Sacramento-San Joaquin Delta. The Sacramento Valley, which forms the core of the region, is bounded to the east by the crest of the Sierra Nevada and southern Cascades and to the west by the crest of the Coast Range and Klamath Mountains. The Sacramento metropolitan area and

surrounding communities form the major population center of the region. With the exception of Redding, cities and towns to the north, while steadily increasing in size, are more rural than urban in nature, being based in major agricultural areas.

- The San Joaquin River hydrologic region covers approximately 9.7 million acres (15,200 square miles) and includes all of Calaveras, Tuolumne, Mariposa, Madera, San Joaquin, and Stanislaus counties, most of Merced and Amador counties, and parts of Alpine, Fresno, Alameda, Contra Costa, Sacramento, El Dorado, and San Benito counties. Significant geographic features include the northern half of the San Joaquin Valley, the southern part of the Sacramento-San Joaquin Delta, the Sierra Nevada and Diablo Range. The region is home to about 1.6 million people.

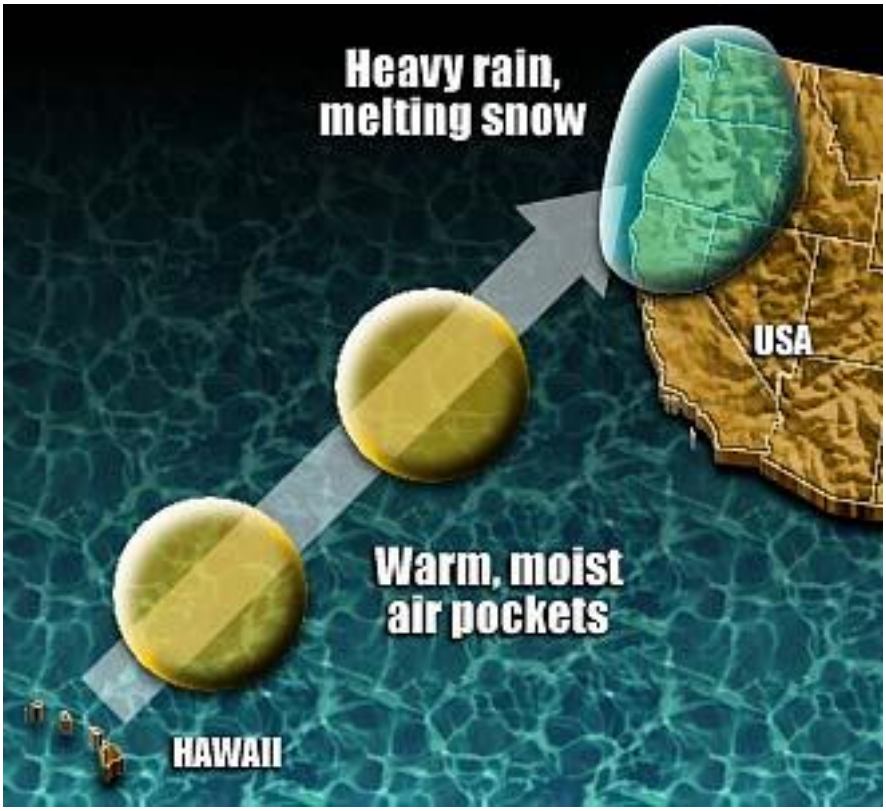
A map of the California's hydrological regions is provided in Figure 4-38.

Figure 4-38 California Hydrologic Regions

Source: California Department of Water Resources

A weather pattern called the "Pineapple Express" contributes to the flooding potential of the area. A pineapple express brings warm air and rain to West. A relatively common weather pattern brings southwest winds to the Pacific Northwest or California, along with warm, moist air. The moisture sometimes produces many days of heavy rain, which can cause extensive flooding. The warm air also can melt the snow pack in the mountains, which further aggravates the flooding potential. In the colder parts of the year, the warm air can be cooled enough to produce heavy, upslope snow as it rises into the higher elevations of the Sierra Nevada or Cascades. Forecasters and others on the West Coast often refer to this warm, moist air as the "Pineapple Express" because it comes from around Hawaii where pineapples are grown. This is shown in Figure 4-39.

Figure 4-39 Pineapple Express Weather Pattern



Source: USA TODAY research by Chad Palmer http://www.usatoday.com/weatherwpinappl.htm

The Sacramento County Waterway System

In the Sierra Nevada Mountains, small creeks and high streams are fed by underground springs, storm run-off, and melting snow. Descending from the upper watershed, these creeks and streams form large rivers such as the Sacramento, American, Feather, Yuba, San Joaquin, Mokelumne, and Consumnes. These waterways are characterized by: small river beds conveying normal flow from the mountains and wide overbank floodplains carrying flood flows cause by heavy mountain rainfall. The Sacramento River Watershed, which includes the American River, encompasses some 27,000 square miles and drains most of Northern California.

The watersheds of Sacramento County include numerous watersheds contained within the County as well as several watersheds that drain into Sacramento County from Placer, El Dorado, or Amador Counties. Figure 4-40 illustrates the watersheds of Sacramento County. Table 4-32 details the watersheds in Sacramento County.

Figure 4-40 Sacramento County Watersheds

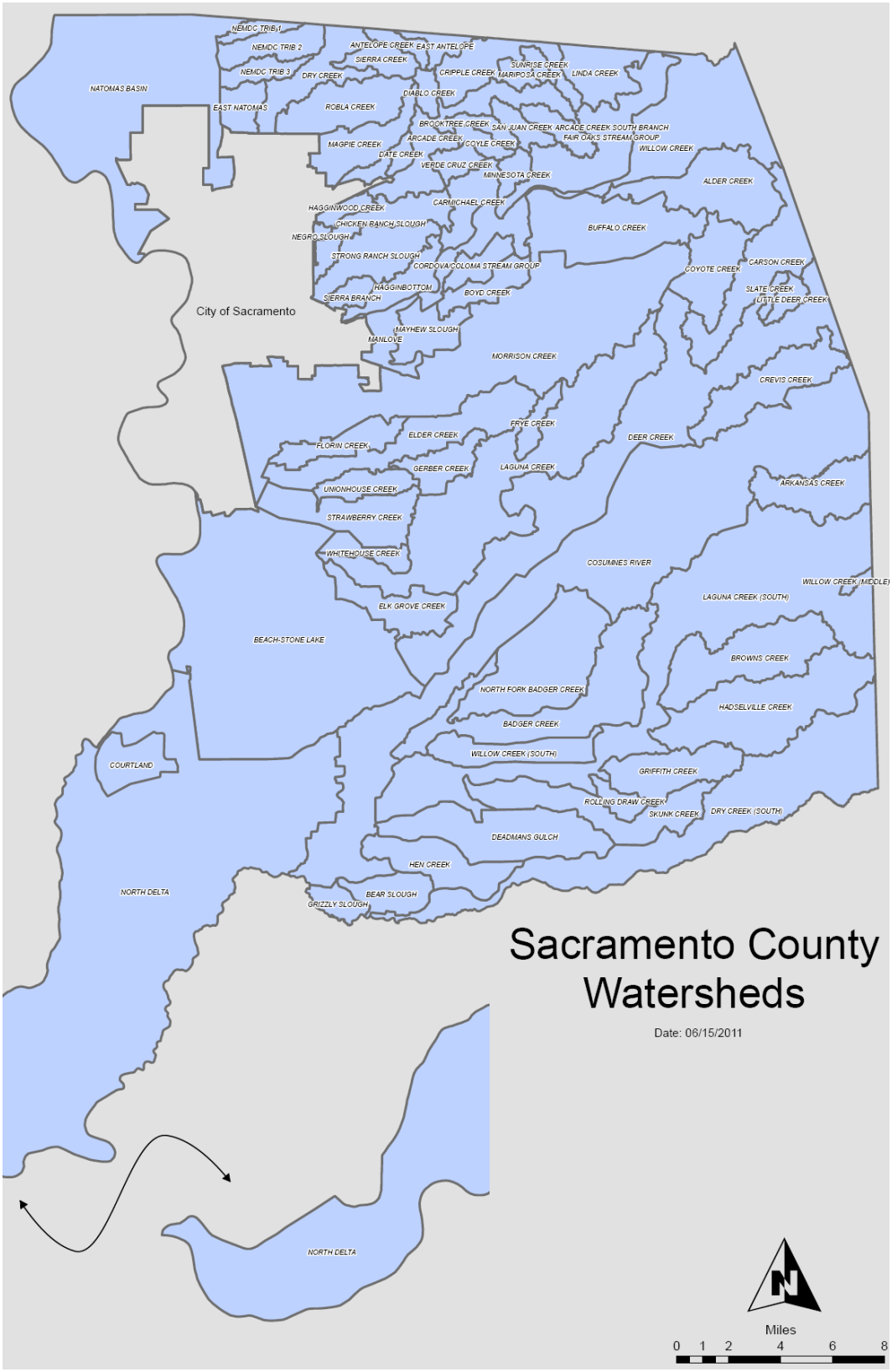


Table 4-32 Watersheds in Sacramento County

Watershed Name	Area (acres)	Watershed Name	Area (acres)
Alder Creek	7,226	Hadselville Creek	11,759
Antelope Creek	973	Hagginbottom	2,571
Arcade Creek	6,508	Hagginwood Creek	885
Arcade Creek South Branch	1,657	Hen Creek	4,759
Arkansas Creek	4,768	Laguna Creek	21,176
Badger Creek	11,109	Laguna Creek (South)	32,471
Beach-Stone Lake	40,118	Linda Creek	3,580
Bear Slough	2,699	Little Deer Creek	1,040
Boyd Creek	2,201	Magpie Creek	3,789
Brooktree Creek	1,180	Manlove	1,987
Browns Creek	8,077	Mariposa Creek	812
Buffalo Creek	9,167	Mayhew Slough	2,954
Carmichael Creek	2,726	Minnesota Creek	1,095
Carson Creek	6,811	Morrison Creek	34,502
Chicken Ranch Slough	3,722	Natomas Basin	26,449
Cordova/Coloma Stream Group	1,728	Negro Slough	285
Cosumnes River	45,130	NEMDC Trib 1	865
Courtland	3,099	NEMDC Trib 2	2,744
Coyle Creek	987	NEMDC Trib 3	1,567
Coyote Creek	4,625	North Delta	100,143
Crevis Creek	5,940	North Fork Badger Creek	10,423
Cripple Creek	4,327	Robla Creek	5,141
Date Creek	694	Rolling Draw Creek	1,128
Deadmans Gulch	8,641	San Juan Creek	1,334
Deer Creek	26,125	Sierra Branch	978
Diablo Creek	893	Sierra Creek	1,743
Dry Creek	4,138	Skunk Creek	6,744
Dry Creek (South)	20,158	Slate Creek	510
East Antelope	1,118	Strawberry Creek	5,588
East Natomas	1,816	Strong Ranch Slough	4,573
Elder Creek	7,632	Sunrise Creek	636
Elk Grove Creek	4,019	Unionhouse Creek	2,194
Fair Oaks Stream Group	7,819	Unnamed	51,157
Florin Creek	2,857	Verde Cruz Creek	1,226
Frye Creek	1,286	Whitehouse Creek	1,585

Watershed Name	Area (acres)	Watershed Name	Area (acres)
Gerber Creek	2,579	Willow Creek	15,207
Griffith Creek	4,806	Willow Creek (Middle)	359
Grizzly Slough	1,374	Willow Creek (South)	3,843

Source: Sacramento County GIS

Sacramento County encompasses multiple rivers, streams, creeks, and associated watersheds. Figure 4-41 illustrates the major waterways of Sacramento County. The following streams in Table 4-33, listed by stream groups, are found in Sacramento County.

Figure 4-41 Sacramento County Major Waterways

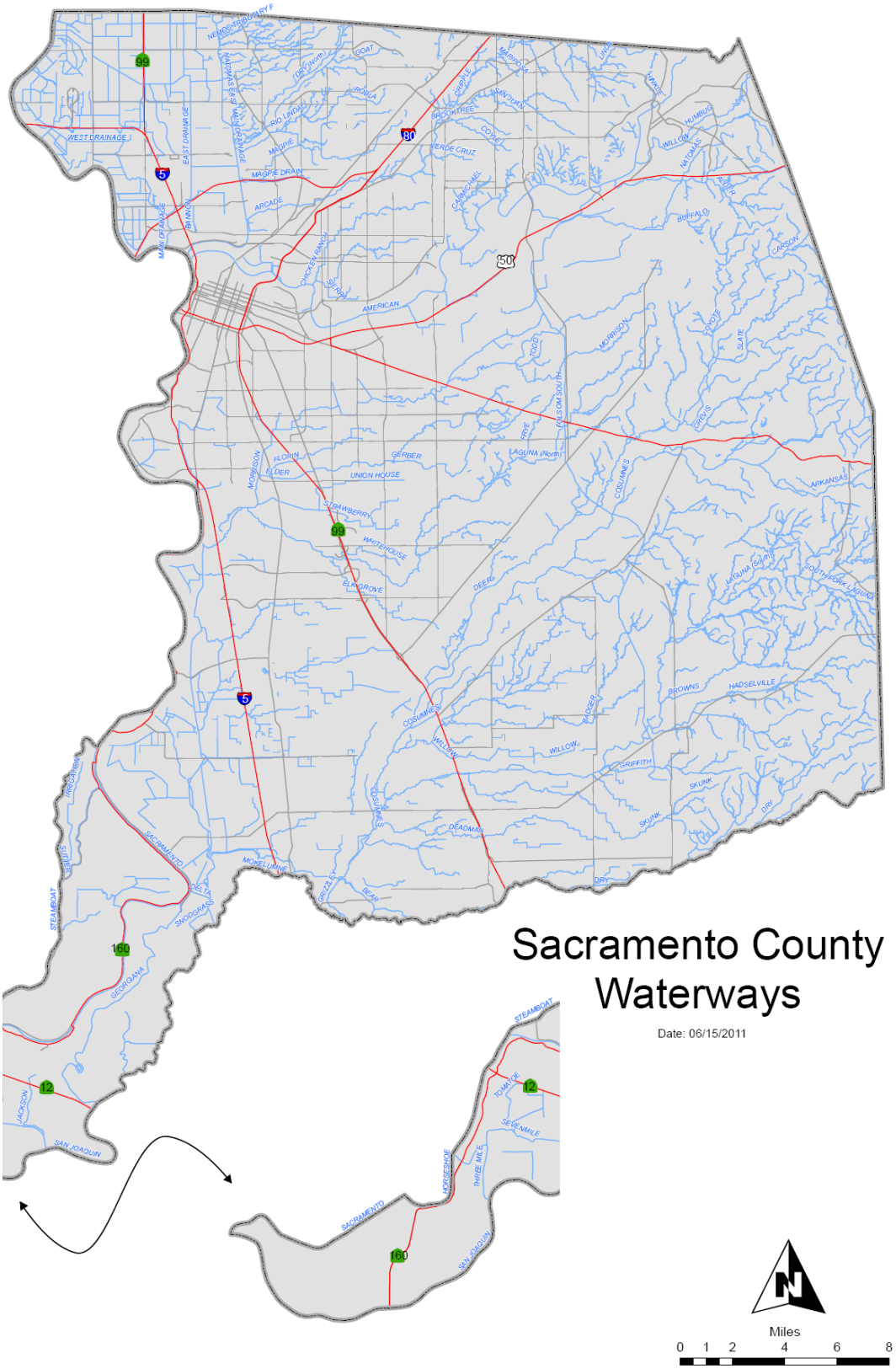


Table 4-33 Waterways and Streams in Sacramento County

Stream Group and Stream	
American River Stream Group	
American River	Magpie Creek
Arcade Creek	Mariposa Creek
Arcade Creek (South Branch)	Natomas East Main Drainage Canal
Brooktree Creek	Natomas East Main Drainage Canal Tributary 1
Carmichael Creek	Natomas East Main Drainage Canal Tributary 2
Chicken Ranch Slough	Natomas East Main Drainage Canal Tributary 3
Cripple Creek	Robla Creek
Coyle Creek	San Juan Creek
Dry Creek	Sierra Creek
Dry Creek (North Branch)	Strong Ranch Slough
Linda Creek	Verde Cruz Creek
Morrison Creek Stream Group	
Elder Creek	Morrison Creek
Elk Grove Creek	North Fork Laguna Creek
Florin Creek	Strawberry Creek
Gerber Creek	Unionhouse Creek
Laguna Creek	Whitehouse Creek
Laguna Creek Tributary 1	
Sacramento River And Delta Slough Group	
Georgiana Slough	Steamboat Slough
Sacramento River	Sutter Slough
Sevenmile Slough	Three Mile Slough
San Joaquin River Stream Group	
Delta Cross Canal	San Joaquin River
Mokelumne River	Snodgrass Slough
North Mokelumne River	
Natomas Area Stream Group	
Natomas East Drainage Canal	Deer Creek
Natomas Main Drainage Canal	Dry Creek
Natomas North Drainage Canal	Hadselville Creek
Natomas West Drainage Canal	Hen Creek
Arkansas Creek	Laguna Creek
Badger Creek	North Fork Badger Creek
Browns Creek	North Stone Lake Tributary

Stream Group and Stream	
Carson Creek	Skunk Creek
Cosumnes River	South Stone Lake-North Tributary
Cosumnes River Overflow	South Stone Lake-South Tributary
Crevis Creek	Willow Creek
Deadman Gulch	

Source: Sacramento County Flood Insurance Study, 2008

In Sacramento County, there are three main rivers, the Sacramento, American and Cosumnes Rivers. The Sacramento and American Rivers and several tributaries to the east, north, and west all flow toward the City of Sacramento. The watersheds of these two main rivers drain most of northern California and part of southern Oregon for a total of some 26,000 square miles. The third, the Cosumnes River, flows southwesterly through the southern portion of the County and into the Delta.

The Sacramento River extends north to Mount Shasta and the Shasta Reservoir. Many other rivers are tributary to the Sacramento, including (immediately north of Sacramento) the Bear and Feather Rivers. The American River extends to the Sierra Nevada foothills in three branches (South, North and Middle). Folsom Reservoir is at the eastern boundary of Sacramento County and serves to control the American River.

The Cosumnes River is a wild and natural river originating in the Sierra Nevada foothills, flowing into southern Sacramento County. This area is mostly rural farmland. Levees were constructed by agricultural interests, and they are inadequate for containing record storm flows such as those experienced in February 1986 and again in January 1997. These two storms left the levee system sorely damaged. Each time, the levee breaks were repaired, but the overall system sits in wait of another flood event.

Another river, the Mokelumne River is the southernmost river in the County and is controlled by a dam in the neighboring county and a series of levees.

All of the watersheds converge at the Sacramento River Delta, the flood issues in the Delta are of concern as the agricultural interests continue to farm the land which is subsiding annually, making the levee systems more vulnerable to breaching.

When the Sacramento River reaches its peak capacity, the American River and other tributaries that flow into the Sacramento River, cannot flow at a normal rate. These conditions result in “backflows’ which cause tributaries to overflow and flood local areas. The Sacramento River is also affected by ocean tides that periodically raise and lower the water level. High tides that occur simultaneously with flooding conditions could increase the rate of flooding.

All surface water originating in or passing through Sacramento County discharges to the ocean via the Sacramento and San Joaquin Rivers, which join at the head of Suisun Bay, the easternmost arm of San Francisco Bay. With a combined tributary drainage area of approximately 60,000 square miles, these rivers provide most of the freshwater inflow to San Francisco Bay.

High water levels along the Sacramento and American Rivers are a common occurrence in the winter and early spring months due to increased flow from storm runoff and snowmelt. An extensive system of dams,

levees, overflow weirs, drainage pumping plants, and flood control bypass channels strategically located on the Sacramento and American Rivers has been established to protect the area from flooding. These facilities control floodwaters by regulating the amount of water passing through a particular reach of the river. The amount of water flowing through the levee system can be controlled by Folsom Dam on the American River and the reserve overflow area of the Yolo Bypass on the Sacramento River. However, flood problems in Sacramento County are still quite a concern, especially since the flood of 1986. Numerous areas of the county are still subject to flooding by the overtopping of rivers and creeks, levee failures, and the failure of urban drainage systems that cannot accommodate large volumes of water during severe rainstorms. However, with the implementation of multiple improvements to the area's flood control structures, including those designed to provide a 200+ level of flood protection, flood risk is being reduced including the potential for devastating floods in the Planning Area.

High flows on the Cosumnes River are less frequent, as the river is essentially dam free and has little in the way of flow regulation. Flooding along the river, such as in 1997, has been due to high water coupled with the failure of non-standard, poorly constructed private levees.

The Sacramento County Flood Control System and Associated Flood Issues

Sacramento County is protected from the American River and Sacramento River by a comprehensive system of dams, levees, overflow weirs, and flood bypasses. Local creeks are often controlled by detention basins that attenuate peak flow by allowing flood water to spill over a weir, detained, and released when the creek subsides. Sacramento County maintains a system of ALERT Flood Warning gages throughout the County that provide real time monitoring information on current flood conditions (www.stormready.org).

In the aftermath of the 1986 and 1997 floods, multiple flood control projects were identified to address flood risks in the Sacramento area. Many of these projects were designed to correct structural deficiencies, others to address levee conditions, while additional projects were intended to increase the level of flood protection provided by the system. The Sacramento River improvements would focus predominantly on rehabilitating the existing system, while the American River required a significant increase in the system's flood control capacity.

Established in 1989, Sacramento Area Flood Contol Agency (SAFCA) is a regional joint-exercise-of-powers agency consisting of Sacramento and Sutter counties, the City of Sacramento, Reclamation District 1000, and the American River Flood Control District. SAFCA's long-term goal is to provide the urbanized portions of Sacramento with a minimum 200-year level of flood protection in order to reduce the risk of catastrophic damages and loss of life associated with a failure of the flood control system in the Sacramento area. SAFCA initiated a number of studies to determine the best implementable approach to address the area's flood problems. These flood control projects are in various stages of implementation; some have been completed, others are under construction, and a number are still being planned.

American River Flood Control System

The American River flood control system consists of the Folsom Dam, an auxiliary dam at Mormon Island, eight earth-filled dikes, Nimbus Dam, and levees on either side of the downstream river. The system

receives runoff from the American River watershed, which contains about 2,100 square miles of the western slope in the Sierra Nevada.

An initial reconnaissance report, "American River Investigation, January 1988" concluded that Folsom Dam and the American River levees were only capable of handling a 70-year flood event. Recommendations were to increase the carrying capacity of the American River below Nimbus Dam, modifying the Folsom Dam spillage, increasing storage capacity at Folsom Lake, and for greatest protection (200-year level), construct a new upstream storage facility. Immediately after the Folsom Dam was completed in 1956, a huge flood filled the reservoir, saving Sacramento. Recently, the dam protected the county from at least four potentially catastrophic floods in 1986, 1995, 1997, and 2005.

American River Common Features and Folsom Dam

SAFCA and the Central Valley Flood Protection Board (CVFPB), working with US Army Corp of Engineers (USACE), identified an American River project to address the low level of flood protection provided by the existing system. Unable to gain support for construction of an expandable flood control dam near Auburn, SAFCA identified a series of American River Common Features and Folsom Dam improvement projects. The Common Features projects focused on the identification of features that were "common" to any project associated with controlling flood flows at Folsom Dam. These projects focused on the conveyance of higher flood flows through the leveed portion of the American River. Once completed, these improvements, along with additional American River improvement projects described below, allow passage of 160,000 cfs through the American River levee system. The Folsom Dam Raise and Auxiliary Spillway Project identified an auxiliary spillway alternative with a 3.5 foot dam raise that would provide at least a 200-year level of protection for the community.

American River-Related Projects

Additional projects have significantly improved the capacity and flows of the American River levee system. These include:

- Mayhew levee Improvements – This entailed raising and widening the levee and constructing a slurry wall, providing for 160,000 cfs to pass and providing 100-year level of protection. The Mayhew Drain Closure Structure project completed in 2009 prevents water from the American River from backing up the drain and putting additional strain on drain levees.
- Upper Levee Slope Protection – Levee slope protection measures were implemented in the area between Cal Expo to Rio Americano High School, the narrowest portion of the American River Parkway to prevent high scour velocities on the upper face of the levee during flood events.
- Slurry Wall Construction – Approximately 23 miles of slurry walls were constructed to prevent underseepage from affecting the levee foundation due to sand layers under the levee.
- Bank Protection – Portions of the American River are subject to extremely high velocities during a major flood event, eroding banks and levee toes, leading to levee failure. Several projects have been completed preserving levee integrity and providing additional protection during floods.
- Regional Sanitation Perimeter Levee – In order to protect the regional sanitation plan from flooding, a perimeter levee was required.

The Sacramento River Flood Control System

The Sacramento River flood control system consists of the several dams including Shasta and Oroville (on the Feather River), the Fremont Weir, Sacramento Weir, Yolo Bypass, and levees along the Sacramento River, and the Sacramento Bypass Channels. The Corps report "Sacramento River System Evaluation, June 1988" revealed that levees on both the Sacramento and American Rivers have inadequate freeboard and/or stability problems.

Sacramento River Projects

Several projects have been identified to rehabilitate the existing flood control system and work towards providing a minimum of 200-year level of flood protection in the urbanized portions of the Sacramento County Planning Area. Key projects include:

- Sacramento Urban Area Levee Reconstruction Project (SUALRP) – This project addressed through-levee seepage problems (i.e., landside sloughing of the levee in Natomas and seepage boils along the landside toe in the Pocket) within the Sacramento River Flood Control System (SRFCS) due to porous levee materials and poor compaction. This project improved flood protection but did not increase the design level of flood protection.
- The Sacramento Riverwall - A project feature of the SRFCS, is a concrete floodwall adjacent to old Sacramento. Due to erosion issues on the waterside toe and design deficiencies found with original construction, reconstruction of the Riverwall was addressed and improves flood protection to Old Sacramento, downtown, and portions of Interstate 5.
- Levee Slump on Garden Highway south of I-6 – To correct settling in an area of the levee near an agricultural well, a Slurry cutoff wall was constructed to prevent levee seepage and to raise the levee back to its original height. This seepage fix was designed to provide 200-year level of protection.
- Little Pocket and Sump 132 Underseepage Remediation – This project entailed construction of an approximately 2,400 feet of a levee underseepage cutoff wall in the Little Pocket area and 400-feet of levee underseepage cutoff wall construction at Sump 132 in the Pocket area. To address know underseepage problems. The project was designed to protect against the 200-year storm event.
- Pocket Underseepage – Reach 2 and Reach 9 – This project entailed construction of an approximately 2,500 feet of cutoff wall to address underseepage issues. Completion of this project along with erosion repairs provided a minimum of 100-year level of flood protection.
- Sacramento River Bank Protection Program (Sac bank) – this is an ongoing effort to address systematic erosion issues along the Sacramento River and its tributaries, including the American River. Erosion, primarily caused by high water events, which lead to scour and high bank erosion and summer boat traffic, which creates wave induced erosion at the levee toe.
- Pioneer Reservoir – Pioneer Reservoir is located along the Sacramento River just upstream of the California Auto Museum. This project constructed a seepage berm and six relief wells to address high seepage pressures in the area.

South Sacramento Streams Group (SSSG)

USACE, in cooperation with SAFCA and the City and County of Sacramento completed a study of alternatives, including both upstream detention and modifications to the downstream levee system. Results of the study supported work to be done to the existing Morrison Creek levees as well as to the Unionhouse,

Florin, and Elder Creek levees. The County is also collecting development impact fees from upstream developers, which will be used to build detention basins to hold the additional run-off generated as new development occurs.

The Morrison Creek System

In 1987, the USACE in a study concluded that the levees and channels lacked adequate capacity to handle the 100-year storm. In 2005, USACE completed construction of nearly four miles of levee from Freeport Boulevard/Sacramento River Levee on the west to the Union Pacific Railroad to the east, raising the existing levee system to protect against a 200-year storm. USACE also constructed floodwalls along the four creeks (Elder, Unionhouse Florin, and Morrison) up to Franklin Boulevard.

Unionhouse Creek Channel Improvements

Channel improvements completed in 2012 increased the amount of water that can be contained I the channel, resulting in 100-year flood protection.

Florin Creek Improvements

Channel improvements in this area, combined with plans to construct a detention basin along Florin Creek will provide FEMA level of flood protection along much of Florin Creek.

The Natomas Area

After the 1986 flood demonstrated the inadequacy of the levee system in this area, efforts ensued to implement a series of levee improvements and other flood control improvements designed to address through-levee seepage and work in tandem with increased storage on the American River to provide affected areas with increased flood protection. This project provided a minimum 100-year level of flood protection to the Natomas Basin and to the lower Dry and Arcade Creek watersheds, including portions of Rio Linda and North Sacramento.

A huge development effort followed including residential in the incorporated City and commercial/industrial in the unincorporated County of Sacramento. The Natomas area includes about 70,000 residents, both Interstates 5 and 80, Sacramento Airport, and significant commercial and industrial development. Natomas is protected from flooding by levees on all sides. Some believe Natomas to be threatened by high probability flood events, but the fact remains that the area has never suffered a levee breach.

December 2008, FEMA remapped the Natomas Area as not having protection from the 1% annual recurrence flood event, and SAFCA kicked off a massive effort to improve the levees. SAFCA's efforts have been to restore at a minimum a 100-year level of protection, while working toward 200-year level of protection.

The Delta Region

The Delta Region lies within a floodplain and is faced with a major flooding problem because of inadequate levee construction and maintenance, subsidence, seepage, erosion and seismicity. Flood fighting has occurred in some part of the Delta on the average of once every four years. While most of the Delta levees in Sacramento County have stood the test of time, they defy engineering logic. Their foundations are soft and uncertain, they have a great deal of vegetation including large trees, and they suffer erosion and sloughing due to river velocity and wind wave wash. Nevertheless, they have served the county very well over many years.

The Delta Islands are subsiding due to lower groundwater, aeration of peat soils, and loss of soil to wind. While some believe the rate has been curbed over the past years due to conservation protocols, the fact is that some islands are 15' below sea level. The levees work much harder than they did a hundred years ago.

Some of the Delta levees essentially serve as a dam repressing hydrostatic pressure every day of the year. This leads some researchers to conclude that the potential for catastrophic failure of the Delta levees due to a seismic event has a concerning probability.

Ongoing and Planned Improvements to the Existing Flood Control Systems

There are currently six federally authorized projects that are being implemented to reduce flood risk to the Sacramento area:

- Natomas Levee Improvement Project
- American River Common Features
- Folsom Dam Modifications/Join Federal Project
- Folsom Dam Raise project
- South Sacramento Streams Group Project
- Sacramento River Bank Protection Program

Other ongoing projects include:

- SAFCA levee accreditation for FEMA level of protection
- Regional planning as part of the Central Valley Flood Protection Plan
- USACE-CVFPB-SAFCA General Reevaluation Report (GRR) planning for 200-year flood protection for Sacramento area
- SAFCA and local community plan development for 200-year flood protection to meet state requirements for urban Level of Protection and Urban Levee Design Criteria.

Details on these projects are provided in Section 4.4.1, Capabilities.

Sacramento County Flood Mapping and Flood Protection Measures

As part of the County's ongoing efforts to identify and manage their flood prone areas, Sacramento County relies on a variety of different mapping efforts. What follows is a brief description of FEMA and State of California DWR mapping efforts and related flood protection measures covering the Sacramento County Planning Area.

FEMA Floodplain Mapping

FEMA established standards for floodplain mapping studies as part of the National Flood Insurance Program (NFIP). The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Floodplain studies that may be approved by FEMA include federally funded studies; studies developed by state, city, and regional public agencies; and technical studies generated by private interests as part of property annexation and land development efforts. Such studies may include entire stream reaches or limited stream sections depending on the nature and scope of a study. A general overview of floodplain mapping is provided in the following paragraphs. Details on the NFIP and mapping specific to the County and participating jurisdictions are in Section 4.3 Vulnerability Assessment and in the jurisdictional annexes.

Flood Insurance Study (FIS)

The FIS develops flood-risk data for various areas of the community that will be used to establish flood insurance rates and to assist the community in its efforts to promote sound floodplain management. The current Sacramento County FIS is dated June 16, 2015. This study covers both the unincorporated and incorporated areas of the County.

Flood Insurance Rate Map (FIRM)

The FIRM is designed for flood insurance and floodplain management applications. For flood insurance, the FIRM designates flood insurance rate zones to assign premium rates for flood insurance policies. For floodplain management, the FIRM delineates 100- and 500-year floodplains, floodways, and the locations of selected cross sections used in the hydraulic analysis and local floodplain regulation. The County FIRMs have been replaced by digital flood insurance rate maps (DFIRMs) as part of FEMA's Map Modernization program, which is discussed further below.

Letter of Map Revision (LOMR) and Map Amendment (LOMA)

LOMRs and LOMAs represent separate floodplain studies dealing with individual properties or limited stream segments that update the FIS and FIRM data between periodic FEMA publications of the FIS and FIRM.

Digital Flood Insurance Rate Maps (DFIRM)

As part of its Map Modernization program, FEMA is converting paper FIRMS to digital FIRMs, DFIRMS. These digital maps:

- Incorporate the latest updates (LOMRs and LOMAs);
- Utilize community supplied data;
- Verify the currency of the floodplains and refit them to community supplied basemaps;
- Upgrade the FIRMs to a GIS database format to set the stage for future updates and to enable support for GIS analyses and other digital applications; and
- Solicit community participation.

DFIRMs for Sacramento County have been developed. The most recent DFIRMs, dated June 16, 2015, was used for the flood analysis for this LHMP Update.

Mapping of Levees

Also as part of FEMA's Map Modernization program, FEMA is mapping levees within communities, with a primary focus on maps determined to provide a 100-year level of flood protection.

In August of 2005, FEMA Headquarters' issued Memo 34 Interim Guidance for Studies Including Levees. This memo recognizes the risk and vulnerability of communities with levees. The memo mandates the inclusion of levee evaluations for those communities that are undergoing map changes such as the conversion to DFIRMs. No maps can become effective without an evaluation of all levees within a community against the criteria set forth in 44 CFR 65.10 Mapping of Areas Protected by Levee Systems. Generally, these levee certification requirements include evaluations of freeboard, geotechnical stability and seepage, bank erosion potential due to currents and waves, closure structures, operations and maintenance, and wind wet and wave run-up. In short, these guidelines require certification of levees before crediting any levee with providing protection from the 1 percent annual event (e.g., the 100-year flood).

In Sacramento County, similar to other locations in California, levees and flood control facilities have been built and are maintained variously by public and private entities, including water, irrigation and flood control districts, other state and local agencies, and private interests. Some of these facilities were constructed with flood control as secondary or incidental to their primary purpose, so are not considered as providing protection from the 100-year or greater flood. Levees in the County are discussed in Section 4.2.17 of this plan.

Other Floodplain Maps and Measures: Department of Water Resources

Also to be considered when evaluating the flood risks in Sacramento County are various floodplain maps and measures implemented by Cal DWR for various areas throughout California, and in the Sacramento-San Joaquin Valley cities and counties.

DWR Flood Awareness Maps

The Flood Awareness Maps, developed under the Flood Awareness Mapping Project, are designed to identify all pertinent flood hazard areas by 2015 for areas that are not mapped under the FEMA NFIP and to provide the community and residents an additional tool in understanding potential flood hazards currently not mapped as a regulated floodplain. The awareness maps identify the 100-year flood hazard areas using approximate assessment procedures. The floodplains are shown on these maps simply as flood prone areas without specific depths and other flood hazard data. The Flood Awareness Maps can be accessed online at: http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/awareness_floodplain_maps/. These maps are included in the levee profile in Section 4.2.17.

State Flood Protection Measures

Senate Bills (SB) 5 and 17 and Assembly Bills (AB) 5, 70, 156, and 162 (Legislation) were signed into law in 2007 to address flood problems, direct use of bond funds, and support local land-use planning. As part

of this Legislation, DWR was required to develop a Central Valley Flood Protection Plan (CVFPP). The CVFPP was adopted in 2012 and will be updated every 5 years. In 2012, SB1278 and AB1965 were enacted, revising provisions related to planning and zoning for flood protection.

In accordance with this legislation, communities will be required to make findings related to an urban level of flood protection as stipulated in California Government Code Sections 65865.5, 65962, and 66474.5, using criteria consistent with, or developed by DWR after July 2016. DWR has developed draft criteria, Urban Level of Flood Protection (ULOP) (November 2013).

The ULOP requires a minimum urban level of 200-year flood protection before a community can issue a building permit or approve a parcel map. This requirement affects areas in the Sacramento-San Joaquin Valley where flood depths are anticipated to exceed three feet and are in a watershed greater than 10 square miles for the 200-year flood event. If a ULOP plan is in place to reach 200-year flood protection and adequate progress is shown annually, then these requirements can be delayed until 2025.

The Legislation also requires DWR to propose updated requirements to the California Building Standards Code for adoption and approval by the California Building Standards Commission. These requirements apply to construction in the Sacramento and San Joaquin valleys, where flood levels are anticipated to exceed three feet for a 200-year flood event.

California Department of Water Resources Best Available Maps (BAM)

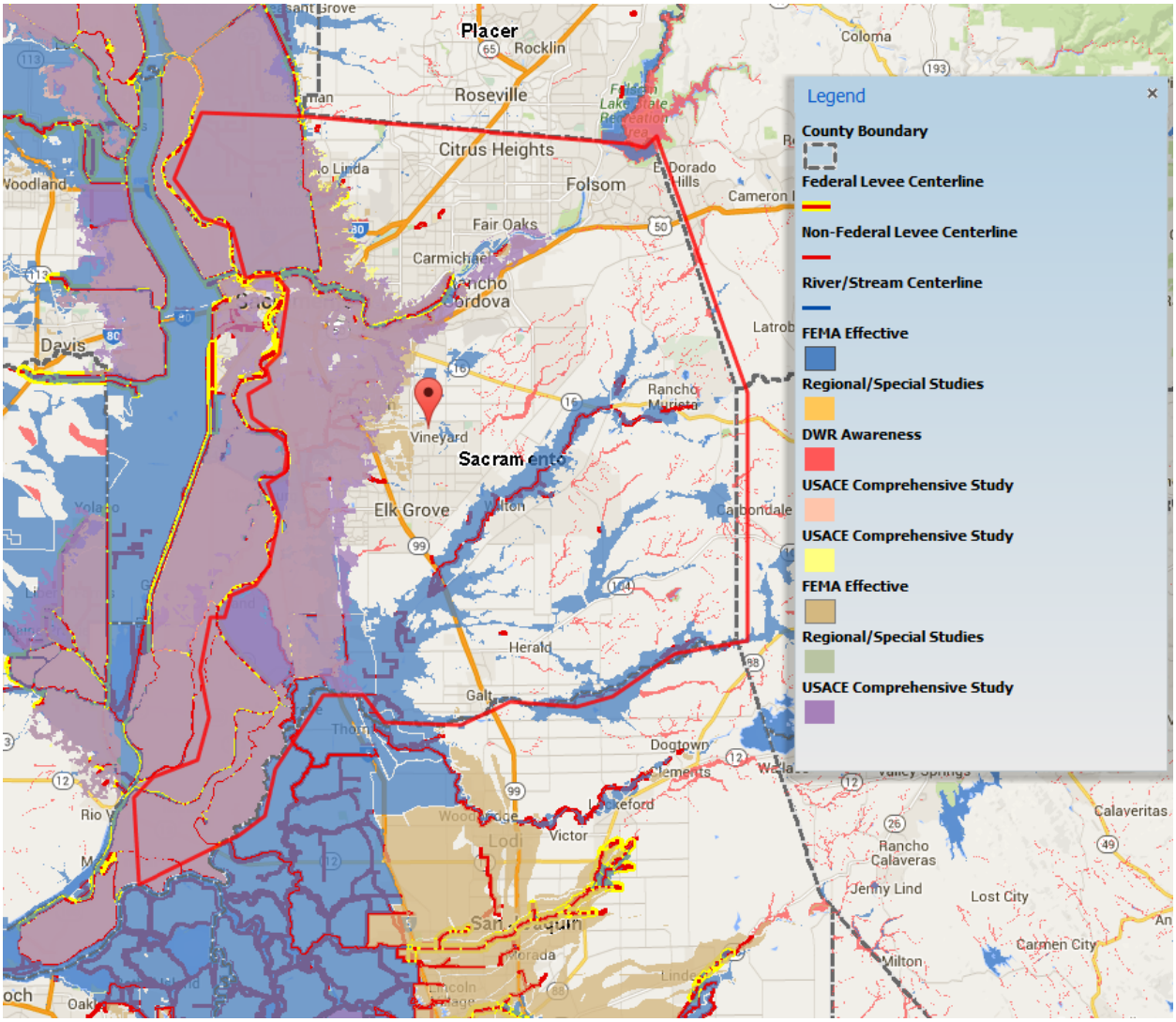
The FEMA regulatory maps provide just one perspective on flood risks in Sacramento County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency; however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the Sacramento County Planning Area than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain,

it also supports identification of the need and requirement for flood insurance. Figure 4-42 shows the BAM for the Sacramento County Planning Area. BAM maps for each jurisdiction are included in their respective annexes.

Figure 4-42 Sacramento County Planning Area – Flood Awareness (Best Available) Map



Source: California DWR

Legend explanation: Blue - FEMA 100-Year, Orange – Local 100-Year (developed from local agencies), Red – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), Pink – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), Purple – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up multiple events. Most of the disaster declarations in the County have been related to flooding. Of the 17 federal declarations in the County, 12 were for flood. Of the 11 remaining state declarations, 8 were for flood. Many disasters in the Severe Weather: Heavy Rains profile in Section 4.2.5 also resulted in flood declarations.

NCDC Events

The NCDC tracks flooding events for the County. Events have been tracked for flooding since 1993. Table 4-34 shows events in Sacramento County since 1993. Events with damages, deaths, or injuries are detailed below the table. USDA Secretarial Disaster Declarations associated with drought are included in Table 4-21 in Section 4.2.7.

Table 4-34 NCDC Flood Events in Sacramento County 1993 to 12/31/2015

Date	Event	Deaths (direct)	Injuries (direct)	Property Damage	Crop Damage	Injuries (indirect)	Deaths (indirect)
1/2/1997	Flash Flood	1	0	$2,400,000	$0	0	0
1/22/1997	Flash Flood	0	0	$1,500,000	$0	0	0
1/26/1997	Flash Flood	0	0	$500,000	$0	0	0
1/26/1997	Flash Flood	0	0	$0	$0	0	0
12/12/1996	Flood	0	0	$0	$0	0	0
1/1/1997	Flood	0	0	$0	$0	0	0
1/1/1997	Flood	0	0	$0	$0	0	0
2/2/1998	Flood	0	0	$0	$0	0	0
2/2/1998	Flood	0	0	$0	$0	0	0
2/2/1998	Flood	0	0	$4,300,000	$7,800,000	0	0
2/2/1998	Flood	1	0	$0	$0	0	0
2/7/1999	Flood	0	0	$0	$0	0	0
2/9/1999	Flood	0	0	$0	$0	0	0
1/23/2000	Flood	0	0	$25,000	$0	0	0
1/23/2000	Flood	0	0	$0	$0	0	0
1/23/2000	Flood	0	0	$0	$0	0	0
1/23/2000	Flood	0	0	$0	$0	0	0
1/23/2000	Flood	0	0	$0	$0	0	0
1/23/2000	Flood	0	0	$0	$0	0	0
1/30/2000	Flood	0	0	$0	$0	0	0
2/10/2000	Flood	0	0	$0	$0	0	0
2/11/2000	Flood	0	0	$0	$0	0	0

Date	Event	Deaths (direct)	Injuries (direct)	Property Damage	Crop Damage	Injuries (indirect)	Deaths (indirect)
2/11/2000	Flood	0	0	$0	$0	0	0
2/11/2000	Flood	0	0	$0	$0	0	0
2/22/2000	Flood	0	0	$0	$0	0	0
2/26/2000	Flood	0	0	$0	$0	0	0
1/1/2006	Flood	0	0	$4,500,000	$0	0	0
12/2/2012	Flood	0	0	$0	$0	0	0
5/6/2013	Flood	0	0	$0	$0	0	0
12/3/2014	Flood	0	0	$1,000	$0	0	0
12/3/2014	Flood	0	0	$0	$0	0	0
12/3/2014	Flood	0	0	$0	$0	0	0
12/3/2014	Flood	0	0	$0	$0	0	0
Totals		**2**	**0**	**$13,326,000**	**$7,800,000**	**0**	**0**

Source: NCDC

January 2, 1997 – The heavy rains brought the Cosumnes River to record flows above designed limits for the protective levees. Twenty breaks occurred, with the largest near the town of Wilton in the southern end of the County. The surging floodwaters inundated 33,000 acres of cropland and 84 homes. Emergency workers effected several roof-top and car-top rescues by boat and helicopter. The single death occurred at the Cosumnes River bridge near the town of McConnel.

January 22, 1997 – Localized heavy rain brought Chicken Ranch Slough out of its banks, flooding the Arden-Arcade area of the city. At least 1,000 homes and apartment buildings were flooded.

January 26, 1997 – Heavy showers and thunderstorms moved over the metro area, re-flooding the neighborhoods surrounding Chicken Ranch Slough, which had just experienced flooding the previous 22nd. The flooding was higher and caused additional damage to 500 more homes.

February 2, 1998 – In Sacramento County, the Consumnes River threatened the town of Wilton, where levees broken by the January, 1997, flooding had not been repaired. Fortunately, flooding impact was minor.

January 23, 2000 – Persistent rains which measured for 34 continuous hours swelled Dry Creek over its banks in Rio Linda. Cherry Lane, 6th Street, as well as Curved Bridge Road were flooded. Twelve homeowners had water over their property. Two of them sustained interior flooding while another five sustained flooded garages. The Grant Joint Union High School District closed Rio Linda junior and senior high schools in fear that students wouldn't get home safely. Approximately 2,500 students were sent home early

January 1, 2006 – A series of warm winter storms brought heavy rain, mudslides, flooding, and high winds to Northern California. Levee overtopping, breaching, and river flooding occurred along the Feather and Sacramento mainstem rivers as well as along numerous smaller rivers, creeks, and streams. Several urban areas had significant street flooding. The Sacramento weir was opened for the first time since 1997 with

twenty gates opened. Transportation throughout the area was difficult during the course of the storms as airports were closed due to the high winds and major road closures resulted from flooding and mudslides. Interstate 80...the main artery between Sacramento and the San Francisco Bay area...was closed near Fairfield in Solano County for several hours due to severe flooding. Additionally, Interstate 80 eastbound between Sacramento and Reno, NV, was closed for more than a day due to a massive mudslide, as was both directions of U.S. Highway 50 between Sacramento and South Lake Tahoe.

December 3, 2014 – Heavy rain showers and thunderstorms brought record rainfall and flooding issues to portions of the Central Valley and foothills. There were 2 berm levees which failed in Tehama County, flooding over 200 homes and damaging farms and orchards. Significant traffic delays were caused by road flooding across interior Northern California. Snow levels remained above 7500 feet, so snowfall was limited to higher Sierra peaks and Lassen Peak. Watt Ave. and Roseville Rd. number 1 lane flooded with 2 feet of water due to clogged drain.

FIS Events

The latest Flood Insurance Study for Sacramento County was released on June 16, 2015. The following discussion is sourced from this discussion.

In urbanizing areas, flood problems are intensified because rooftops of homes and other structures, streets, driveways, parking lots, and other paved areas all decrease the amount of open land available to absorb rainfall and runoff, thus increasing the volume of water that must be carried away by streams. As indicated earlier, the northern portion of the county is urbanizing at a fairly rapid rate.

Native American legends and historical records indicate that at least nine major floods occurred in the Sacramento River basin during the 19th century. A great flood (described in Native American legend as having swamped the entire Sacramento River basin) occurred in 1805. Indians also described floods that occurred in 1825 and 1826 as widespread in the basin. Extensive flooding in northern California took place in 1839, 1840, 1847, 1849-1850, 1852, 1861-1862, 1881, and 1890. The flood of 1861-1862 was the largest known flood in Sacramento County.

One of the earliest reports of flooding in Sacramento County was the graphic account of Professor William H. Brewer of Yale University, who described the floods of January-March 1862 in the Sacramento area:

> *"Nearly every house and farm over this immense region is gone. There is such a body of water-250 to 300 miles long and 20 to 60 miles wide, the water ice cold and muddy--that the winds high waves which beat the farm houses in pieces… The new Capitol is far out in the water—the Governor's house stands as in a lake—churches, public buildings, private buildings, everything is wet or in water. Not a road leading from the city is passable, business is at a dead standstill,"*

Substantial flooding in the County also occurred in 1928, 1937, 1938, 1940, 1943, 1945, 1950, 1952, 1955, 1956, 1958, 1962, 1963, 1964-1965, 1967 and 1969, 1972, 1980, 1982, 1983 and 1997. Newspaper accounts, rainfall and stream gage records and previous studies, indicate that the City of Sacramento has experienced significant flooding in 1928, 1950, 1962, 1967, 1986 and 1997.

American River Stream Group Flooding

The American River near the City of Sacramento overflowed in 1928, causing extensive flooding in the River Park and Industrial Park areas on the south bank. In 1950, the American River inundated extensive areas on the north bank, including the area in the vicinity of Fulton Avenue and Fair Oaks Boulevard.

Floods on Dry Creek (American River Stream Group) have occurred with regularity since 1937. Flooding also occurred on Dry and Robla Creeks near the Natomas East Main Drainage Canal. The October 1962 floods on Dry and Robla Creeks spread from approximately 800 feet to approximately 1 mile wide. The flood of October 1962, was the largest that has been recorded at the Roseville gaging station, located on Dry Creek upstream of Sacramento County. Damage in the October 1962 flood, was on the order of approximately $50,000. The resultant high water was within 2 feet of the top of the levee on the southern side of Robla Creek and along the Magpie Creek diversion channel. Floodwaters from Magpie Creek bypassed the upper portion of the diversion levee and flowed into lower Magpie Creek. Similar, less-severe floods, occurred in 1955, 1958, February 1962, 1967, 1969, 1970 and 1973.

Other creeks in the American River Stream Group have floodplain boundaries similar to that of Dry Creek. In December 1955, Arcade Creek overflowed its banks, inundating portions of Del Paso Park as well as areas upstream along Winding Way and portions of the Hagginwood District downstream.

Floods occurred twice in 1962. The largest recent floods on Strong Ranch and Chicken Ranch Sloughs occurred in February 1962.The February 1962 floods caused inundation along Arcade Creek in the vicinity of Del Paso Park. The park and the Haggin Golf Course were flooded, and the floodwaters forced the closing of Roseville Road. Dry and Robla Creeks caused flooding in the vicinity of the Natomas East Main Drainage Canal where Rio Linda Boulevard was threatened. Laguna Creek spread out over its floodplain. No damage estimates are available; however, runoff was too large for the channels and bridges, resulting in local flooding. The capacity of the American River pumping plant was exceeded for a short time, and floodwaters backed up and inundated areas in the vicinity of the nearby sewage treatment plant.

The largest flood on Arcade and Cripple Creeks occurred in October 1962. A severe, early season rainstorm occurred in October 1962, resulting in widespread flooding in the City of Sacramento. Arcade Creek overflowed from Marysville Road to past Del Paso Park. Six families on Verno Street had to evacuate because the flood threat was particularly severe in this area. Damages were estimated at $10,000 along Arcade Creek. Excess floodwaters from Dry Creek flowed southerly along the eastern side of the Western Pacific Railroad to Robla Creek and the Magpie Creek Diversion. The resultant high water was within 2 feet of the top of the southern levee of the diversion. Portions of floodwaters from Magpie Creek bypassed the upper portion of the diversion's levee and flowed into Lower Magpie Creek, causing flooding in the area between Dry Creek Road and Raley Boulevard. Dry and Robla Creeks again spread out over their common floodplain near the Natomas East Main Drainage Canal. An estimated $50,000 in flood-related damages was caused by the flood on Dry Creek. Many of these damages were caused in areas along Dry Creek upstream of the City of Sacramento.

Flooding in January 1967 was less severe than flooding in 1962. Arcade Creek overflowed its banks upstream of the City of Sacramento and flooding in the city was restricted to minor inundation in Del Paso

Park. Flooding that occurred in February 1973 on Arcade Creek had a recurrence interval of approximately 10-percent annual chance flood. Dry and Robla Creeks, however, overflowed inside the city.

The most recent flooding on the American River occurred in February 1986. The peak flow during this flood has been estimated to exceed the current 1-percent annual chance flood peak of 115,000 cubic feet per second (cfs).

Morrison Stream Group Flooding

Large portions of the Morrison Creek Stream Group area in Sacramento County were flooded in 1952, 1955, 1958, 1962-64, 1966-67 and 1969. During the 1955 flood, overflow from the Cosumnes and Mokelumne Rivers caused inundation of the Beach-Stone Lake area, thus creating high backwater conditions on streams of the Morrison Creek Stream Group. Damage was estimated at $213,000 in the Morrison Creek Stream Group area as a result of the 1955 floods and at $204,000 from the 1958 flood.

In October 1962, the Morrison Creek Basin was again flooded. A local newspaper called the Fruitridge-Florin area "the worst hit," with water "up to the tops of doors on cars" (Sacramento Bee, 1962). Floodwaters escaped from Morrison Creek near the Sacramento Army Depot. This overflow, along with other overflows from Morrison Creek upstream of Stockton Boulevard, caused widespread inundation of a primarily residential area east of Stockton Boulevard from the City of Sacramento corporate limits north to Fruitridge Road. The Glen Elder section east of Stockton Boulevard and south of Elder Creek Road, was the most severely flooded portion in the Morrison Creek Stream Group area. Laguna, Elder, Florin and Unionhouse Creeks, also overflowed their banks during this flood, adding to the flood problems in the area. A total of $161,000 in flood related damages was estimated to have occurred in the entire Morrison Creek Stream Group area during the October 1962 flood.

In 1964, Morrison Creek flooded a large region west of the Western Pacific Railroad tracks and south of Meadowview Road. Laguna Creek flooded an area adjacent to the stream that extended for about six miles from near the City of Elk Grove westerly to the Union Pacific Railroad tracks. The 1964 flooding in the basin inundated about 7,700 acres and caused an estimated $156,000 in damages. The majority of flooding in January 1969, occurred on agricultural lands in the City of Sacramento, predominantly on lands that lay west of the Union Pacific Railroad (UPRR) tracks in the Beach-Stone Lakes area. Minor flood losses (principally to farmland, crops, and improvements) were incurred east of the Union Pacific Railroad tracks. Floodwaters covered approximately 10,500 acres, and damages were estimated at $159,000.

The Morrison Creek Stream Group experienced lesser flooding in 1967 and 1969. The estimated damage for 1969 was $159,000. Moderate agricultural damages estimated at $104,000 were caused by the 1966-67 flooding, even though more acres were flooded (approximately 8,070 acres), particularly on Laguna Creek which again overflowed into its floodplain, than during the flooding of 1963 and 1964.

In the Morrison Creek Stream Group Basin in Sacramento County, the most recent flooding occurred in February 1986. That flood had the largest peak flow recorded on Morrison Creek (slightly higher than the January 1982 peak flow). Both the 1982 and 1986 floods have recurrence intervals of approximately a 4-percent annual chance flood. The estimated damage for 1982 was $500,000. Flooding had also occurred in February 1973 and has a recurrence interval of approximately a 10-percent annual chance flood.

Detailed flood damage surveys were not conducted after the 1973, 1983, 1986 and 1997 floods. However, it is estimated that approximately $500,000 in damages occurred in 1983. Only negligible damages occurred during the February 1986 flood. Peak flows in the last ten years may have been higher partly because of channel improvement work, enlarged channel capacity, and levee construction by local interests in that period.

The severity of flooding on all the streams studied during the July 6, 1998, restudy in the City of Sacramento, is intensified by backwater conditions between stream systems. Floodwater elevations are increased in the lower portions of tributary streams due to the backwater effect from main streams reducing hydraulic gradients and flow-storage areas. During this time, there will be a high degree of coincidental 1-percent annual chance flood flows on all the study area waterways.

San Joaquin River Stream Group Flooding

Historically, flooding along the Mokelumne River has been caused by general rainstorms in late fall and winter, and by snowmelt runoff in spring and early summer. The effects of cloudburst storms on an area as large as the Mokelumne River basin is negligible.

Flooding on the detailed study reach of the Mokelumne River has occurred in 1907, 1909, 1911, 1914, 1921, 1925, 1928, 1937, 1950, 1952, 1955-1956, 1963, 1964, 1967, 1969 and 1970. The most disastrous flood was that of November 1950, which caused about $1.1 million in damages. The December 1955-January 1956 floodwaters caused an estimated $750,000 in damages. The flood of December 1964 is the largest of record on the Mokelumne River. However, due to the completion of Camanche Dam in April 1964, most damages in the later flood had been prevented. Contemporary accounts of floods on the Mokelumne River are essentially nonexistent. Streamflow recorded for the study reach of the Mokelumne River were begun in 1904.

Delta Flooding

The lower reaches/delta of the Sacramento and San Joaquin Rivers are under the influence of the tides. The most severe flood conditions in the delta would result when very high tides and large volume of stream outflow occur coincidentally, and strong onshore winds generate wave action. It should be noted that precipitation over the delta does not materially affect local flood conditions. More information about past occurrences of flooding in the Delta can be found in the levee failure discussion in Section 4.2.17.

Natomas Area Stream Group Flooding

Floods on the Cosumnes River occurred in 1950, 1955, 1958, 1962 and 1964, with the events of 1955, 1958 and 1964, being most severe. In 1958, an estimated 38,000 acres of land were inundated along the Cosumnes River and the lower portions of Dry, Deer, and Laguna Creeks. In 1964, an estimated 30,000 acres of land were inundated.

The higher elevation tributary area of the Dry Creek watershed, near the City of Galt, subject to snowfall is too small to generate snowmelt flooding. Snowmelt during a flood-producing rainstorm would not increase runoff significantly. Due to the largely rural nature of the Dry Creek floodplain, and because flood damage has been predominantly agricultural, historical floods have not been documented in much detail.

The earliest major flood flow of record, 13,200 cubic feet per second (cfs), approximately an 11.1-percent annual chance (9-year) flood, occurred on February 2, 1945. From high-water marks known to long-time residents of the area, an estimated flood flow of 18,700 cfs (approximately a 5.8-percent annual chance [17-year] flood) occurred in February 1936 and a flood flow estimated to be approximately 24,000 cfs (approximately a 2.9-percent annual chance [35-year] flood) occurred in March 1907.

In December 1955, a 17,000 cfs flow (approximately a 7.1-percent annual chance [14-year] flood) on Dry Creek resulted from approximately 7 inches of antecedent rainfall over the tributary drainage. Although there was no Dry Creek overflow into the City of Galt, there was flooding from Hen Creek in the west-central part of the city where water was nearly knee deep along Lois Avenue, and at the Myrtle Avenue-Palin Street and Myrtle Avenue-Oak Avenue intersections. Damage, however, was minor and floodwater receded within 1 day. On April 3, 1958, the largest flood of record, 24,000 cfs (approximately a 2.9-percent annual chance flood), occurred on Dry Creek. Although approximately 9,000 acres of land were flooded along the creek, there was no overflow into the City of Galt. Antecedent rainfall, which was 12.5 inches over a period of several days, had created very wet ground conditions that influenced the magnitude of runoff. Rainfall on January 31 and February 1, 1963, a total of approximately 32 percent of the normal annual precipitation over the Dry Creek drainage, resulted in a flow of 9,800 cfs (approximately a 20-percent annual chance [5-year] flood) on Dry Creek. A small dam at one end of the golf course, which was under construction on the south side of the City of Galt, was breached, and part of the facility was inundated for a short time. During the height of the storm, many streets in the City of Galt were submerged due to lack of adequate storm drainage. In December 1964, approximately 8,200 acres were flooded by Dry Creek; however, overflow near the City of Galt was limited to a portion of the golf course, which was caused when a low levee was overtopped. The flow recorded at the Dry Creek stream gage was 14,500 cfs (approximately a 10-percent annual chance flood). Antecedent rainfall was not significant.

The severity of two areas within the unincorporated areas where the high flow of floodwaters on some channels has a great impact (causing backwater conditions) on the hydraulic regimen of other channels. High flows on the Sacramento River generate backwater conditions on the lower reaches of the American River and the Cross Canal. The American River peak 1-percent annual chance flows induce backwater conditions in the lower reach of the Natomas East Main Drainage Canal. Coincidentally, high flows on the Natomas East Main Drainage Canal cause backwater conditions on the lower reaches of Arcade and Dry Creeks.

Other Flooding

The floodplain areas of Willow, Humbug, and Hinkle Creeks near the City of Folsom have little existing structural development. The current and past land uses have been agricultural and open space. A thorough search of records has not uncovered any record of past floods. No records have been kept due to the past and current land uses and short duration of flood flows. The flooding events have not been considered significant problems, and the flood damages have not been recorded.

HMPC Events

The HMPC noted an event in February of 1986. A resident in the area noted that flooding occurred in South Sacramento County. A 35-year flood event flooded 15,000 acres, including areas around I-5. I-5

was closed for 4 weeks and was under 3' of water in areas. Substantial damages to homes and businesses in the area. No deaths or injuries were reported.

Likelihood of Future Occurrence

Riverine flooding is the most significant natural hazard that Sacramento County faces. The Sacramento area has a good working knowledge of the 100-year flood, however, the statistical outlier flood is not as well quantified. Sacramento is not just at high risk of flooding, but is at low risk of catastrophic flooding.

In addition, there are many urban streams, channels, canals, and creeks that serve the drainage needs of the County. There is significant threat of flooding in large areas of the County from several of these streams. Many of these streams are prone to rapid flooding with little notice.

100-Year Flood

Occasional—The term "100-year flood" is misleading. It is not the flood that will occur once every 100 years. Rather, it is the flood that has a 1- percent chance of being equaled or exceeded in any given year. Thus, the 100-year flood could occur more than once in a relatively short period of time.

200/500-Year Flood

Unlikely—The 200- and 500-year flood is the flood that has a 0.5 and 0.2 percent chance of being equaled or exceeded in any given year respectively.

Climate Change and Flood

According to the CAS, climate change may affect flooding in Sacramento County. While average annual rainfall may decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events.

Preliminary Draft - Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan (CAP), Ascent Environmental 2016 Analysis

According to the 2016 Preliminary Draft CAP, climate change is likely to lead to changes in frequency, intensity, and duration of extreme precipitation events. Increases in annual temperature may result in earlier and more rapid melting of the Sierra Nevada snowpack, which could lead to increased surface water flow rates and flood magnitude and frequency in Sacramento County.

Sea Level Rise. Another climate change issue is sea-level rise. The average global sea level rose approximately seven inches during the last century. Assuming that sea-level changes along the California coast reflects global trends, sea levels along the coastline could rise by 10-18 inches from its 2000 levels by 2050 and 31 to 55 inches higher by the end of the Century. The Cal-Adapt tool depicts sea level rise projections and existing storm-related flooding events using a "bathtub model", which shows the consequences of a 100-year flood event combined with up to 55 inches of sea level rise without taking into account protective flood control structures and levees or the increased flood risk from wave run-up. Based

on this model a small portion of Sacramento County near the Delta is vulnerable to the influences of sea-level rise. Under current conditions, Cal-Adapt shows 171 acres inundated by the 100-year flood, with a 240 percent increase of up to 411 acres under a 55-inch sea level rise scenario. The area affected by sea level rise projections is determined to constitute only 0.1% of the County, which is largely undeveloped land containing wetlands on Delta islands. Although by land mass, Sacramento County is not predicted to be directly affected by sea-level rise, rising sea levels in the Sacramento-San Joaquin Delta may result in indirect effects associated with saltwater intrusion to the lower reaches of the Sacramento River. The level of salinity of the Delta and Sacramento River is dependent on several variables and fluctuates depending on the season, snowpack, tides, temperature, weather conditions, and human-related demand, thus it is difficult to predict the severity of saltwater intrusion into the Sacramento River as a result of sea-level rise. However, it would be expected that rising sea levels would introduce saltwater further upstream the Sacramento River reducing the quality of fresh water supply. It is further expected that the salt water intrusion from sea level rise would be limited to the lower reaches of the Sacramento River and would not affect the water quality of the Mokelumne, American, and Cosumnes rivers.

4.2.15. Flood: Localized Flooding

Hazard/Problem Description

Localized, stormwater flooding also occurs throughout the County. Urban storm drainpipes and pump station have a finite capacity. When rainfall exceeds this capacity, or the system is clogged, water accumulates in the street until it reaches a level of overland release. This type of flooding may occur when intense storms occur over areas of development.

According to Sacramento County, numerous parcels and roads throughout the County not included in the FEMA 100- and 500-year floodplains are subject to flooding in heavy rains. In addition to flooding, damage to these areas during heavy storms includes pavement deterioration, washouts, mudslides, debris areas, and downed trees. The frequency and type of damage or flooding that occurs varies from year to year, depending on the quantity of runoff.

Table 4-35 identifies the number of parcels and roads by watersheds affected by localized flooding throughout the unincorporated County. Parcels were identified by the County based on those parcels historically affected by localized flooding issues. Affected roads are estimated based on those roads fully within 50 feet of a parcel with historical flooding problems. Maps of these localized flooding areas are still under development by the County. The Watershed Master Plan included as Appendix H to this LHMP Update also addresses these flood prone areas falling outside of the established 100- and 500-year floodplains.

Table 4-35 Unincorporated Sacramento County Localized Flooding Areas

Watershed	# of Parcels Affected	# of Road Segments Affected
Buffalo Creek	63	686
Morrison Creek	1,102	366
Chicken Ranch Slough	421	221

Watershed	# of Parcels Affected	# of Road Segments Affected
Cosumnes River	335	211
Laguna Creek	1042	202
North Delta	769	199
Linda Creek	379	199
Florin Creek	715	191
Arcade Creek	347	182
Fair Oaks Stream Group	197	172
Dry Creek	308	166
Strong Ranch Slough	196	153
Sierra Creek	93	149
Carmichael Creek	176	128
Robla Creek	320	126
Antelope Creek	187	107
Minnesota Creek	212	105
Deadmans Gulch	223	102
Alder Creek	19	88
North Fork Badger Creek	232	86
NEMDC Trib 3	137	78
East Natomas	158	69
Badger Creek	194	62
Elder Creek	149	58
Arcade Creek South Branch	83	58
Magpie Creek	56	58
Diablo Creek	11	49
Sierra Branch	70	48
NEMDC Trib 2	118	47
Strawberry Creek	168	46
East Antelope	111	46
Unionhouse Creek	47	46
Skunk Creek	81	45
Laguna Creek (South)	52	45
Beach-Stone Lake	123	44
Hen Creek	94	44
Gerber Creek	75	42
Cripple Creek	38	39
Hagginbottom	38	38
Verde Cruz Creek	19	38

Watershed	# of Parcels Affected	# of Road Segments Affected
Dry Creek (South)	66	37
Hagginwood Creek	49	37
Courtland	157	31
Griffith Creek	125	29
Mayhew Slough	18	25
Date Creek	48	23
Deer Creek	61	21
Boyd Creek	40	20
Willow Creek (South)	64	19
NEMDC Trib 1	41	17
San Juan Creek	24	16
Hadselville Creek	43	15
Frye Creek	22	12
Manlove	13	12
Negro Slough	11	12
Rolling Draw Creek	10	11
Willow Creek	15	8
Coyle Creek	9	7
Natomas Basin	0	5
Crevis Creek	4	4
Coyote Creek	26	3
Arkansas Creek	4	3
Carson Creek	13	2
Bear Slough	3	2
Brooktree Creek	3	2
Browns Creek	6	1
Cordova/Coloma Stream Group	1	1
Elk Grove Creek	0	1
Little Deer Creek	0	1
Grizzly Slough	0	0
Mariposa Creek	0	0
Slate Creek	0	0
Sunrise Creek	0	0
Whitehouse Creek	0	0
Willow Creek (Middle)	0	0
Total	**10,034**	**5,216**

Source: Sacramento County

Past Occurrences

Disaster Declaration History

There have been no disasters declarations related specifically to localized flooding in Sacramento County, beyond those identified in the 100/200/500-year flood hazard section above.

NCDC Events

There have been no NCDC localized flooding events in Sacramento County, beyond those identified in the 100/200/500-year Flood Hazard section above.

HMPC Events

The Planning Team for the County noted the following localized flooding events that have occurred in the County since 2011.

- 2011 Mar 24 – High winds & 1 – 1.5" rain. 90 service calls, most for plugged drains. 1 structure flooded.
- 2012 Nov 30 – Dec 3. – High winds & 4" -6" rain. 800 service calls w/ 474 drainage service requests. 24 Mobile homes flooded at Auburn Blvd. & 15 other structures Countywide.
- 2014 Feb 10 - 2.5" – 4.5" rain. 72 drainage service calls.
- 2014 Dec 2 – 4 – 1.1 -5.5" rain. 321 drainage service calls. No structural flooding. Watt Ave. and Roseville Rd. number 1 lane flooded with 2 feet of water due to clogged drain. Roadway flooding in Sacramento on southbound Highway 99 near Sutterville Rd. Water was as deep as car doors and traffic was backed up. I-80 at Watt Ave. Eastbound Underpass had significant flooding due to heavy rain and pump failure. This resulted in major traffic backup, lasting several hours during evening rush hour.
- 2014 Dec 11 -12 – 2.3" – 3.5" rain. 179 drainage service calls.
- 2015 Feb 5 -9 – 1"-3" rain. 47 drainage service calls.
- January 5th & 19th, 2016 – A cool winter storm brought moderate rain, 1-2 inches across the Valley, with ponding on roads and small stream rises. There was roadway flooding with partial lane blockage reported on I80 and also on US Highway 50.

Likelihood of Future Occurrence

Highly Likely— With respect to the localized, stormwater flood issues, the potential for flooding may increase as storm water is channelized due to land development. Such changes can create localized flooding problems in and outside of natural floodplains by altering or confining natural drainage channels. Urban storm drainage systems have a finite capacity. When rainfall exceeds this capacity or systems clog, water accumulates in the street until it reaches a level of overland release. With increasing urbanization of the Sacramento County Planning Area, combined with older infrastructure, this type of flooding will continue to occur during heavy rains. Based on historical data, localized, stormwater flooding events less severe than a 100-year flood and those outside of the 100-year floodplain occur frequently (on an annual basis) during periods of heavy rains.

Climate Change and Localized Flood

While average annual rainfall may decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century, increasing the likelihood of overwhelming stormwater systems built to historical rainfall averages. This makes localized flooding more likely.

4.2.16. Landslides and Debris Flows

Hazard/Problem Description

Landslides refer to a wide variety of processes that result in the perceptible downward and outward movement of soil, rock, and vegetation under gravitational influence. Common names for landslide types include slump, rockslide, debris slide, lateral spreading, debris avalanche, earth flow, and soil creep. Landslides may be triggered by both natural and human-induced changes in the environment that result in slope instability.

A landslide is the breaking away and gravity-driven downward movement of hill slope materials, which can travel at speeds ranging from fractions of an inch per year to tens of miles per hour depending on the slope steepness and water content of the rock/soil mass. Landslides range from the size of an automobile to a mile or more in length and width and, due to their sheer weight and speed, can cause serious damage and loss of life. Their secondary effects can be far-reaching; such as catastrophic flooding due to the sudden release of river water impounded by landslide debris or slope failure of an earthen dam.

Landslide problems can be caused by land mismanagement, particularly in mountain, canyon, and coastal regions. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Land-use zoning, professional inspections, and proper design can minimize many landslide, mudflow, and debris flow problems.

The susceptibility of an area to landslides depends on many variables including steepness of slope, type of slope material, structure and physical properties of materials, water content, amount of vegetation, and proximity to areas undergoing rapid erosion or changes caused by human activities. These activities include mining, construction, and changes to surface drainage areas.

Landslides often accompany other natural hazard events, such as floods, wildfires, or earthquakes. Landslides can occur slowly or very suddenly and can damage and destroy structures, roads, utilities, and forested areas, and can cause injuries and death.

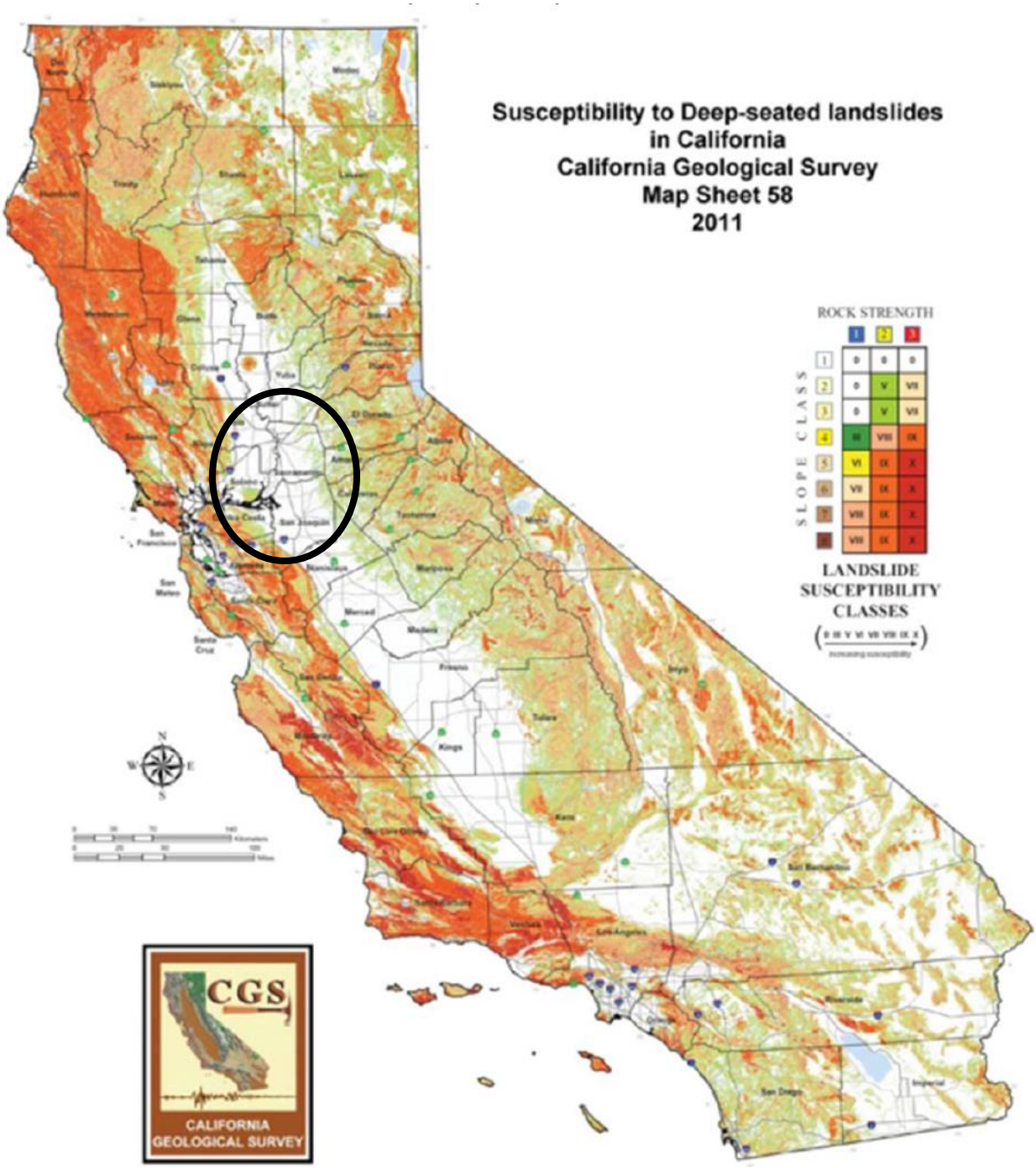
Landslides directly damage buildings in two general ways: 1) disruption of structural foundations caused by differential movement and deformation of the ground upon which the structure sits; and 2) physical impact of debris moving down slope against structures located in the travel path. In addition to buildings, other types of engineered structures are vulnerable to the impact and ground deformation caused by slope failures, particularly utilities and transportation structures. These belong to a category of structures called lifelines. Transmission lines such as telephone lines, electric power, gas, water, sewage, roadways, etc., are necessary for today's functioning society. They present a particular vulnerability because of their

geographic extent and susceptibility to physical distress. Lifelines are generally linear structures that, because of their geographic extent, have a greater opportunity for impact by ground failure.

The Sacramento County General Plan Background Report describes areas in the County that are particularly prone to landslides. In Sacramento County, only a narrow strip along the eastern boundary, from the Placer County line to the Cosumnes River, is considered to have landslide potential. However, future slides on these slopes are expected to be minor in nature and do not pose a large-scale threat to life or property. The American River Bluffs downstream from Folsom and in Fair Oaks and Carmichael are considered stable and are generally not subject to fracture or landslides.

Figure 4-43 was developed for the 2013 State of California Multi-Hazard Mitigation Plan. It indicates that most areas throughout Sacramento County are at low risk for landslides, with areas in the eastern portion of the County is at low to medium risk for landslides.

Figure 4-43 Landslide Risk Zones



Source: 2013 State of California Multi-Hazard Mitigation Plan

Past Occurrences

Disaster Declaration History

There have been no disaster declarations associated with landslides in Sacramento County.

NCDC Events

The NCDC contains no records of landslides in the County.

HMPC Events

The HMPC did not identify any landslide incidents since the 2011 plan.

Likelihood of Future Occurrence

Unlikely – The topography of the majority of Sacramento County is relatively flat and not subject to landslide. In Sacramento County, only a narrow strip along the eastern boundary, from the Placer County line to the Cosumnes River, is considered to have landslide potential. However, future slides on these slopes are expected to be minor in nature and do not pose a large-scale threat to life or property. The American River Bluffs downstream from Folsom and in Fair Oaks and Carmichael are considered stable and are generally not subject to fracture or landslides; most land movement in this area is attributed to natural processes. This small portion, coupled with a lack of previous occurrences, equates to a likelihood of future occurrence of unlikely.

Climate Change and Landslide and Debris Flows

According to the CAS, climate change may result in precipitation extremes (i.e., wetter wet periods and drier dry periods). While total average annual rainfall may decrease only slightly, rainfall is predicted to occur in fewer, more intense precipitation events. The combination of a generally drier climate in the future, which will increase the chance of drought and wildfires, and the occasional extreme downpour is likely to cause more mudslides and landslides.

4.2.17. Levee Failure

Hazard/Problem Description

A levee is a raised area that runs along the banks of a stream or canal. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a narrower steam channel, levees can also increase the speed of the water. Levees can be natural or man-made. A natural levee is formed when sediment settles on the stream bank, raising the level of the land around the stream. To construct a man-made levee, workers place dirt or concrete along the stream banks, creating an embankment. This embankment is flat at the top, and slopes at an angle down to the water. For added strength, sandbags are sometimes placed over dirt embankments.

Approximately 150 years ago, the levees of the Sacramento-San Joaquin Delta were raised to prevent flooding on what remains some of the most fertile farmland in the nation. While the peat soils were excellent for agriculture, they were not the best choice to create strong foundations for levee barriers meant to contain a constant flow of river water. Nevertheless, it was these native soils that were primarily used to create the levee system.

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events or dam failure. Levees reduce, not eliminate, the risk to individuals and structures located behind them.

The time of year of a failure is an important factor in determining risk. Overtopping is most likely to occur during high water events in the winter. Multiple failures during large floods would generally not pose an immediate threat to water supplies outside the Delta. In contrast, a structural failure during a period of low inflow, such as summer, can draw ocean salinity into the Delta. The saline water could cause a multi-year disruption to statewide water use. Large-scale disruptions could cost hundreds of billions of dollars annually.

A levee system failure or overtopping can create severe flooding and high water velocities. It's important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

There are three primary risks to levee integrity in Sacramento County:

- Earthquake failure
- High water failure
- Dry weather failure

Earthquake Failure

Seismic risk in the Delta Region is characterized as moderate-to-high because of many active faults in the San Francisco Bay Area. Figure 4-30 in Section 4.2.12 Earthquake, illustrates the locations of faults in and near the San Francisco Bay Area and the Delta Region. Area seismic activity during the last 100 years is significantly less than what was experienced during the 1800s and the first part of the 1900s. Seismic experts predict increased seismic activity in the future similar to that which occurred up to the first part of the 1900s. Seismic risk to levees stems from the risk of liquefaction. Liquefaction is discussed as a stand-alone hazard in Section 4.2.13. A more in depth discussion may be found there.

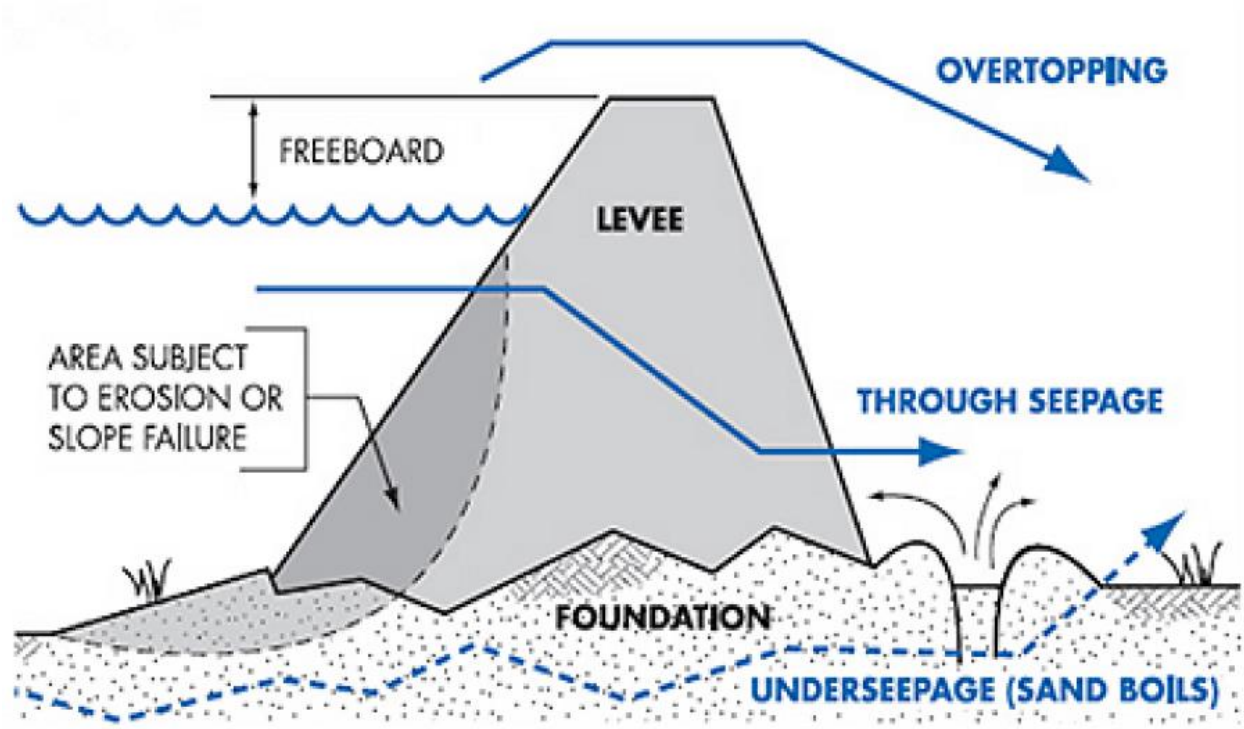
High Water Failure

Although earthquakes pose the greatest single risk to Delta Region levees, winter storms and related high water conditions are also a serious risk to all levees in the Sacramento County Planning Area. High water events can overtop levees. High water also increases the hydrostatic pressure on levees and their foundations, causing instability. The risk of through-levee and under-levee seepage failures increases as well.

Under-seepage refers to water flowing under the levee through the levee foundation materials, often emanating from the bottom of the landside slope and ground surface and extending landward from the landside toe of the levee. Through-seepage refers to water flowing through the levee prism directly, often emanating from the landside slope of the levee. Both conditions can lead to failure by several mechanisms, including excessive water pressures causing foundation heave and slope instabilities, slow progressing internal erosion, and piping leading to levee slumping.

Rodents burrowing into and compromising the levee system is a significant issue in the Planning Area. Erosion can also lead to levee failure. More information on erosion can be found in Section 4.2.18. Figure 4-44 depicts many causes of levee failure.

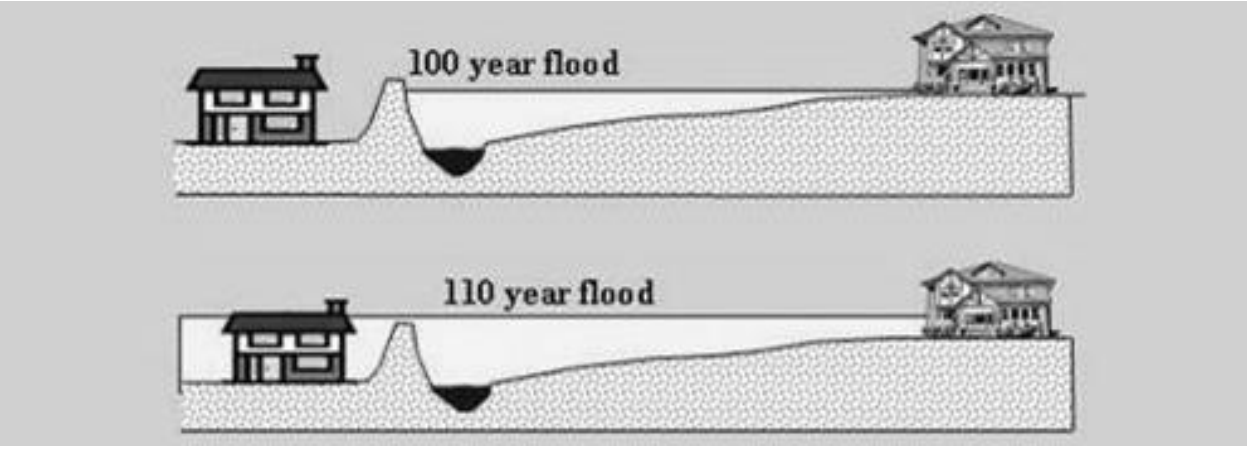
Figure 4-44 Potential Causes of Levee Failure



Source: USACE

Overtopping failure occurs when the flood water level rises above the crest of a levee. As shown in Figure 4-45, overtopping of levees can cause greater damage than a traditional flood due to the often lower topography behind the levee.

Figure 4-45 Flooding from Levee Overtopping



Source: Levees in History: The Levee Challenge. Dr. Gerald E. Galloway, Jr., P.E., Ph.D., Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.

Most levee failures in the Delta Region have occurred during winter storms and related high water conditions, often in conjunction with high tides and strong winds.

Dry Weather Failures

Dry weather, or sunny-day, failures are levee breaches that are not flood or seismic related. These failures typically occur between the end of the late snowmelt from the Sierras, in late May, and the beginning of the rainy season, in early October. Sunny-day failures are addressed separately from flood-induced failures to differentiate between winter and summer events. Aside from seismic events, factors that can cause levee failures in the Sacramento–San Joaquin River Delta (Delta) in the summer period are different than the factors that can cause winter failures.

Burrowing animal activities and pre-existing weaknesses in the levees and foundation are the key weak links leading to levee failures. This is the case regardless of whether the failures occur during a high-tide condition or not. Most practicing engineers, scientists, and maintenance personnel in the Delta and Suisun Marsh believe that rodents are prolific in the Delta and use levees for burrowing. As a result, they cause undue weaknesses by creating a maze of internal and interconnected galleries of tunnels.

Under-seepage and through-levee seepage are slow processes that tend to work through time by removing fines from levee and foundation material during episodes of high river levels. Cumulative deterioration through the years can lead to foundations ultimately failing in dry weather by means of uncontrollable internal erosion that leads to slumping and cracking of levees.

Accredited and Provisionally Accredited Levees (PAL)

It is important that community officials and citizens have the most accurate and up-to-date information to make decisions based on the flood risk that exists in levee-impacted areas. Accredited levees are those levees meeting the criteria set forth in 44 CFR 65.10 Mapping of Areas Protected by Levee Systems and certified as providing a 100-year level of flood protection. The PAL designation is used for a levee system

when FEMA has previously accredited the levee system on an effective FIRM or DFIRM and FEMA is awaiting data and/or documentation that will demonstrate the levee system's compliance with Section 65.10 of the NFIP regulations.

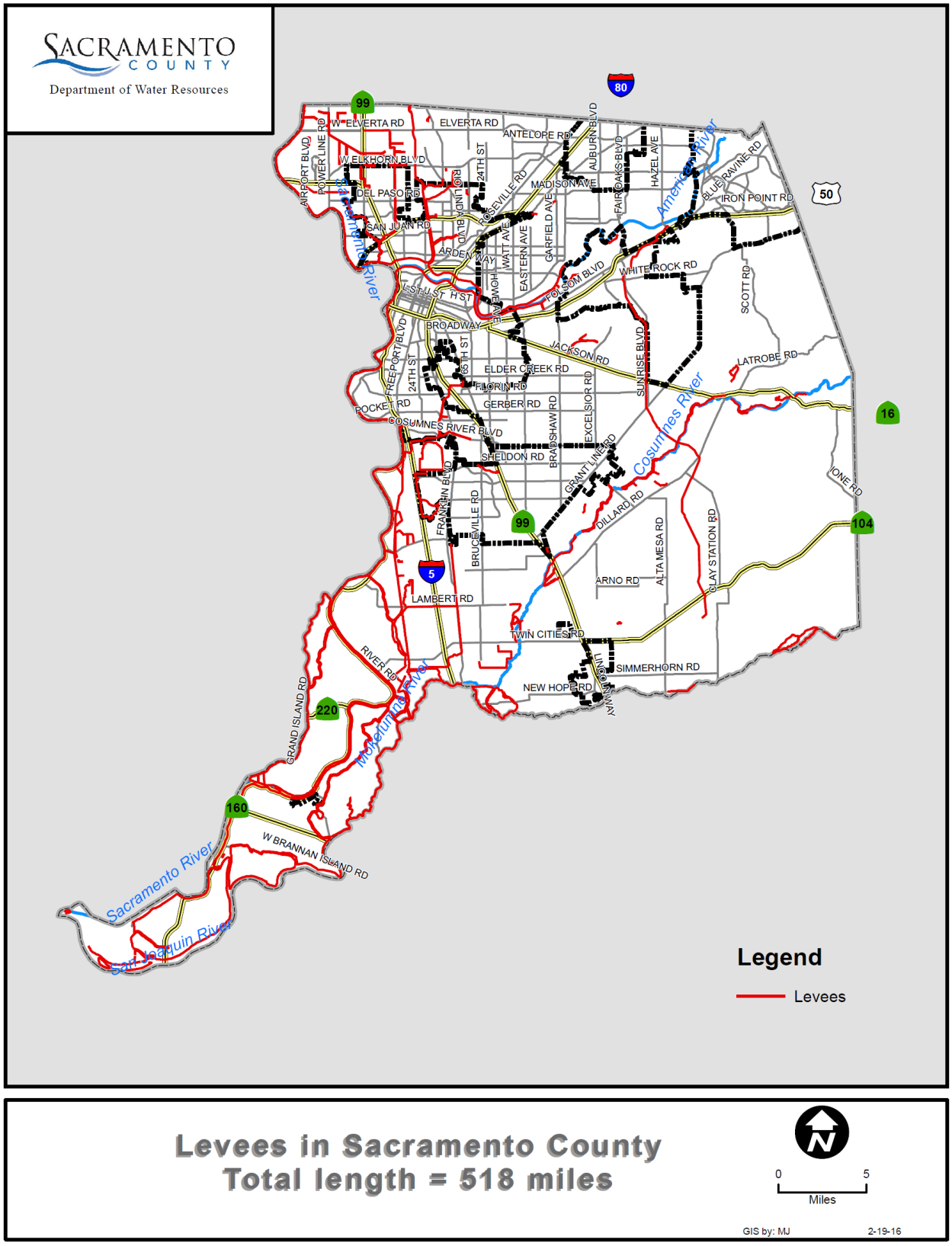
To be eligible for the PAL designation, the levee system must be shown as accredited on the effective FIRM. For levee systems that meet the PAL requirement, FEMA will place a note on the DFIRM panel landward of the levee system to indicate FEMA has provisionally accredited the levee system and the designation of any existing Zone X (shaded) area is provisional. The area impacted by the PAL system is shown as Zone X (shaded) except for areas of residual flooding, such as ponding areas, which are shown as SFHAs, areas subject to inundation by the base (1-percent annual chance) flood.

Current Accredited Levee and PAL Status in Sacramento County

There are over 1,100 miles of levees in Sacramento County; including over 500 miles of project levees. Currently, there are no accredited levees or PALs within the Sacramento County Planning Area. However, the current 2015 DFIRMs still reflect the presence of some levees as providing 100-year level of flood protection. As described throughout this LHMP Update, there are numerous planned and ongoing flood control system improvements, including levee improvement projects, that will result in establishing increased flood protection levels. Increased flood protection levels will include a minimum of 100-year level of protection to meet FEMA NFIP accreditation requirements and 200-year level of protection to meet the State of California's legislation resulting from Senate bill 5 and associated ULOP requirements and Urban Levee Design Criteria (ULDC).

Sacramento County's levee system can be seen in Figure 4-46.

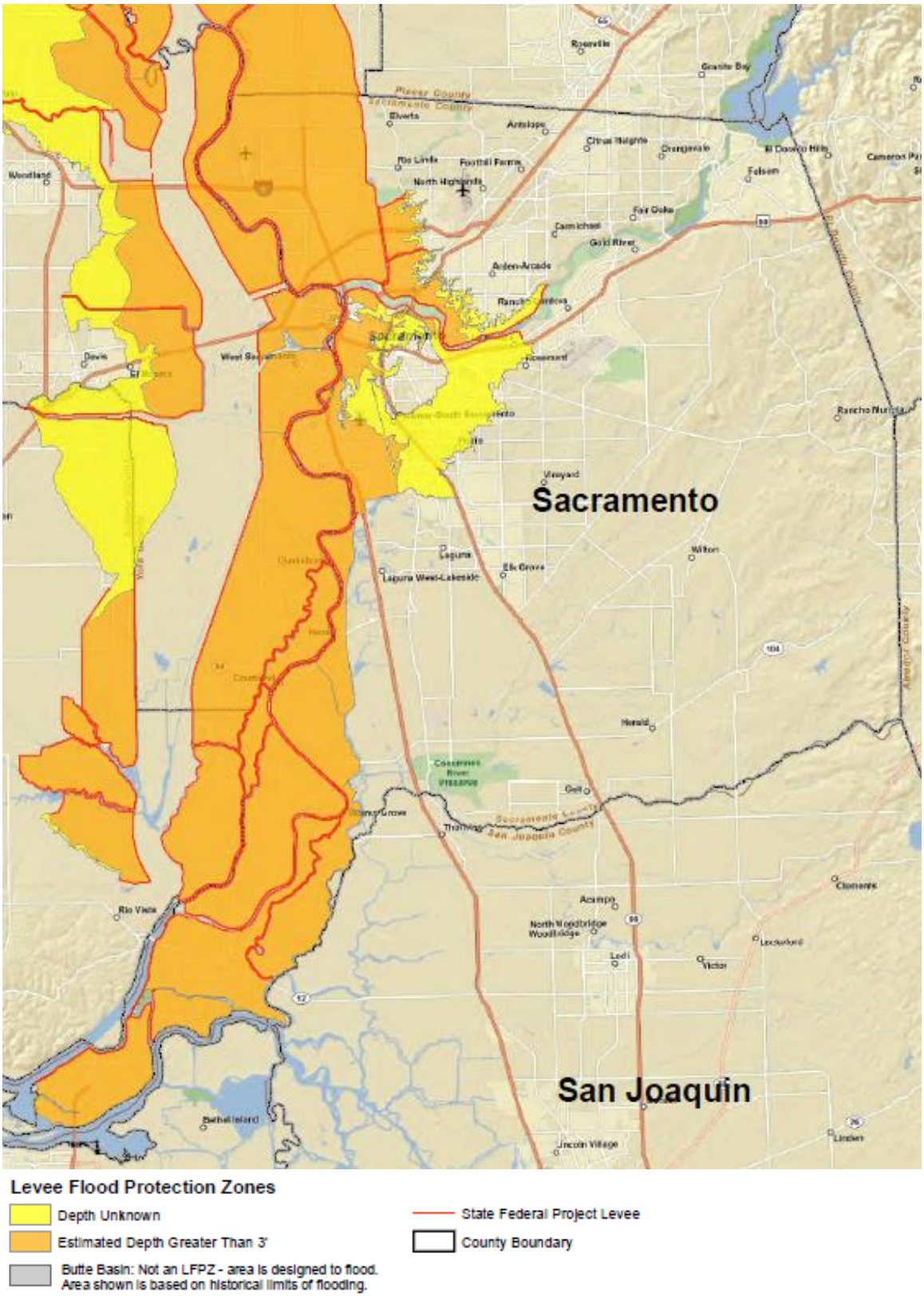
Figure 4-46 Sacramento Planning Area – Levee Map



Levee Flood Protection Zones (LFPZ) Maps

LFPZ maps represent floodplain areas protected by Central Valley State-Federal Project Levees. Under Water Code Section 9110(b), "LFPZ" means the area, as determined by the Central Valley Flood Protection Board or DWR, that is protected by a project levee. These maps were developed based on the best available information as required by Assembly Bill 156. This Bill requires DWR to prepare LFPZ maps to identify the areas where flood levels would be more than three feet deep if a project levee were to fail. DWR delineated the LFPZs by estimating the maximum area that may be flooded if a project levee fails with flows at maximum capacity that may reasonably be conveyed. DWR is using information from several sources, including FEMA floodplain maps, FEMA Q3 data, USACE's 2002 Sacramento and San Joaquin River Basins Comprehensive Study, and local project levee studies. Using this data, DWR is implementing a multi-year program to evaluate and delineate detailed floodplains for areas protected by project levees. This effort includes new topography, hydrology, hydraulic models, and floodplain maps. This information will be used to update the initial LFPZ maps. LPFZ maps can be accessed at: http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/levee_protection_zones/LFPZ_maps.cfm. Figure 4-47 is the most recent LFPZ map for the Sacramento County Planning Area.

Figure 4-47 Sacramento County - Levee Flood Protection Zones



Source: California Department of Water

Past Occurrences

Disaster Declaration History

There have been two FEMA disaster declarations in Sacramento County related to levee failure. Both were federal and state declared disasters.

- 1980 Delta Levee Break (Disaster EM-3078 declared on 1/23/1980)
- 1972 Andrus Island Levee Break (Disaster DR-342 declared on 6/21/1972)

NCDC Events

The NCDC does not track levee failure events.

FIS Events

The FIS reported the following regarding levee failure flooding.

Past flooding in the City of Isleton area has been due to levee failures caused by the separate or coincidental occurrence of very high tides and high stream outflow through the delta region, or from unexplained levee failures apparently not related from high tides and/or high stream outflow can reasonably be expected, such failures cannot be reliably predicted. A detailed field inspection of levees protecting Andrus, Brannan and Twitchell Islands, was made to determine levee conditions insofar as it is possible to do so without subsurface exploration. The report on the inspection identifies problem areas susceptible to failure and requires exploratory borings and testing of core materials to definitively determine levee stability (USACE, 1976). Because 2-percent annual chance flooding would overtop levees, stability analysis was deemed unnecessary, and this study is concerned only with levee overtopping and disintegration of levee sections subsequent to overtoppings.

The Delta has a long history of flooding, but little definitive data on specific flood events are available. Andrus, Brannan and Twitchell Islands, have all experienced historical floods. Large areas of the delta were inundated during floods, and it is probable that the City of Isleton was damaged or seriously threatened.

The 1950 and 1955 floods were outstanding in peak outflows through the delta and several islands were flooded. The City of Isleton, however, was not affected. In December 1965 and January 1965, the coincidental occurrence of very high tides and heavy inflow resulted in unusually high stages on all delta waterways. Concurrent strong onshore winds generated high waves that created very perilous conditions for many islands. Levees protecting Twitchell Island were seriously threatened by erosion and overtopping, but a massive flood fighting effort prevented overflow, destruction of levees and inundation of the City of Isleton.

In December 1964 and January 1965, the coincidental occurrence of very high tides and heavy inflow resulted in unusually high stages on all delta waterways. Concurrent strong onshore winds generated high waves that created very perilous conditions for many islands. Several hundred acres were flooded and damages, mainly flood fighting and repair of levees and levee roads, were a little less than $1 million. In January and February 1969, high tides and adverse wave action in the delta, combined with large river

inflow and rain-soaked levees, caused the flooding of several islands and the endangerment of many other islands. Approximately 11,400 acres were inundated and flood damages amounted to about $9.2 million. The levee separating Andrus Island and the San Joaquin River failed from unknown causes in June 1972, resulting in the flooding of Andrus and Brannan Islands (including the City of Isleton). High winds had occurred prior to the break, but there had been no antecedent rainfall and the tidal cycle was not on the higher side. About 15,000 acres were inundated and flood damages for the event approximated $30 million.

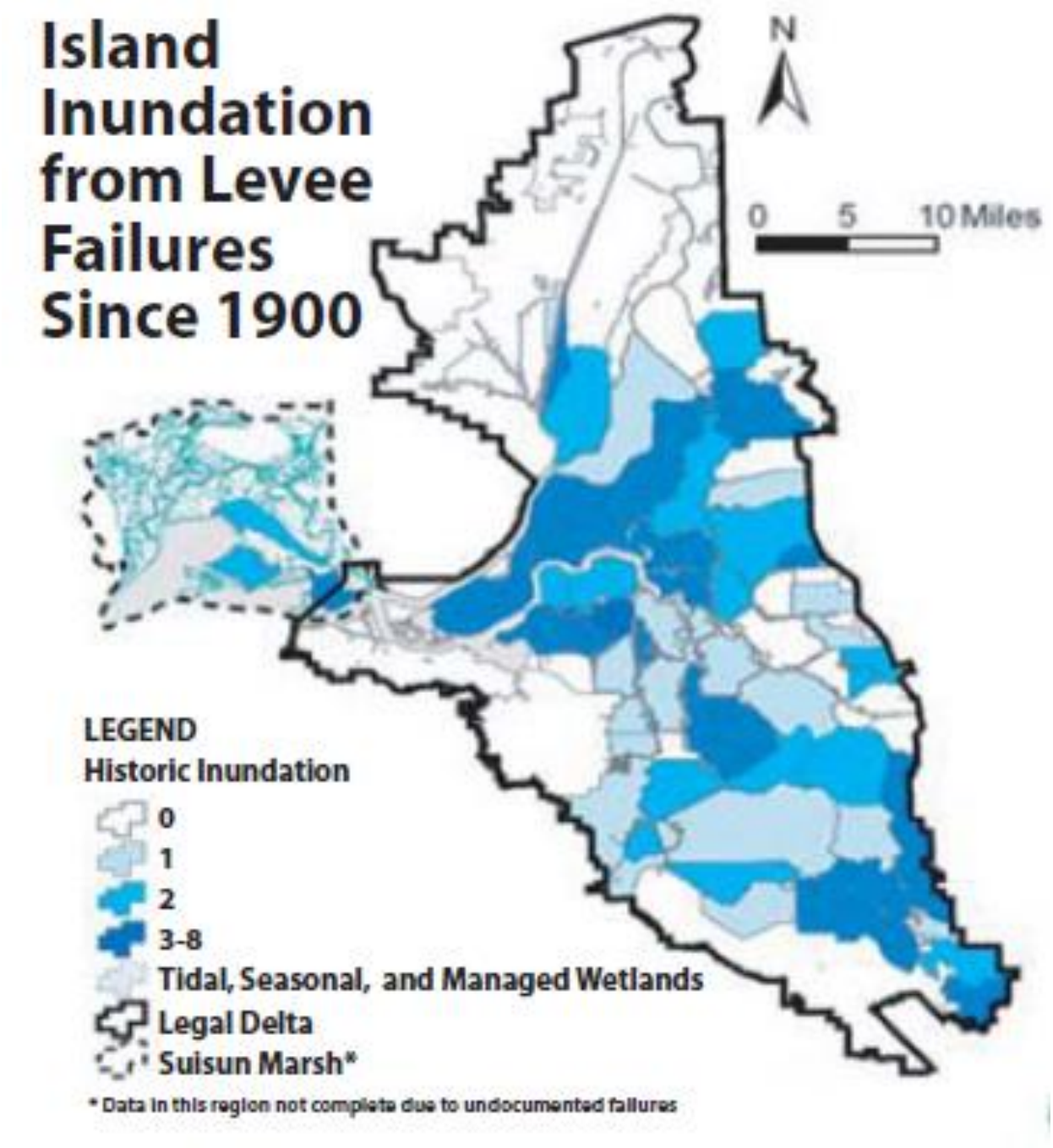
The most devastating and recent flooding of the City of Isleton resulted from failure of a levee at the southern end of Andrus Island. The levee failed from unknown causes during the night of June 21, 1972. There had not been any antecedent rainfall and the tidal cycle was not on the higher side, but high winds had been occurring prior to the break. Approximately 200,000 acre-feet of water from the San Joaquin River inundated Andrus and Brannan Islands. Activities to fight floods to protect the City of Isleton proved to be a losing battle, and almost all of the city was flooded. The entire population was evacuated, with some residents not being able to return to their homes for 4 months. Approximately one-half of the housing units in the city were damaged or destroyed. Damage from the flood event on the islands and in the City of Isleton totaled approximately $30 million.

Due to the size of the delta region, and the complexity of its stream and tidal regimen, flood frequency varies from location to location. In general, the 1950, 1955 and 1964 tidal stages in the central delta, had frequencies of 10, 30 and 5 years, respectively. Stage during the 1955 and 1964 flood periods was strongly influenced by onshore winds. The 1972 flood event cannot be assigned a frequency because the levee failure that caused the flooding cannot be attributed to tidal stage or streamflow conditions.

HMPC Events

There have been about 100 levee failures and 163 levee breaches since the early 1900. However, most of these failures occurred in the Delta area and are not specific to portions of the Delta located inside of Sacramento County. Only 14 failures and 17 breaches occurred after 1990 due to overall improvements in the levee systems throughout the Delta. These historic numbers are not representative of future occurrences within the County. Figure 4-48 shows the levee failures since 1900.

Figure 4-48 Island Inundation from Levee Failures from 1900-Present



Some islands have been flooded and recovered multiple times. A few islands, such as Franks Tract in San Joaquin County, have never been recovered. Some of the more major levee breaks in Sacramento County are detailed below.

June 21, 1972 – A levee in the Brannan-Andrus Levee Maintenance District broke. 35% of the City of Isleton was inundated. A national disaster was declared June 27, and the breach was closed on July 26. Estimated damages in 2011 dollars were $234 million. The USACE repaired the break.

February 19, 1986 – Heavy rains and flooding affected Sacramento County and the surrounding area. 6 months of precipitation fell in 10 days in mid-February. High water content caused multiple levee failures. Two levee breaks in the same general area occurred on the 8,800 acre Tyler Island in Sacramento County. These two levee breaks were approximately 300 feet in length (see Figure 4-49). A FEMA disaster declaration was declared on February 21. The approximate cost to repair the breaks was $6 million in 2011 dollars. Details on damages to structures and crops on the islands was not available.

Figure 4-49 1986 Tyler Island Levee Breach

Source: California Department of Water Resources

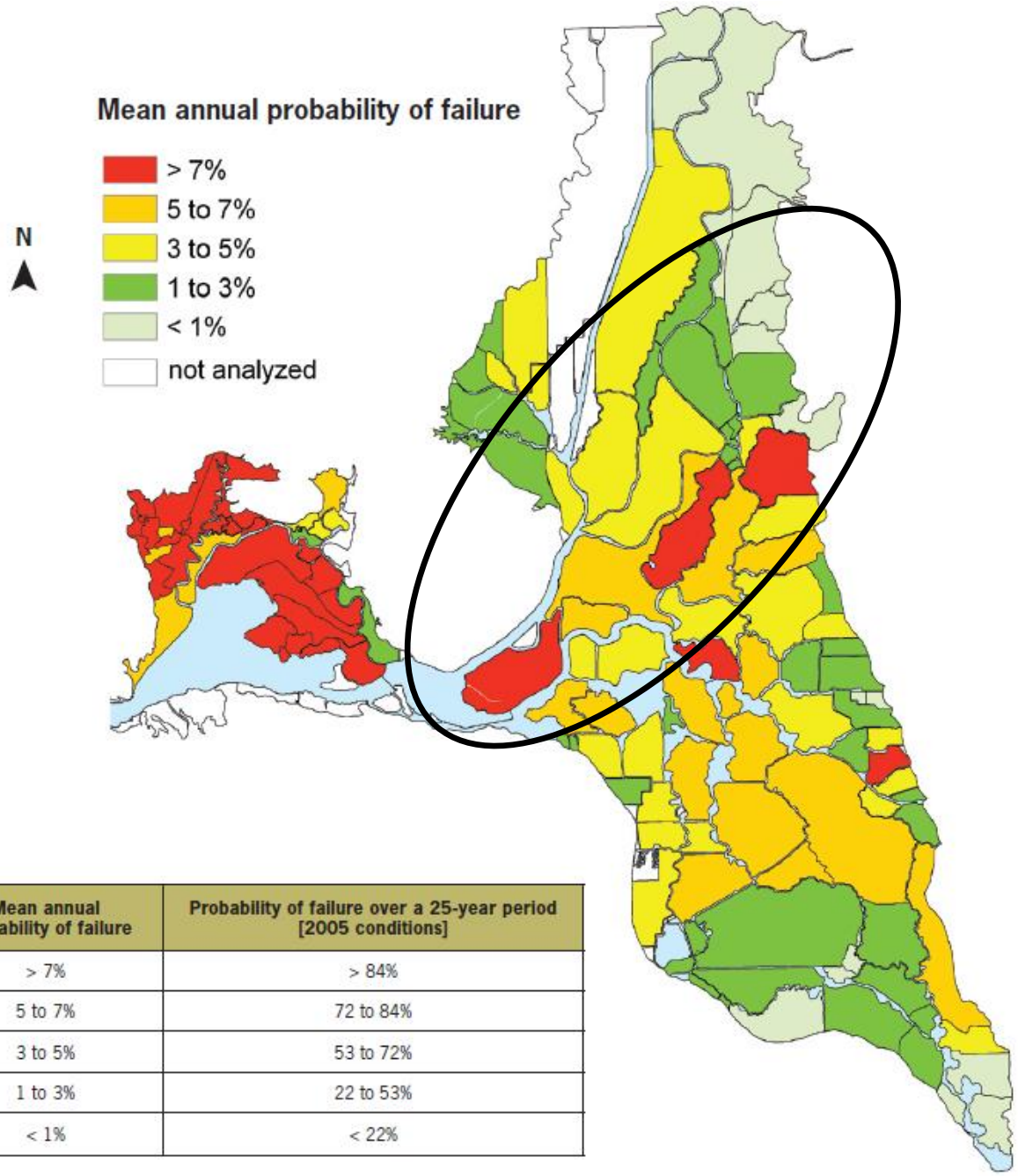
December 1996 was one of the wettest Decembers on record. Watersheds in the Sierra Nevada were already saturated by the time three subtropical storms added more than 30 inches of rain in late December 1996 and Early January 1997. The third and most severe of these storms lasted from December 31, 1996 through January 2, 1997. Rain in the Sierra Nevada caused record flows that stressed the flood management

system to capacity in the Sacramento River Basin and overwhelmed the system in the San Joaquin River Basin. Levee failures due to breaks or overtopping in the Sacramento River Basin resulted in extensive damages. In the San Joaquin River Basin, dozens of levees failed throughout the river system and produced widespread flooding. The Sacramento-San Joaquin River Delta also experienced several levee breaks and levee overtopping. Affected Delta islands within Sacramento County included McCormack-Williamson Tract, Dead Horse Island and Glanville Tract.

Likelihood of Future Occurrence

Occasional – Due to the high number of past events, increasing subsidence, and the deteriorating conditions of the levees in Sacramento, future levee failures will occur occasionally. This can be seen for the Delta area in Figure 4-50.

Figure 4-50 Estimated Frequency of Levee Overtopping Under Current Conditions



Mean annual probability of failure	Probability of failure over a 25-year period [2005 conditions]
> 7%	> 84%
5 to 7%	72 to 84%
3 to 5%	53 to 72%
1 to 3%	22 to 53%
< 1%	< 22%

Source: Delta Risk Management Strategy

Climate Change and Levee Failure

Increased flood frequency in California is a predicted consequence of climate change. Mechanisms whereby climate change leads to an elevated flood risk include more extreme precipitation events and shifts in the seasonal timing of river flows. This threat may be particularly significant because recent estimates indicate the additional force exerted upon the levees is equivalent to the square of the water level rise.

These extremes are most likely to occur during storm events, leading to more severe damage from waves and floods.

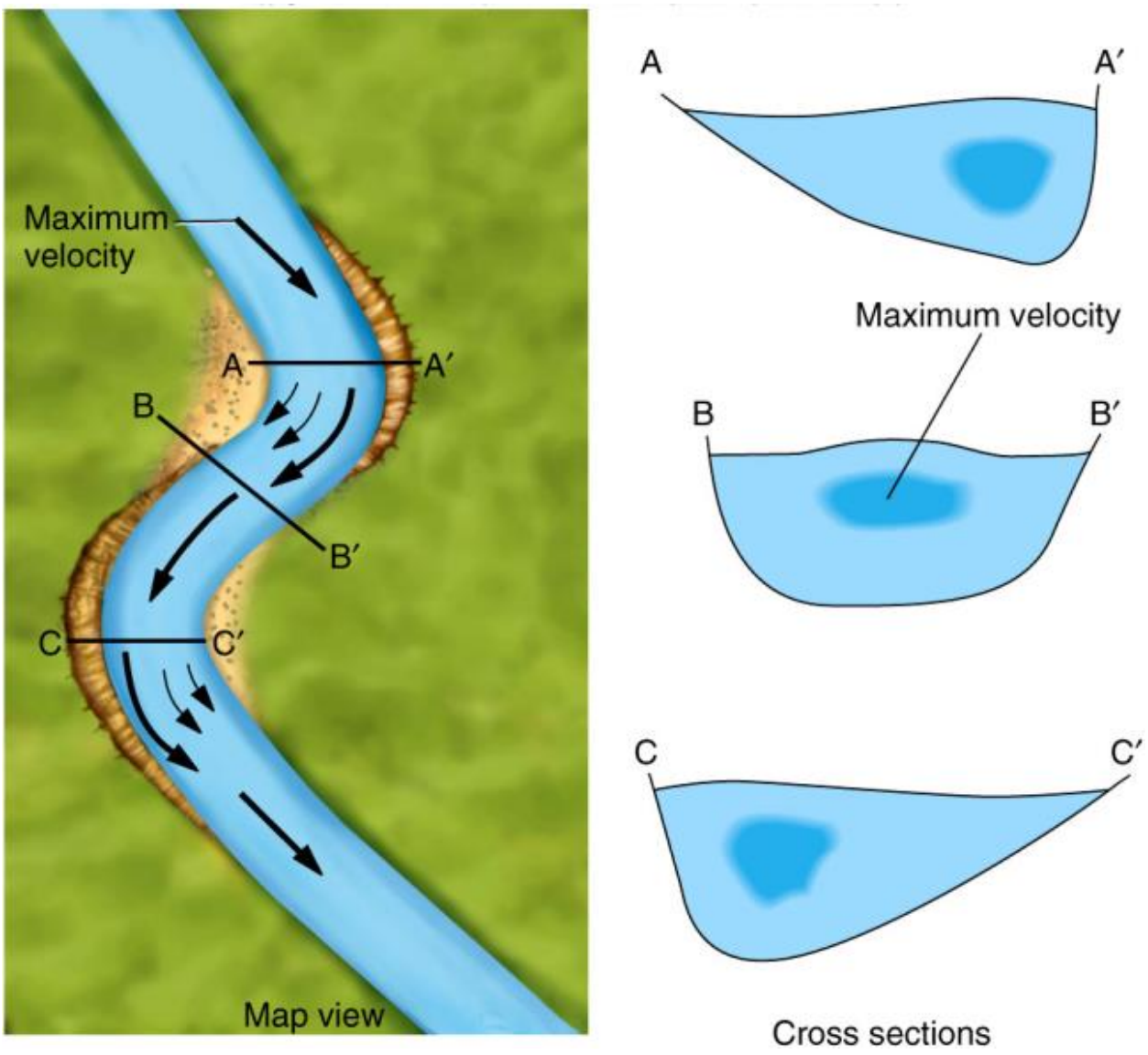
4.2.18. River/Stream/Creek Bank Erosion

Hazard/Problem Description

Any flowing body of water (brook, creek, stream, river) is a stream. Stream flow is expressed as volume per unit time, usually cubic meters per second, cubic feet per second, sometimes cubic kilometers per second, or acre-feet per second or day. Stream flow varies tremendously with time. Short term controls include rainfall, snowmelt, and evaporation conditions. Long term controls include land use, soil, groundwater state, and rock type.

Streams erode by a combination of direct stream processes, like down cutting and lateral erosion, and indirect processes, like mass-wasting accompanied by transportation. Water tends to move downstream in slugs that extend all the way across a channel as shown in Figure 4-51. When the channel bends, water on the outside of the bend (the cut-bank) flows faster and water on the inside of the bend (the point) flows slower. This distribution of velocity results in erosion occurring on the outside of the bend (cut) and deposition occurring on the inside of the bend.

Figure 4-51 Meanders and Streamflows



Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. Stream bank erosion processes, although complex, are driven by two major components: stream bank characteristics (erodibility) and hydraulic/gravitational forces. Many land use activities can affect both of these components and lead to accelerated bank erosion. The vegetation rooting characteristics can protect banks from fluvial entrainment and collapse, and also provide internal bank strength. When riparian vegetation is changed from woody species to annual grasses and/or forbs, the internal strength is weakened, causing acceleration of mass wasting processes. Stream bank aggradation or degradation is often a response to stream channel instability. Since bank erosion is often a symptom of a larger, more complex problem, the long-term solutions often involve much more than just bank stabilization. Numerous studies have demonstrated that stream bank erosion contributes a large portion of the annual sediment yield.

Determining the cause of accelerated streambank erosion is the first step in solving the problem. When a stream is straightened or widened, streambank erosion increases. Accelerated streambank erosion is part of the process as the stream seeks to re-establish a stable size and pattern. Damaging or removing streamside vegetation to the point where it no longer provides for bank stability can cause a dramatic increase in bank erosion. A degrading streambed results in higher and often unstable, eroding banks. When land use changes occur in a watershed, such as clearing land for agriculture or development, runoff increases. With this increase in runoff the stream channel will adjust to accommodate the additional flow, increasing streambank erosion. Addressing the problem of streambank erosion requires an understanding of both stream dynamics and the management of streamside vegetation.

Approximately 150 years ago, the levees of the Sacramento-San Joaquin Delta were raised to prevent flooding on what remains some of the most fertile farmland in the nation. While the peat soils were excellent for agriculture, they were not the best choice to create strong foundations for levee barriers meant to contain a constant flow of river water. Nevertheless, it was these native soils that were primarily used to create the levee system.

As farmers settled the valleys, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. Hydraulic gold mining in the northern Sierra Nevada foothills produced 1.1 billion cubic meters of sediment. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment.

However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system. In addition, the peat soils of the Delta have subsided, gradually lowering the elevations of Delta islands. As a result, some of these parcels are now more than 20 feet below sea level.

Erosion and deposition are occurring continually at varying rates over the Planning Area. Swiftly moving floodwaters cause rapid local erosion as the water carries away earth materials. Severe erosion removes the earth from beneath bridges, roads and foundations of structures adjacent to streams. By undercutting it can lead to increased rockfall and landslide hazard. The deposition of material can block culverts, aggravate flooding, destroy crops and lawns by burying them, and reduce the capacity of water reservoirs as the deposited materials displace water.

Streambank erosion increases the sediment that a stream must carry, results in the loss of fertile bottomland and causes a decline in the quality of habitat on land and in the stream. High velocity flows can erode material from the streambank. Erosion may also occur on the outboard or waterside of the levee (see Section 4.2.17), which may lead to instability and failure. Erosion can occur at once or over time as a function of the storm cycle and the scale of the peak storms.

Past Occurrences

Disaster Declaration History

There have been no disasters declarations in Sacramento County for erosion activity.

NCDC Events

The NCDC does not track erosion events.

USACE Events

The USACE began an annual erosion inventory of the Sacramento River in 1997, following the large flood event in the winter of 1996 and 1997. This flood event caused a levee failure and required numerous flood fighting efforts throughout the Sacramento River System. The original goal of the inventory was to identify the weak spots in the levee system caused by streambank erosion and repair them. However, concerns for the environment and endangered species limited the repair work to mainly emergency work (PL84-99) and local maintenance efforts. Under the SRBPP project, one site on the Sacramento River and a few sites on the American River were repaired prior to 2006.

In 2006, after the City of New Orleans was flooded, concern was raised for the threat of flooding to the Sacramento Valley. The Sacramento River Levee System has a lower level of flood protection than that of New Orleans. In February 2006, the governor of California declared a state of emergency for the Central Valley levees. Soon after, all the sites that were defined as "critical" in the 2005 inventory were repaired. Repairs have continued every year since and over 100 sites have been repaired since the declaration through the combined efforts of the USACE and Cal DWR.

While sites are currently being repaired, more sites enter the erosion inventory every year. The number of erosion sites within the system is large and even with repairs being completed every year, the number of stream bank erosion sites shows little decline year over year. With the large number of sites, a ranking system was developed to help determine which sites should be considered the highest priority for repair. Based on a 2010 field investigation, the total number of erosion sites within the Sacramento River Flood Control System is 185 sites, of which 3 are critical, 13 are new, 7 are minor, 11 were repaired, and 1 was removed. In 2010, none of these critical sites were located in Sacramento County.

In 2009, there were 221,582 linear feet of erosion within the system. In 2010, there is a total of 233,697 linear feet of erosion in the system. The total linear feet added in 2010 was 14,311 ft, of which 9,220 came from adding Wadsworth Canal into the inventory. The total linear feet repaired in 2009 was 5,497 ft. Data for specific linear feet in Sacramento County was unavailable for this plan.

During the 2011 annual erosion inventory, the following was added:

- There are currently 205 erosion sites in the inventory, or approximately 261,192 linear feet of eroding sites within the system.
- There are 48 new erosion sites and 47,113 linear feet of eroding bank were added this year.

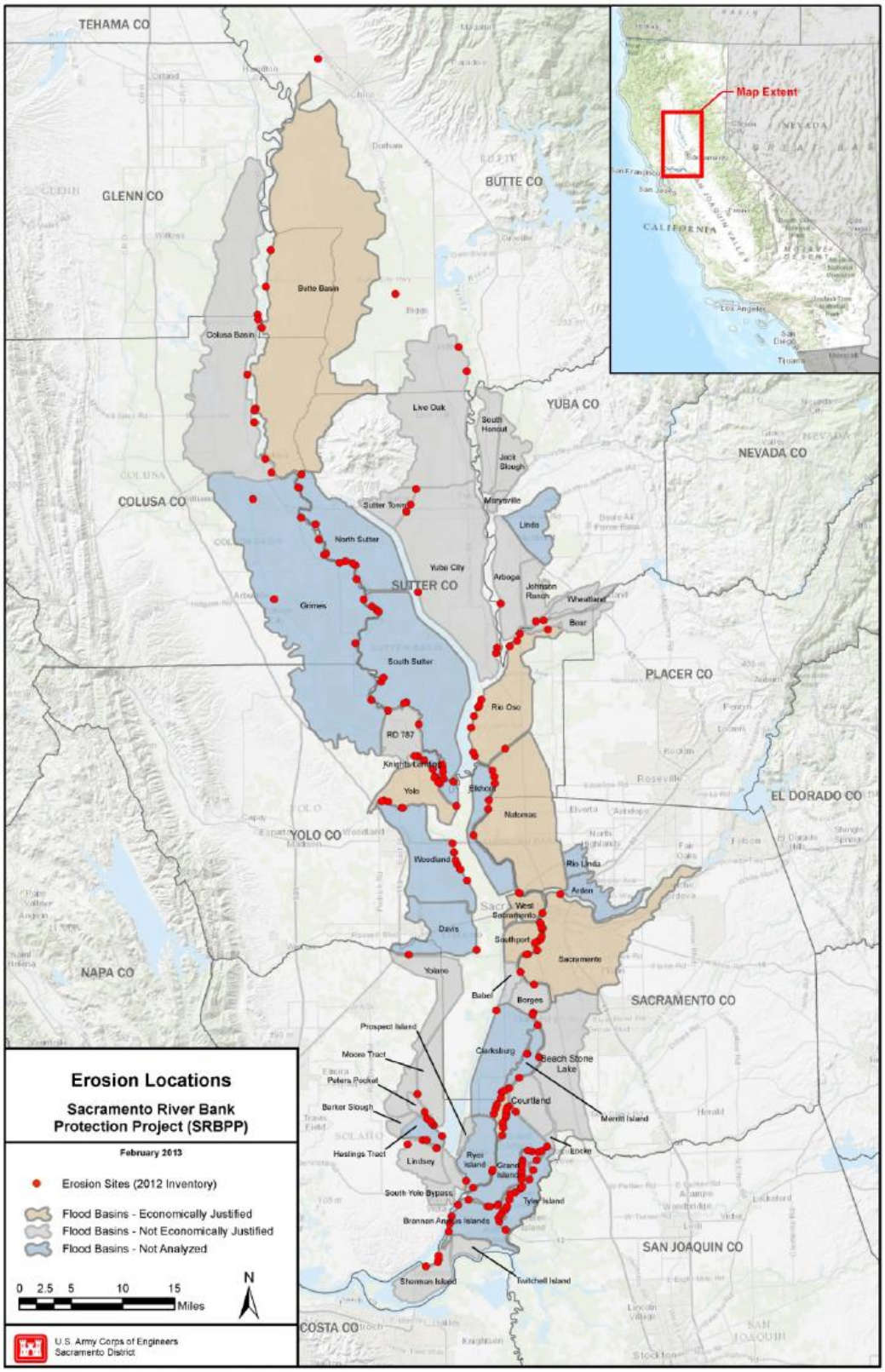
- There are 13 critical erosion sites: three on Cache Creek, five on Georgiana Slough, three on the Sacramento River, and two on Steamboat Slough. Ten of these critical erosion sites were upgraded to critical this year.

Following the 2012 annual erosion inventory the following was added:

- There are currently 201 erosion sites in the inventory, or approximately 265,625 linear feet of eroding sites within the system.
- There are 4 new erosion sites and 7,654 linear feet of eroding bank which were added this year.
- There are 14 critical erosion sites: three on Cache Creek, four on Georgiana Slough, six on the Sacramento River, and one on Steamboat Slough. Three of these erosion sites were upgraded to critical this year.

The 2012 Sacramento River Protection Project report (the most recent report available), done by the US Army Corps of Engineers, identified erosion spots of concern on the Sacramento River. These sites are shown on Figure 4-52.

Figure 4-52 2012 Identified Erosion Sites within the Sacramento River Flood Control Project



Source: Post Authorization Change Report for the Sacramento River Bank Protection Project Draft EIS

HMPC Events

The HMPC confirmed that erosion is an ongoing issue throughout the County.

Likelihood of Future Occurrence

Highly Likely – Due to the high number of linear feet in need of repair and the continuing number of linear feet that enter the USACE inventory, the likelihood of future occurrences of streambank erosion in Sacramento County is highly likely.

Climate Change and Soil Bank Erosion

Climate change may affect flooding in Sacramento County, which in turn may affect erosion rates. While average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. High water associated with these heavy rains and flooding can contribute to increased erosion to stream and creek banks. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events.

4.2.19. Subsidence

Hazard/Problem Description

Subsidence is the gradual settling or sinking of the earth's surface over manmade or natural underground voids with little or no horizontal motion. Subsidence occurs naturally and also through man-driven or technologically exacerbated circumstances. In Sacramento County, the Delta in the southeast portion of the County is highly at risk to subsidence. In the Delta, subsidence affects the islands as well as the levees.

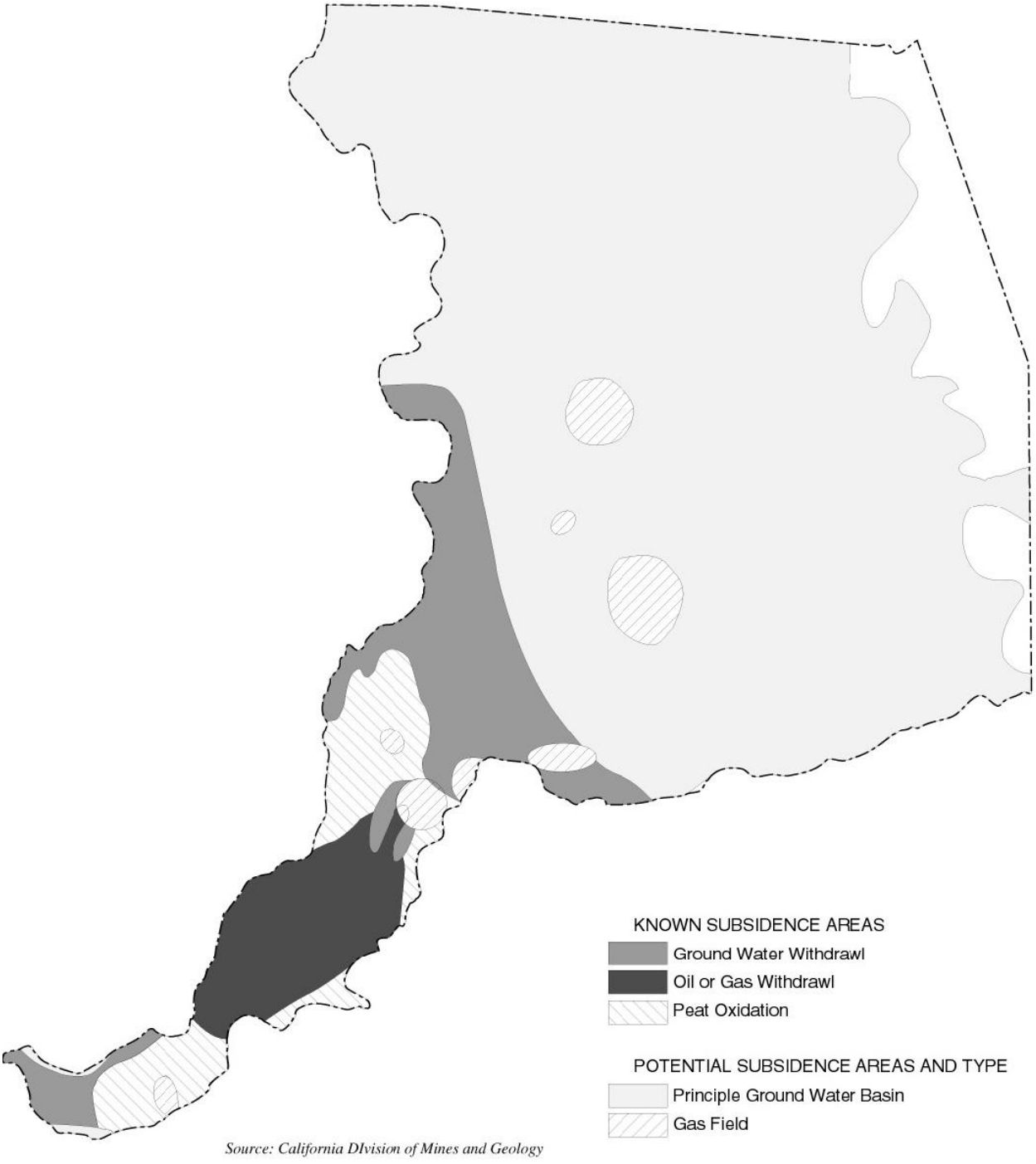
The Delta, located at the confluence of the Sacramento and San Joaquin Rivers, is blanketed by peat and peaty alluvium deposited where streams, originating in the Sierra Nevada, Coast Ranges, and southern Cascade Range, enter the San Francisco Bay system. In the late-1800s, large-scale agricultural development in the Delta required levee-building to prevent frequent flooding. The leveed marshland tracts then had to be drained, cleared of wetland vegetation, and tilled. Levees and drainage systems were largely complete by 1930 and the Delta had taken on its current appearance, with most of its 1,150-squaremile area reclaimed for agricultural use. Today the Delta includes about 57 islands or tracts that are imperfectly protected from flooding by more than 1,100 miles of levees.

Sacramento County is affected by five types of subsidence. They are:

- compaction of unconsolidated soils by earthquake shaking (liquefaction)
- compaction by heavy structures
- the erosion of peat soils
- peat oxidation
- fluid withdrawal

These areas are shown in Figure 4-53.

Figure 4-53 Known and Potential Subsidence Areas in Sacramento County



Source: Sacramento County General Plan Background Report, 2011

Compaction of Unconsolidated Soils by Earthquake Shaking (Liquefaction)

Compaction of unconsolidated soils by earthquake shaking is also known as liquefaction. Liquefaction is profiled as a separate hazard in Section 4.2.13. Refer to that section for more detail.

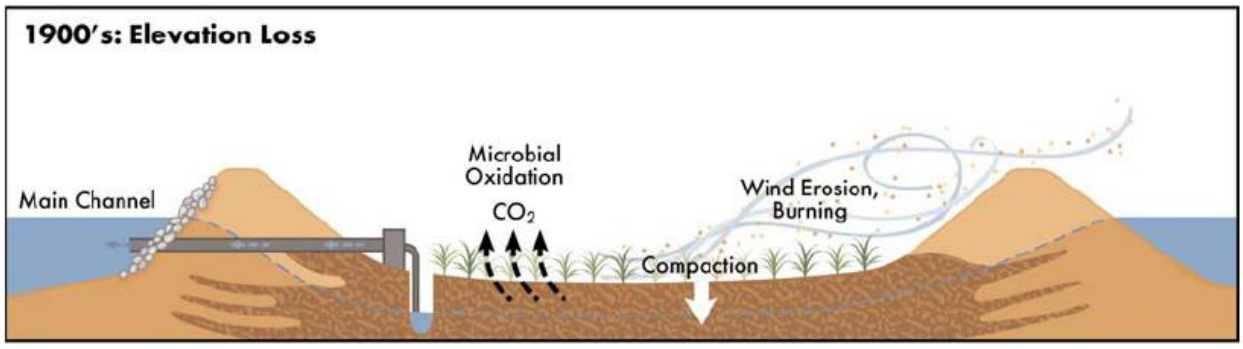
Compaction by Heavy Structures

Land development pressures are forcing the building of structures on top of fine grained water saturated sediments. Unfortunately, the weight of the structures presses the water out of the soils. To mitigate the problem, piles are installed from the footings of the heavy structures to a subsurface zone that will support the structural footing loads. The utilities, travel ways, and smaller building will be constructed to rest on the soil surface. As surface loading causes subsidence, the footings and pile support systems of the heavy structures will be exposed. In extreme situations, it may be necessary to build up the area to gain access into the pile supported structure as the area subsides. Structures that are not supported on piles will have a high probability of damage as the area subsides.

The Erosion of Peat Soils

Prior to 1950, poor land use practices, including burning of peat soils and wind erosion, exacerbated soil losses due to microbial oxidation (discussed in the next section and shown in Figure 4-54). Peat soils, being much less dense than mineral soils, are more easily eroded by wind. Peat soils are frequently wet either at, or close to, the surface thus limiting the amount of material which can be lost. Nevertheless, peat soils do blow causing spectacular dust clouds and degradation of this valuable resource.

Figure 4-54 Causes of Subsidence in the Delta during the 20th Century

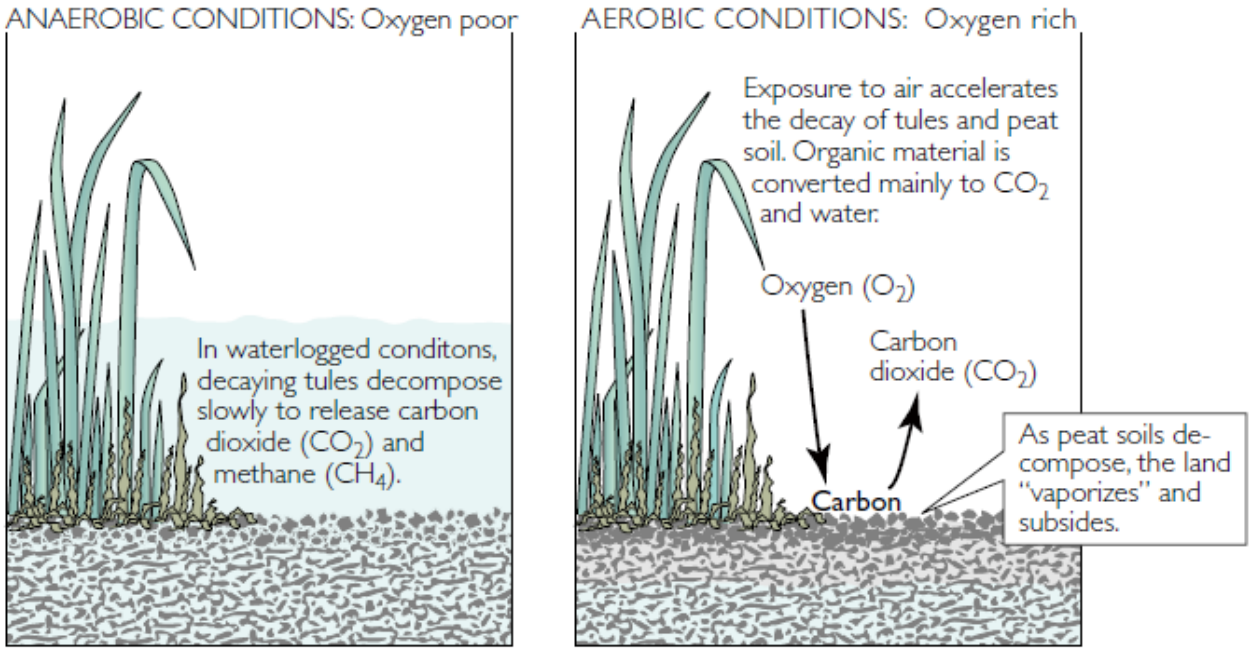


Source: Mount J, Twiss R. 2005. Subsidence, sea level rise, seismicity in the Sacramento-San Joaquin Delta. San Francisco Estuary and Watershed Science. Vol. 3, Issue 1 (March 2005), Article 5.

Peat Oxidation

The dominant cause of land subsidence in the Delta is decomposition of organic carbon in the peat soils. As shown in Figure 4-55, prior to agricultural development, the soil was waterlogged and anaerobic (oxygen-poor). Organic carbon accumulated faster than it could decompose. Drainage for agriculture led to aerobic (oxygen-rich) conditions that favor rapid microbial oxidation of the carbon in the peat soil. Most of the carbon loss is emitted as carbon dioxide gas to the atmosphere.

Figure 4-55 Peat Oxidation in Anaerobic and Aerobic Conditions



Source: USGS Publication "Sacramento-San Joaquin Delta: The Sinking Heart of the State." Report FS-005-00

Fluid Withdrawal

In the late-1800s, large-scale agricultural development in the Delta required levee-building to prevent frequent flooding. The leveed marshland tracts then had to be drained, cleared of wetland vegetation, and tilled. Levees and drainage systems were largely complete by 1930 and the Delta had taken on its current appearance, with most of its 1,150-square mile area reclaimed for agricultural use. As oxidation, erosion, and burning continued to cause subsidence of the land, more water needed to be withdrawn to maintain a constant water table to ensure agricultural plant growth. Water levels in the depressed islands are maintained 3 to 6 feet below the land surface by an extensive network of drainage ditches, and the accumulated agricultural drainage is pumped through or over the levees into stream channels. Without this drainage the islands would become waterlogged.

Groundwater Pumping

Central Sacramento County Groundwater Management Plan discussed groundwater pumping in the County.

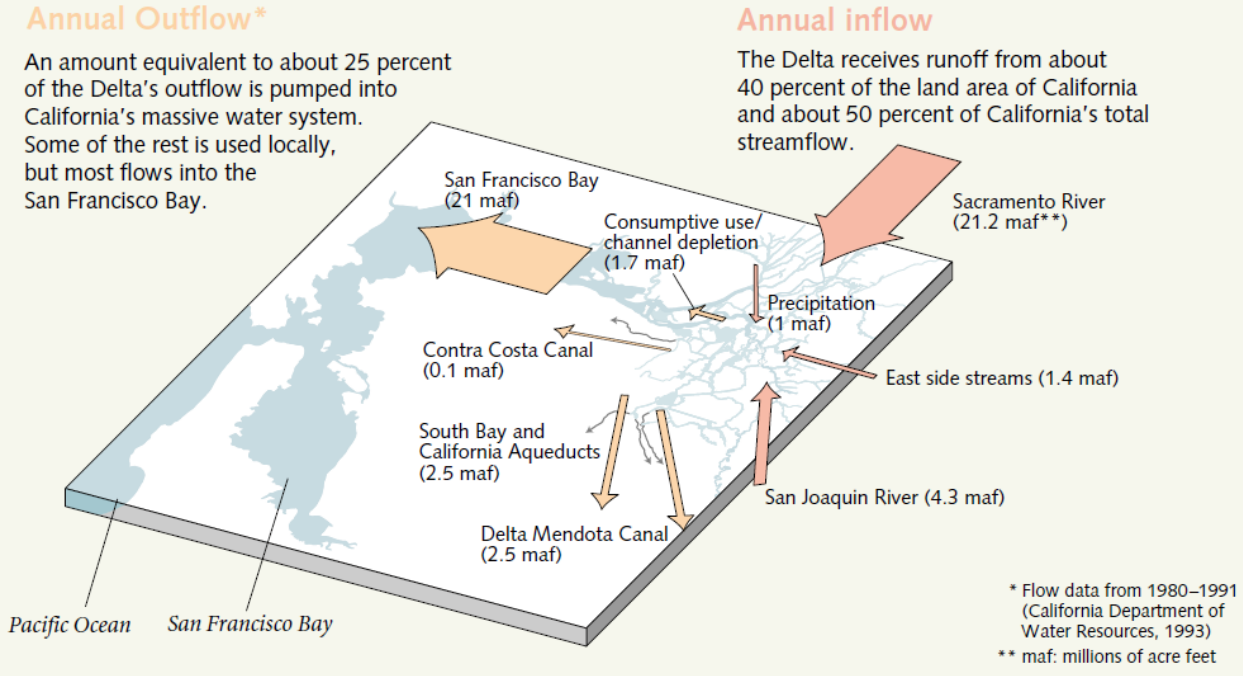
> *Historical benchmark elevation data for the period from 1912 through the late 1960s obtained from the National Geodetic Survey (NGS) were used to evaluate land subsidence in north Sacramento County. From 1947 to 1969, the magnitude of land subsidence measured at benchmarks north of the American River ranged from 0.13 feet to 0.32 feet, with a general decrease in subsidence in a northeastward direction. This decrease is consistent with the geology of the area: formations along the eastern side of the Sacramento Valley are older than those on the western side and are subject to a greater degree of pre-consolidation, making them less susceptible to subsidence. The maximum documented land subsidence of 0.32 feet was measured at both benchmark L846, located approximately two miles northeast of the former McClellan AFB, and benchmark*

G846, located approximately one mile northeast of the intersection of Greenback Lane and Elkhorn Boulevard. Another land subsidence evaluation was performed in the Arden-Arcade area of Sacramento County from 1981 to 1991. Elevations of nine wells in the Arden-Arcade area were surveyed in 1981, 1986, and 1991. The 1986 results were consistently higher than the 1981 results; this was attributed to extremely high rainfall totals in early 1986 that recharged the aquifer and caused a rise in actual land surface elevations. The 1991 results were consistently lower than the 1986 results; this was attributed to five years of drought immediately preceding the 1991 measurements which caused depletion of the aquifer and resulting land surface subsidence. Comparison of eight of the locations indicates that seven benchmarks had lower elevations in 1991 than in 1981 and one benchmark had a higher elevation in 1991. Of the seven benchmarks with lower elevations in 1991, the maximum difference is 0.073 feet (less than one inch). Whether this is inelastic subsidence is indeterminate from the data, but it is clear that the magnitude of the potential subsidence in the benchmarks between 1981 and 1991 was negligible.

Subsidence and Delta Water Supply

The Delta receives runoff from about 40 percent of the land area of California and about 50 percent of California's total streamflow, as shown in Figure 4-56. It is the heart of a massive north-to-south water-delivery system whose giant engineered arterials transport water southward. State and Federal contracts provide for export of up to 7.5 million acre-feet per year from two huge pumping stations in the southern Delta near the Clifton Court Forebay. About 83 percent of this water is used for agriculture and the remainder for various urban uses in central and southern California. Two-thirds of California's population (more than 20 million people) gets at least part of its drinking water from the Delta.

Figure 4-56 The Delta and California's Water System



Source: USGS Publication "Sacramento-San Joaquin Delta: The Sinking Heart of the State." Report FS-005-00

Land subsidence of Delta islands indirectly affects the north-to-south water transfer system, which is predicated on the available water supply (annual inflows to the Delta), the viability of aquatic species populations, and acceptable water quality in the southern Delta. The statewide water-transfer system in California is so interdependent that decreased water quality in the Delta, whether due to droughts or levee failures, might lead to accelerated subsidence in areas dependent on imported water from the Delta.

The waterways of the Delta are subject to tidal action. Ocean tides propagating into San Francisco Bay are observed 5–6 hours later along the Cosumnes River in the eastern Delta. The position of the interface between the saline waters of the Bay and the freshwaters of the Delta depends upon the tidal cycle and the flow of freshwater through the Delta. Before major dams were built on rivers in the Delta watershed, the salinity interface migrated as far upstream as Courtland along the Sacramento River. Today, releases of freshwater from dams far upstream help reduce the maximum landward migration of the salinity interface during the late summer. In the spring, however, reservoirs and Delta exports consistently act in concert to increase the landward migration of the salinity interface over that expected under conditions of unimpaired flows.

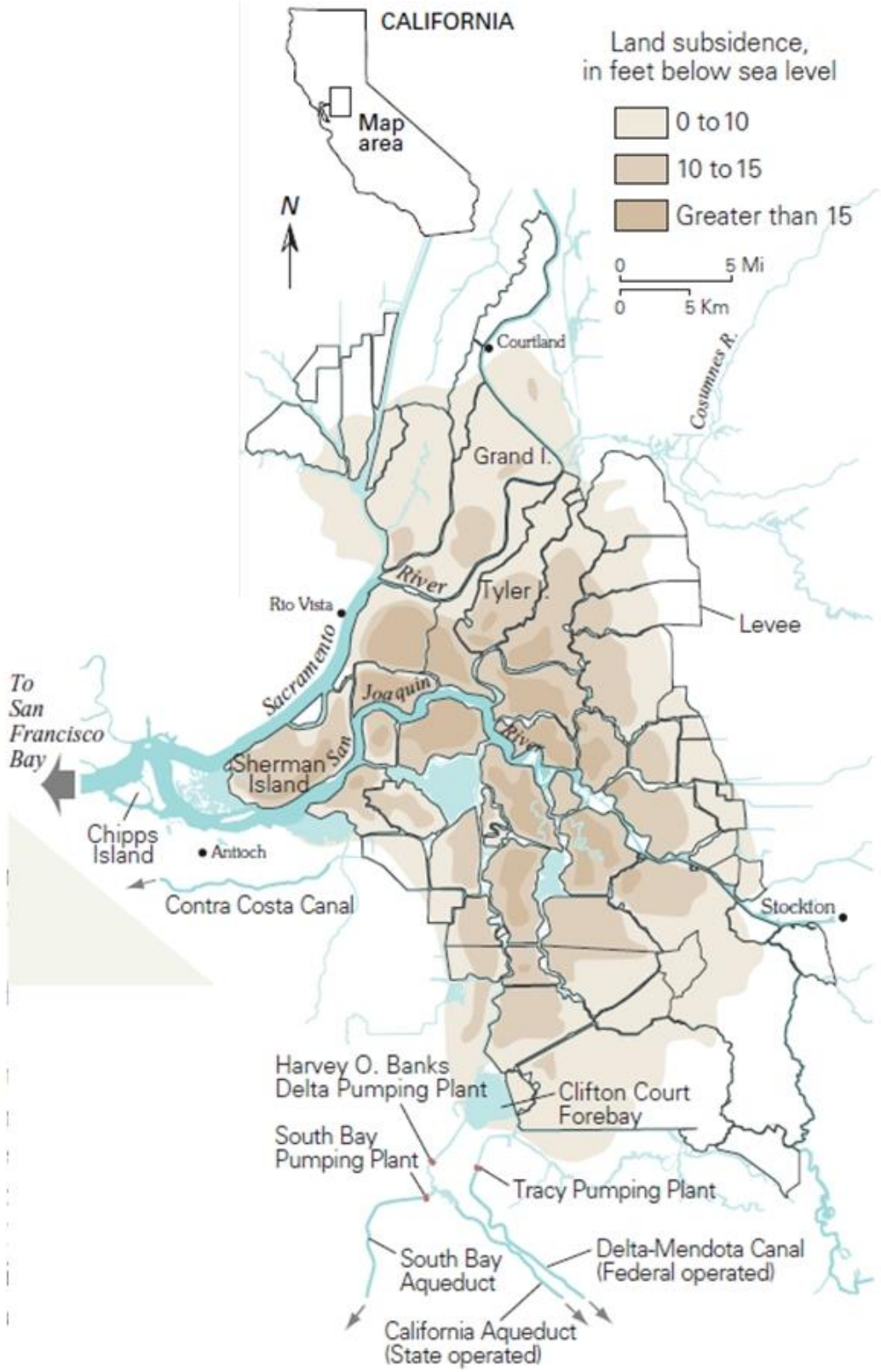
A less significant, terms of acreage effected, but no less severe problem arising from subsidence of bayward Delta islands is salt water intrusion of subsurface fresh water. River water runoff during years of comparatively normal precipitation has been sufficient to retard salt water from intruding into the fresh water table. However, the rate of salt water intrusion of west Delta islands increases during years of below normal precipitation, causing damage to crops irrigated with subsurface water contaminated with salt water. Efforts to develop salt tolerant crops and a reduction in the subsidence rate might enable farming to continue on west Delta islands for a limited time. However, continuing crop production accelerates peat oxidation and potentially lessens irrigation water quality from salt water intrusion of subsurface fresh water sources.

Subsidence and Levee Failure

Island subsidence has reduced the stability of Delta levees, increasing the risk of failure (see the discussion of Levee Failure in Section 4.2.17). Embankment and foundation materials for most Delta levees are substandard, adding the risk of failure during seismic events. Subsidence of levees and crop covered islands is occurring, though levees lower at a slower rate due primarily to a slow oxidation process from reduced tillage and irrigation.

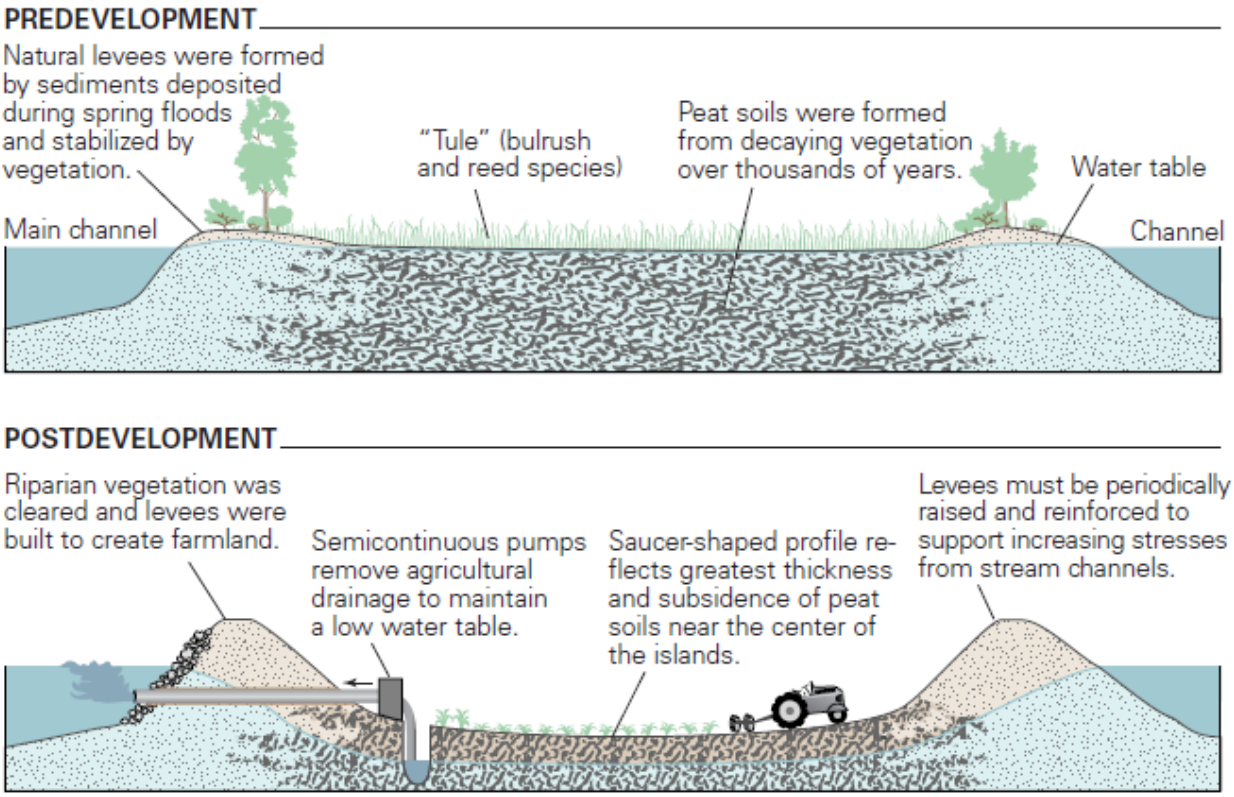
As shown in Figure 4-57, many of the islands in the central Delta are presently 10 to nearly 25 feet below sea level. The land surface profile of many islands is somewhat saucer-shaped, because subsidence is greater in the thick peat soils near their interior than in the more mineral-rich soils near their perimeter. As subsidence progresses, the levees themselves must be regularly maintained and periodically raised and strengthened to support the increasing stresses on their banks.

Figure 4-57 Land Subsidence in the Sacramento-San Joaquin Delta



Source: USGS Publication "Sacramento-San Joaquin Delta: The Sinking Heart of the State." Report FS-005-00

Figure 4-58 Subsidence in Peat Soils on the Delta Islands



Source: USGS Publication "Sacramento-San Joaquin Delta: The Sinking Heart of the State." Report FS-005-00

When levee breaches occur on deeply-subsided islands, rapid filling draws brackish water into the Delta, temporarily degrading water quality over a large region. Known colloquially as the "Big Gulp," the water quality impact of island filling is principally a function of the magnitude and location of anthropogenic accommodation space (vertical space once filled by peat but that has now subsided). Island flooding directly affects tidal prism dynamics within the Delta, with the potential for long-term degradation of water quality. The magnitude of the impact depends upon the location of flooded islands, the volume of water within the island, and the geometry of breach openings.

The costs of levee construction and maintenance are borne by the State of California and the Federal government, as well as by local reclamation districts. These costs increase as subsidence progresses, forcing levees to be built higher and stronger. Between 1981 and 1986, the total amount spent on emergency levee repairs related to flooding was about $97 million, and in 1981 to 1991 the amount spent on routine levee maintenance was about $63 million. Annual cost of repair and maintenance of Delta levees in the 1980s averaged about $20 million per year.

Subsidence and Natural Resources Protection

The Delta provides at least a portion of the water supply for about two-thirds of California's population, and provides a migratory pathway for four fish that are listed as endangered or threatened pursuant to the federal Endangered Species Act.

Past Occurrences

Disaster Declaration History

There have been no disaster declarations related to subsidence in Sacramento County.

NCDC Events

The NCDC database shows no past occurrences of subsidence.

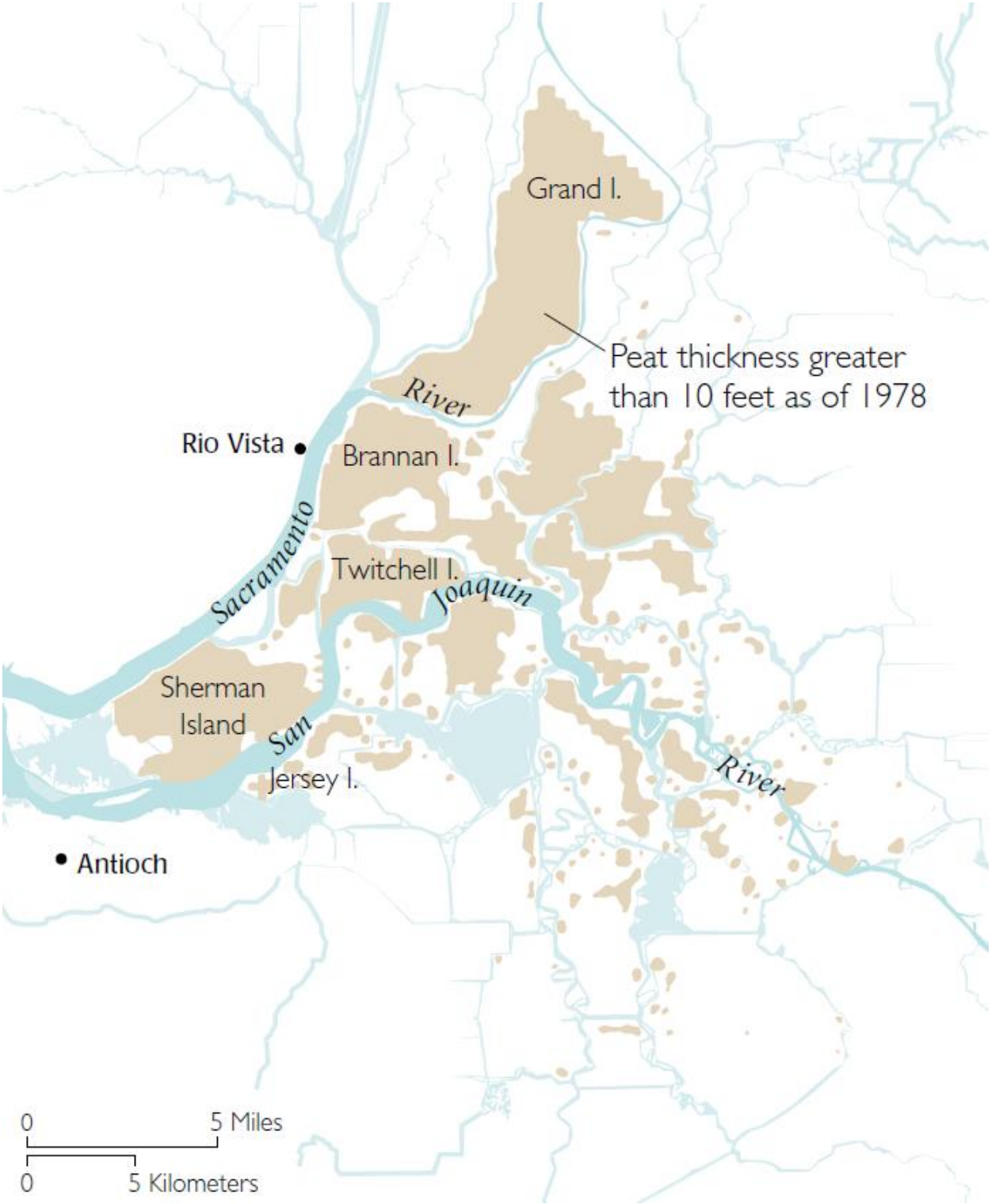
HMPC Events

Subsidence has been occurring since the late 1800s, when the land in the Delta region first was converted to farmland. Reclamation projects continued, and by the 1930s the levee system was complete. The best evidence for long-term rates of subsidence comes from two sources—measurements of the exposure of transmission-line foundations on Sherman and Jersey Islands in the western Delta and repeated leveling surveys on Mildred and Bacon Islands and Lower Jones Tract in the southern Delta. The transmission lines in the western Delta were installed in 1910 and 1952. They are founded on pylons driven down to a solid substrate, so that comparison of the original foundation exposure with the current exposure allows estimates of soil loss. The southern Delta transect was surveyed 21 times between 1922 and 1981; in 1983 further surveys were precluded when Mildred Island flooded. Both data sets indicate long-term average subsidence rates of 1 to 3 inches per year, but also suggest a decline in the rate of subsidence over time, probably due to a decreased proportion of readily oxidizable peat in the near surface. In fact, rates of elevation loss measured at three selected sites in 1990 to 1992 were less than 0.4 inches per year, consistent with the inferred slowing of subsidence. However, all of these sites were near island edges, and likely underestimate the average island-wide elevation loss.

Likelihood of Future Occurrences

Highly Likely—Subsidence in the Delta has been a historical problem, occurring on an annual basis. Although changes in farming techniques and improved land use practices have slowed levels of subsidence, subsidence continues to occur. This is unlikely to change in the near future. Areas with peat thickness over 10 feet have a great potential for continued subsidence. These areas are shown in Figure 4-59.

Figure 4-59 Peat Thickness Estimates



Source: California Department of Water Resources, 1998

Climate Change and Subsidence

Climate change may further contribute to subsidence in the County, by increasing evapotranspiration rates for agriculture and other vegetation and by increasing periods of drought, both of which can increase demand for water, accelerate groundwater pumping and the drilling of new groundwater wells and lead to further lowering of the groundwater table.

4.2.20. Volcano

Hazard/Problem Description

The California State Hazard Mitigation Plan identifies volcanoes as one of the hazards that can adversely impact the State. However, there have been few losses in California from volcanic eruptions. Of the approximately 20 volcanoes in the State, only a few are active and pose a threat. Of these, Long Valley Caldera and Lassen Peak are the closest to Sacramento County. The Long Valley area is considered to be an active volcanic region of California and includes features such as the Mono-Inyo Craters, Long Valley Caldera, and numerous active and potential faults. Figure 4-60 shows volcanoes in or near California and the location of the Lassen Peak and the Long Valley area relative to the Sacramento County Planning Area.

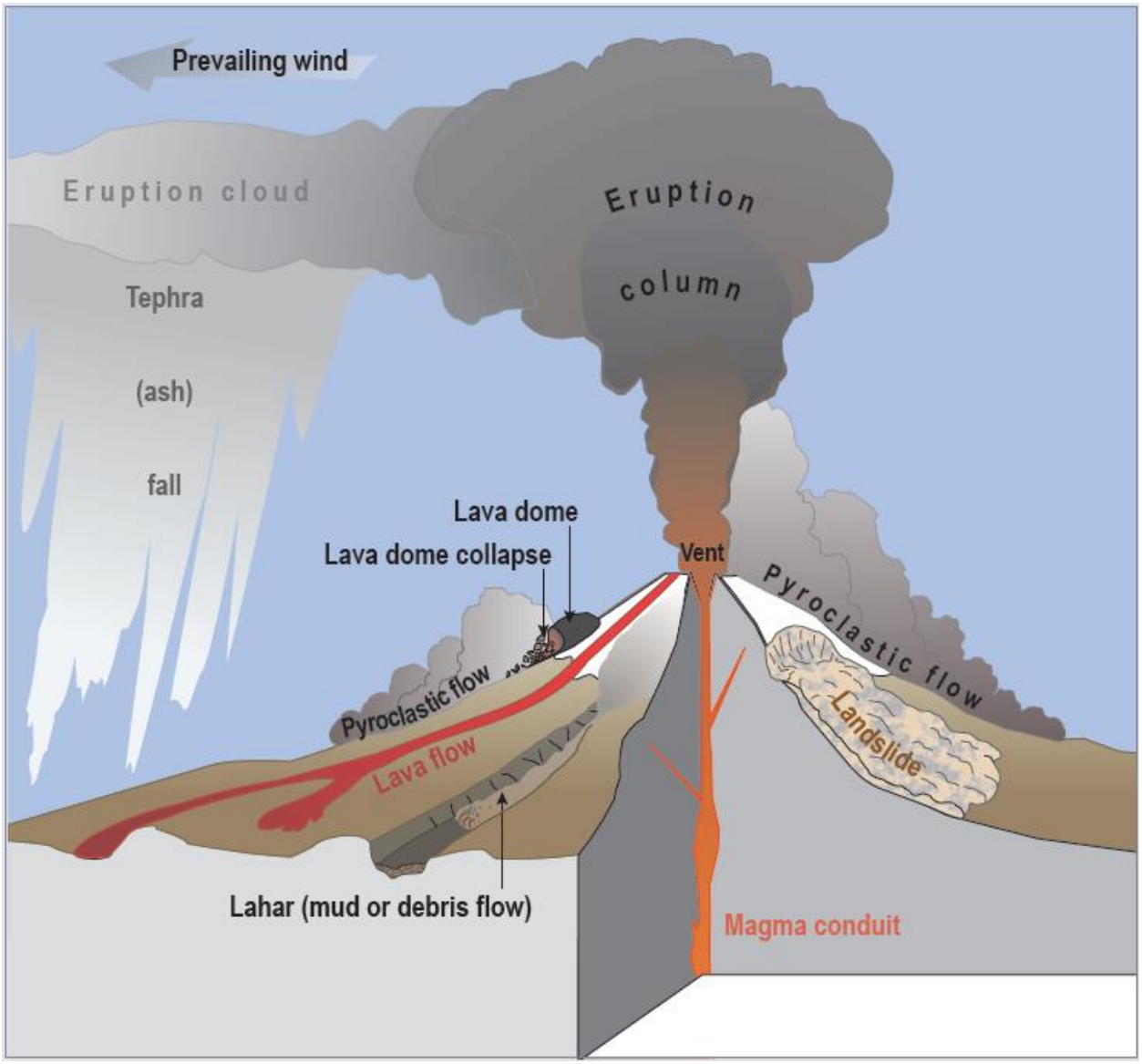
Figure 4-60 Active Volcanoes in California and in the Sacramento County Area

Source: 2013 State of California Hazard Mitigation Plan

As shown in Figure 4-61, active volcanoes pose a variety of natural hazards. Explosive eruptions blast lava fragments and gas into the air with tremendous force. The finest particles (ash) billow upward, forming an eruption column that can attain stratospheric heights in minutes. Simultaneously, searing volcanic gas laden with ash and coarse chunks of lava may sweep down the flanks of the volcano as a pyroclastic flow. Ash in the eruption cloud, carried by the prevailing winds, is an aviation hazard and may remain suspended for

hundreds of miles before settling to the ground as ash fall. During less energetic effusive eruptions, hot, fluid lava may issue from the volcano as lava flows that can cover many miles in a single day. Alternatively, a sluggish plug of cooler, partially solidified lava may push up at the vent during an effusive eruption, creating a lava dome. A growing lava dome may become so steep that it collapses, violently releasing pyroclastic flows potentially as hazardous as those produced during explosive eruptions.

Figure 4-61 Volcanoes and Associated Hazards

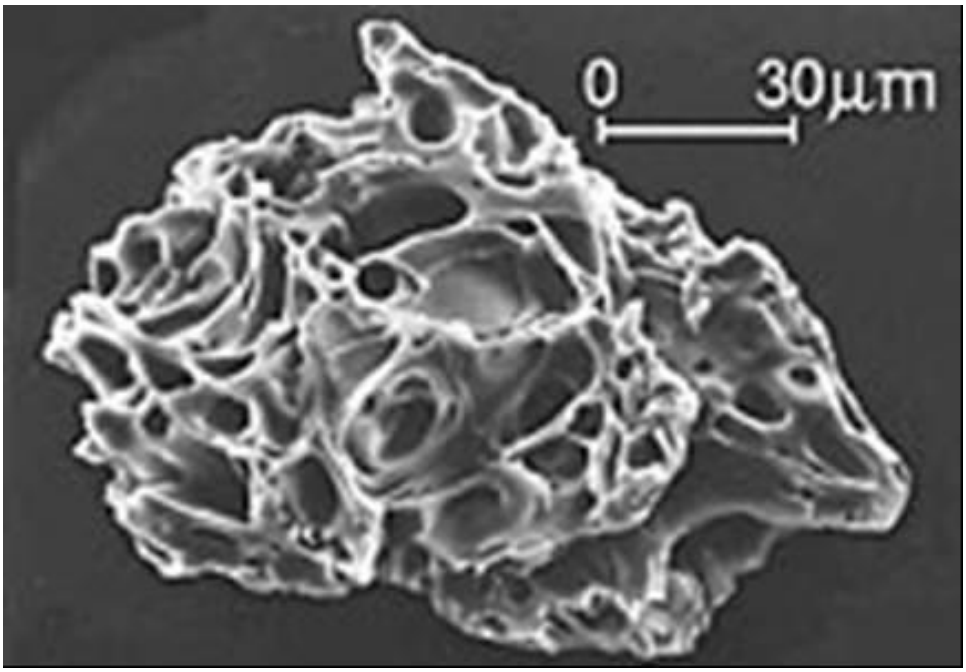


Source: USGS Publication 2014-3120

During and after an explosive or effusive eruption, loose volcanic debris on the flanks of the volcano can be mobilized by heavy rainfall or melting snow and ice, forming powerful floods of mud and rock (lahars) resembling rivers of wet concrete. These can rush down valleys and stream channels as one of the most destructive types of volcano hazards.

Populations living near volcanoes are most vulnerable to volcanic eruptions and lava flows, although volcanic ash can travel and affect populations many miles away and cause problems for aviation. The USGS notes specific characteristics of volcanic ash. Volcanic ash is composed of small jagged pieces of rocks, minerals, and volcanic glass the size of sand and silt, as shown in Figure 4-62. Very small ash particles can be less than 0.001 millimeters across. Volcanic ash is not the product of combustion, like the soft fluffy material created by burning wood, leaves, or paper. Volcanic ash is hard, does not dissolve in water, is extremely abrasive and mildly corrosive, and conducts electricity when wet.

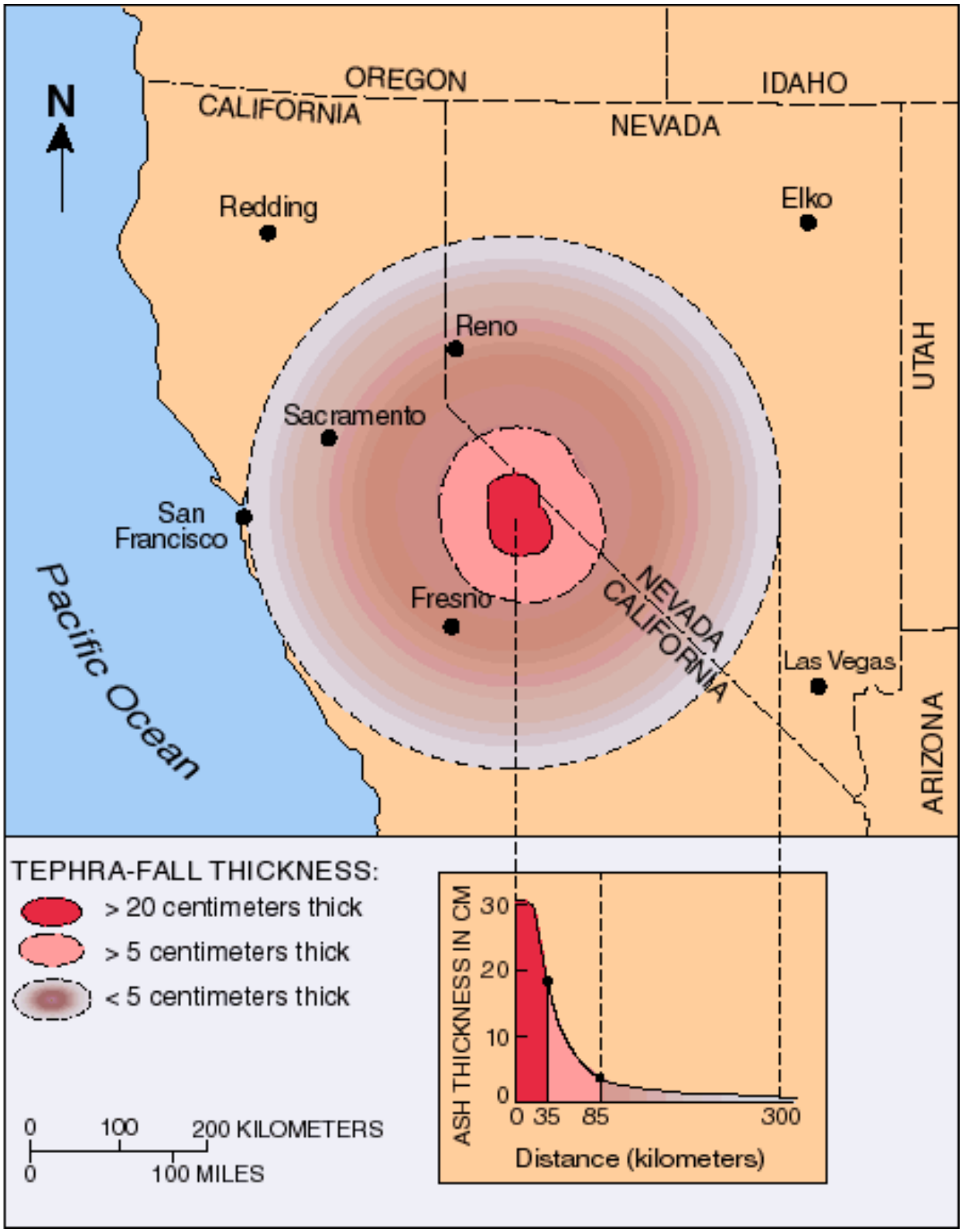
Figure 4-62 Ash Particle from 1980 Mt. St Helens Eruption Magnified 200 Times



Source: US Geological Survey: Volcanic Ash: Effect & Mitigation Strategies. http://volcanoes.usgs.gov/ash/properties.html.

Volcanic ash is formed during explosive volcanic eruptions. Explosive eruptions occur when gases dissolved in molten rock (magma) expand and escape violently into the air, and also when water is heated by magma and abruptly flashes into steam. The force of the escaping gas violently shatters solid rocks. Expanding gas also shreds magma and blasts it into the air, where it solidifies into fragments of volcanic rock and glass. Once in the air, wind can blow the tiny ash particles tens to thousands of miles away from the volcano. Figure 4-63 is a volcanic hazard's ash dispersion map for the Long Valley Caldera, which could possible affect Sacramento County.

Figure 4-63 Volcanic Hazards Ash Dispersion Map for the Long Valley Caldera



Source: US Geological Survey

The average grain-size of rock fragments and volcanic ash erupted from an exploding volcanic vent varies greatly among different eruptions and during a single explosive eruption that lasts hours to days. Heavier, large-sized rock fragments typically fall back to the ground on or close to the volcano and progressively smaller and lighter fragments are blown farther from the volcano by wind. Volcanic ash, the smallest particles (2 mm in diameter or smaller), can travel hundreds to thousands of kilometers downwind from a volcano depending on wind speed, volume of ash erupted, and height of the eruption column.

The size of ash particles that fall to the ground generally decreases exponentially with increasing distance from a volcano. Also, the range in grain size of volcanic ash typically diminishes downwind from a volcano (becoming progressively smaller). At specific locations, however, the distribution of ash particle sizes can vary widely. Based on Figure 4-63, the USGS estimated that ash of up to 2" could fall in areas of Sacramento County.

Past Occurrences

Disaster Declarations

There have been no disaster declarations related to volcano.

NCDC Events

The NCDC does not track volcanic activity.

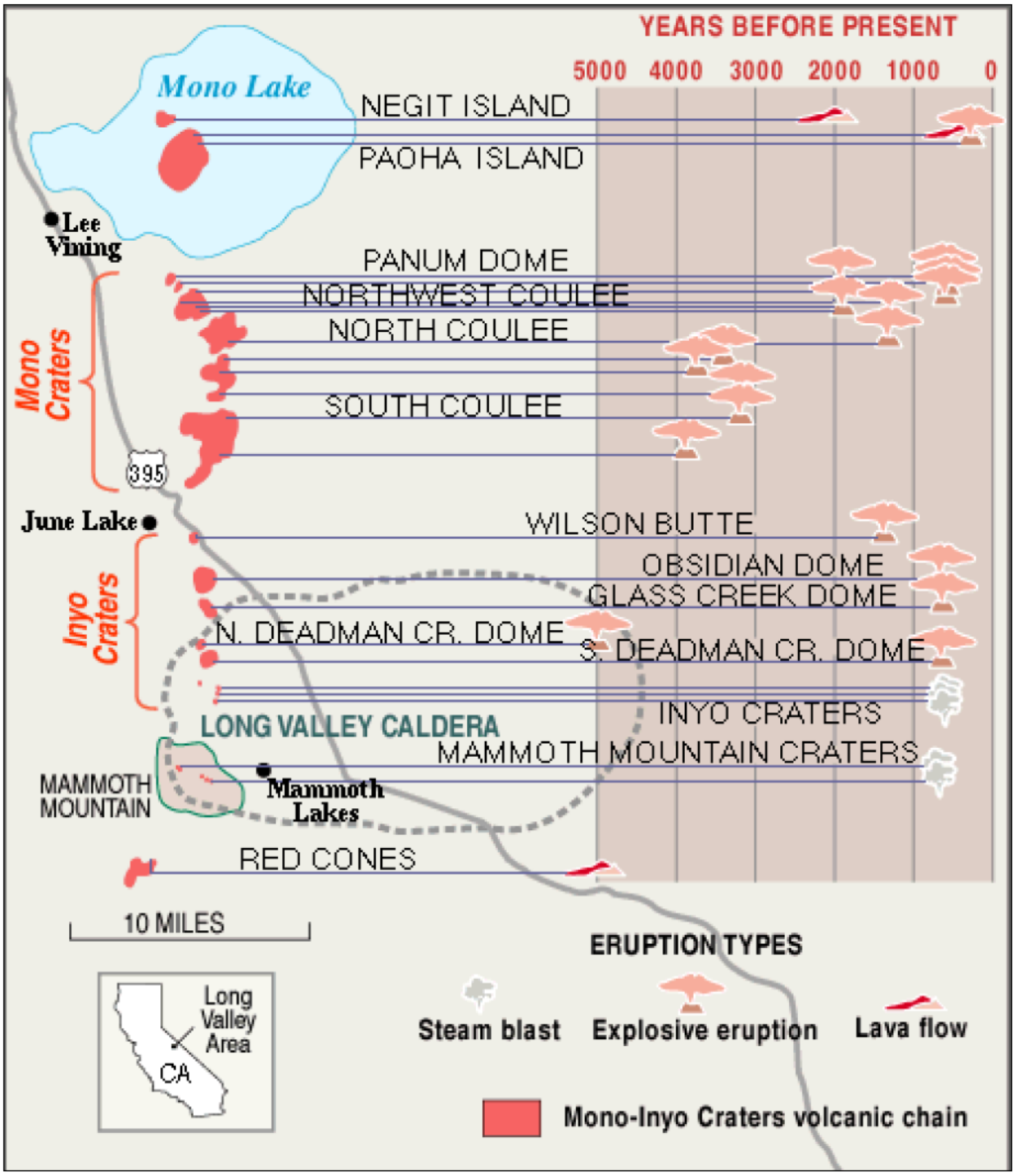
HMPC Events

The HMPC noted no volcanic events.

USGS Events

During the past 1,000 years there have been at least 12 volcanic eruptions in the Long Valley area. This activity is likely to continue long into the future. The Long Valley Caldera and Mono-Inyo Craters volcanic chain has a long history of geologic activity that includes both earthquakes and volcanic eruptions. Volcanoes in the Mono-Inyo Craters volcanic chain have erupted often over the past 40,000 years. As shown in Figure 4-64. over the past 5,000 years, small to moderate eruptions have occurred at various sites along the Mono-Inyo Craters volcanic chain at intervals ranging from 250 to 700 years.

Figure 4-64 Volcanic Activity in the Mono-Inyo Craters Volcano Chain in the Past 5,000 Years



Source: U.S. Geological Survey

As recently as 1980 four large earthquakes (greater than magnitude 6 on the Richter Scale) and numerous relatively shallow earthquakes occurred in the area. Since then, earthquakes and associated uplift and deformation in the Mammoth Lakes Caldera have continued. Because such activities are common

precursors of volcanic eruptions, the U.S. Geological Survey closely monitors the unrest in the region. There are no records of past impacts from volcanic eruptions to the Sacramento County Planning Area.

Likelihood of Future Occurrences

Unlikely—According to the U.S. Geological Survey, the pattern of volcanic activity over the past 5,000 years suggests that the next eruption in the Long Valley area will most likely happen somewhere along the Mono-Inyo volcanic chain. However, the probability of such an eruption occurring in any given year is less than 1 percent. The next eruption will most likely be small and similar to previous eruptions along the Mono-Inyo volcanic chain during the past 5,000 years (see Figure 4-64 above). According to the State Multi-Hazard Mitigation Plan, only Medicine Lake, Mount Shasta, Lassen Peak, and the Long Valley Caldera are considered active and pose a threat of future activity. However, due to the location of the Planning Area relative to the active volcanoes, the State Plan does not consider Sacramento County to be vulnerable to eruption and/or ash from these volcanoes.

4.2.21. Wildfire (Burn Area/Smoke)

Hazard/Problem Description

Wildland fire is an ongoing concern for the Sacramento County Planning Area. Generally, the fire season extends from early spring through late fall of each year during the hotter, dryer months. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds.

Throughout California, communities are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas and subsequent fire suppression practices have affected the natural cycle of the ecosystem. While wildfire risk is predominantly associated with wildland urban interface (WUI) areas, significant wildfires can also occur in heavily populated areas. The wildland urban interface is a general term that applies to development adjacent to landscapes that support wildland fire. Wildland fires affect grass, forest, and brushlands, as well as any structures located within them.

WUI fires are the most damaging. WUI fires occur where the natural and urban development intersect. Even relatively small acreage fires may result in disastrous damages. WUI fires occur where the natural forested landscape and urban-built environment meet or intermix. The damages are primarily reported as damage to infrastructure, built environment, loss of socio-economic values and injuries to people.

The pattern of increased damages is directly related to increased urban spread into historical forested areas that have wildfire as part of the natural ecosystem. Many WUI fire areas have long histories of wildland fires that burned only vegetation in the past. However, with new development, a wildland fire following a historical pattern now burns developed areas. WUI fires can occur where there is a distinct boundary between the built and natural areas or where development or infrastructure has encroached or is intermixed in the natural area. WUI fires may include fires that occur in remote areas that have critical infrastructure easements through them, including electrical transmission towers, railroads, water reservoirs, communications relay sites or other infrastructure assets.

Wildfire and urban wildfire are an ongoing concern for Sacramento County. Generally, the fire season extends from early spring to late fall. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions when combined with high winds and years of drought increase the potential for a wildfire to occur. Urban wildfires often occur in those areas where development has expanded into the rural areas. A fire along this urban/rural interface can result in major losses of property and structures. Generally, there are three major factors that sustain wildfires and allow for predictions of a given area's potential to burn. These factors include fuel, topography, weather, and human actions.

- **Fuel**. Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree needles and leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source, are man-made structures and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Light fuels such as grasses burn quickly and serve as a catalyst for fire spread. The volume of available fuel is described in terms of Fuel Loading. Certain areas in and surrounding Sacramento County are extremely vulnerable to fires as a result of dense grassy vegetation combined with a growing number of structures being built near and within rural lands. In the northern portion of the County, such as Folsom, an increase in forested areas increase the risk and vulnerability of wildfire.
- **Topography**. An area's terrain and land slopes affect its susceptibility to wildfire spread. Fire intensities and rates of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The natural arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes. Most of the Sacramento area is relatively flat, thus limiting the influence of this factor on wildfire behavior.
- **Weather**. Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out the fuels that feed the wildfire creating a situation where fuel will more readily ignite and burn more intensely. Wind is the most treacherous weather factor. The greater a wind, the faster a fire will spread, and the more intense it will be. Winds can be significant at times in Sacramento County. However, it should be noted that the winds generally occur during the winter storm season, not during the summer, fire season. In addition to high winds, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. Related to weather is the issue of recent drought conditions contributing to concerns about wildfire vulnerability. During periods of drought, the threat of wildfire increases.
- **Human Actions** – Most wildfires are ignited by human action, the result of direct acts of arson, carelessness, or accidents. Many fires originate in populated areas along roads and around homes, and are often the result of arson or careless acts such as the disposal of cigarettes, use of equipment or debris burning. Recreation areas that are located in high fire hazard areas also result in increased human activity that can increase the potential for wildfires to occur.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Economic losses could also result. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides, and erosion during the rainy season.

Consequently, wildland fires that burn in natural settings with little or no development are part of a natural ecological cycle and may actually be beneficial to the landscape. Century old policies of fire exclusion and aggressive suppression have given way to better understanding of the importance fire plays in the natural cycle of certain forest types.

Past Occurrences

Disaster Declaration History

There were no FEMA or Cal OES disaster declarations associated with wildfire in the Sacramento County Planning Area. There was one USDA Secretarial Disaster Declaration (S3626) for wildfire in 2014.

NCDC Events

The NCDC has tracked wildfire events in the County dating back to 1993. Events in Sacramento County are shown in Table 4-36.

Table 4-36 NCDC Wildfire Events in Sacramento County 1993 to 12/31/2015

Date	Event	Injuries (direct)	Deaths (direct)	Property Damage	Crop Damage	Injuries (direct)	Deaths (direct)
7/4/2014	Wildfire	0	0	$2,500,000	$0	0	0
7/22/2015	Wildfire	0	0	$0	$0	0	0
7/27/2015	Wildfire	0	0	$500,000	$0	0	0
Totals		**0**	**0**	**$3,000,000**	**$0**	**0**	**0**

Source: NCDC

*Deaths, injuries, and damages are for the entire event, and may not be exclusive to the County.

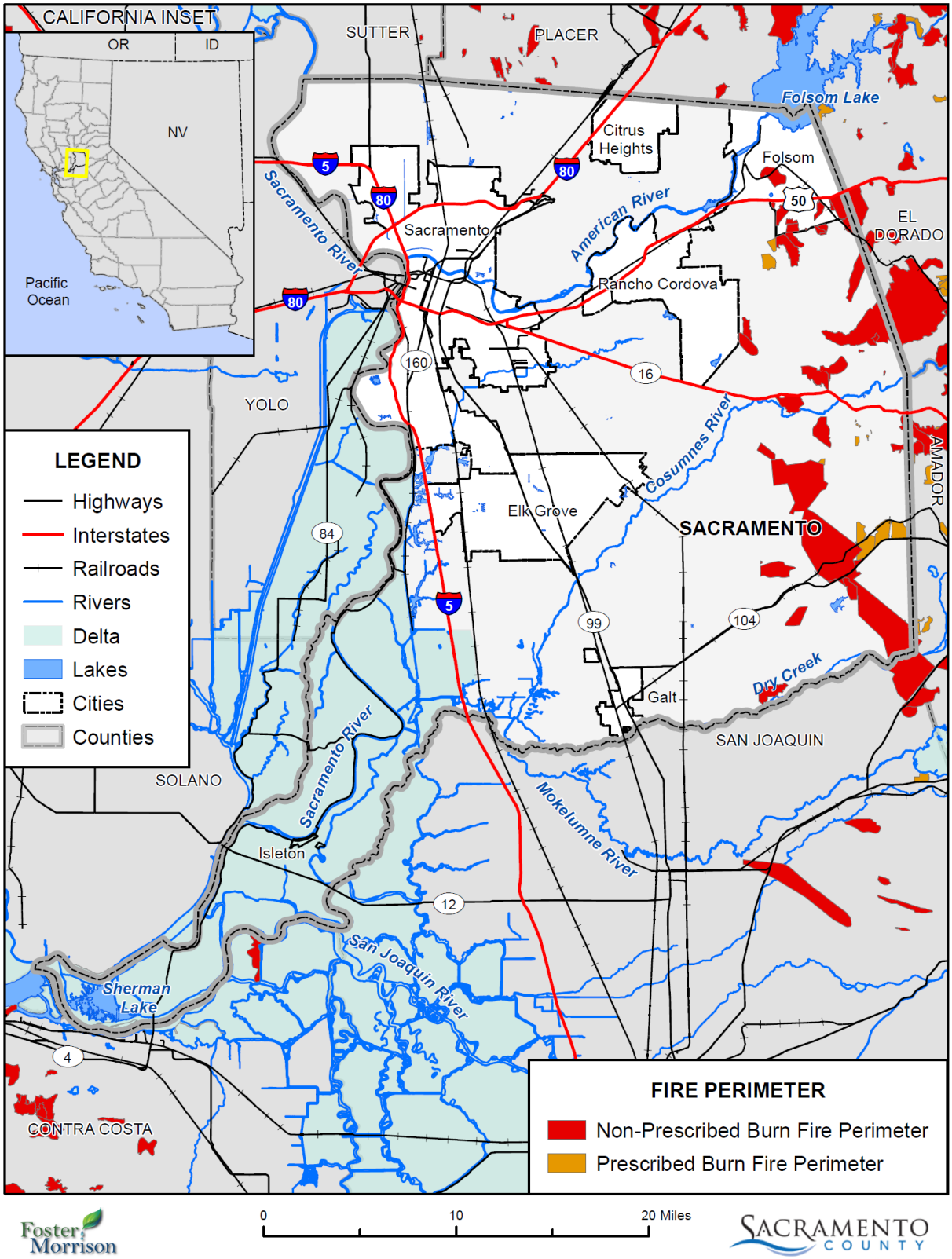
CAL FIRE Events

CAL FIRE, USDA Forest Service Region 5, Bureau of Land Management (BLM), the National Park Service (NPS), Contract Counties and other agencies jointly maintain a comprehensive fire perimeter GIS layer for public and private lands throughout the state. The data covers fires back to 1878 (though the first recorded incident for the County was in 1950). For the National Park Service, Bureau of Land Management, and US Forest Service, fires of 10 acres and greater are reported. For CAL FIRE, timber fires greater than 10 acres, brush fires greater than 50 acres, grass fires greater than 300 acres, and fires that destroy three or more residential dwellings or commercial structures are reported. CAL FIRE recognizes the various federal, state, and local agencies that have contributed to this dataset, including USDA Forest Service Region 5, BLM, National Park Service, and numerous local agencies.

Fires may be missing altogether or have missing or incorrect attribute data. Some fires may be missing because historical records were lost or damaged, fires were too small for the minimum cutoffs, documentation was inadequate, or fire perimeters have not yet been incorporated into the database. Also, agencies are at different stages of participation. For these reasons, the data should not be used for statistical or analytical purposes.

The data provides a reasonable view of the spatial distribution of past large fires in California. Using GIS, fire perimeters that intersect Sacramento County were extracted and are listed in Table 4-37. There are 50 fires recorded in this database for Sacramento County. 44 of these burned areas greater than 50 acres. Each of them was tracked by Cal Fire; Cal Fire last updated this database in June 2014. Table 4-37 lists each fire's date, cause, name, and acreage burned in Sacramento County. Figure 4-65 shows fire history for the County, colored by burn type. This map contains fires from 1950 to 2014.

Figure 4-65 Sacramento County Wildfire History



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 05/2015 Fire History Data; Map Date: 05/2016.

Table 4-37 Sacramento County Wildfire History 1950 to 2014

Alarm Date	Fire Name	Cause	Prescribed / Non-prescribed Burn	Acres
6/6/1950	Russi	Unknown / Unidentified	Non-prescribed Burn	534
6/19/1950	Questo Ranch	Unknown / Unidentified	Non-prescribed Burn	878
9/13/1950	Cavitt	Unknown / Unidentified	Non-prescribed Burn	339
10/4/1962	Roadside #31 Series	Unknown / Unidentified	Non-prescribed Burn	352
7/10/1964	Joerger	Unknown / Unidentified	Non-prescribed Burn	1514
6/22/1968	Van Vleck	Unknown / Unidentified	Non-prescribed Burn	2665
6/18/1973	Russell	Unknown / Unidentified	Non-prescribed Burn	408
6/7/1974	Cosumnes School	Unknown / Unidentified	Non-prescribed Burn	582
6/7/1974	Grantline	Unknown / Unidentified	Non-prescribed Burn	311
6/20/1976	Gill	Unknown / Unidentified	Non-prescribed Burn	715
7/29/1980	Michigan Bar	Unknown / Unidentified	Non-prescribed Burn	848
6/14/1981	Meiss	Miscellaneous	Non-prescribed Burn	14126
6/18/1981	Joerger Series	Equipment Use	Non-prescribed Burn	1676
6/20/1981	Silva	Arson	Non-prescribed Burn	248
9/21/1981	Prairie City	Arson	Non-prescribed Burn	593
7/6/1983	Clay	Equipment Use	Non-prescribed Burn	405
7/14/1983	White Rock	Miscellaneous	Non-prescribed Burn	169
8/28/1983	Meiss	Equipment Use	Non-prescribed Burn	603
3/1/1985	Arroyo Seco #3		Prescribed Burn	406
7/20/1986	White Rock Series	Arson	Non-prescribed Burn	7
7/20/1986	White Rock Series	Arson	Non-prescribed Burn	82
7/20/1986	White Rock Series	Arson	Non-prescribed Burn	162
7/20/1986	White Rock Series	Arson	Non-prescribed Burn	282
7/20/1986	White Rock Series	Arson	Non-prescribed Burn	33
6/17/1989	Trunk Handle (Unit1)		Prescribed Burn	56
6/17/1989	Trunk Handle (Unit2)		Prescribed Burn	178
6/21/1992	Smud #1	Powerline	Non-prescribed Burn	1179
6/26/1996	Prairie City		Prescribed Burn	316
8/2/1996	Scott	Arson	Non-prescribed Burn	8828
6/16/2001	Vanvleck		Prescribed Burn	23
6/23/2001	Bevan	Equipment Use	Non-prescribed Burn	687
7/4/2001	Dillard Wf2	Playing with Fire	Non-prescribed Burn	11
7/5/2001	Payen	Miscellaneous	Non-prescribed Burn	302
7/31/2001	Clay	Arson	Non-prescribed Burn	526
7/31/2001	Michigan #4	Arson	Non-prescribed Burn	55

Alarm Date	Fire Name	Cause	Prescribed / Non-prescribed Burn	Acres
6/8/2002	Twin	Arson	Non-prescribed Burn	322
6/12/2002	Pony	Powerline	Non-prescribed Burn	702
7/1/2002	White	Vehicle	Non-prescribed Burn	81
9/16/2002	Puerto	Arson	Non-prescribed Burn	17
10/10/2002	White #2	Unknown / Unidentified	Non-prescribed Burn	170
6/12/2003	Cosumnes River Preserve #2		Prescribed Burn	70
7/15/2003	Cosumnes River Preserve #1		Prescribed Burn	433
4/4/2004	Scott	Unknown / Unidentified	Non-prescribed Burn	609
9/26/2005	Twin	Vehicle	Non-prescribed Burn	104
6/9/2006	CHANCE Ranch VMP		Prescribed Burn	560
6/14/2006	Van Vleck Ranch VMP		Prescribed Burn	57
6/12/2007	Chance Ranch VMP		Prescribed Burn	479
7/7/2011	Chance Ranch		Prescribed Burn	263
3/25/2012	Van Vleck		Prescribed Burn	3
5/28/2013	Prairie City OHV - Prairie City		Prescribed Burn	176

Source: CAL FIRE

HMPC Events

The HMPC also provided the following information on historical fires in the County.

- **Late 1850**s: The worst fire in Sacramento history leveled nine-tenths of the City.
- **September/October 2014 – King Fire**. While the King Fire did not burn ground in Sacramento County, it did affect the County. Production from the Upper American River Hydroelectric Power Plant was disrupted for 2 weeks, requiring an additional unbudgeted $37 million for replacement power, by far the largest cost compared to the approximately $4M in immediate physical damage.
- **7/2015 NOAA** (fires regional to Sacramento County) – Rocky Fire burned 69,000 acres in Lake, Yolo & Colusa Counties. 43 homes and 53 outbuildings were destroyed.
- A 25-acre fire in Elk Grove occurred on **June 9, 2015**. A grass fire that started about 1:30 p.m. at Bond and Waterman roads was driven by high, shifting winds. It quickly spread toward homes that border the field to the east and south. The fire damaged one Elk Grove home and prompted evacuation of several other residences before it was contained.

Likelihood of Future Occurrence

Highly Likely — From May to October of each year, Sacramento County faces a wildfire threat. Fires will continue to occur on an annual basis in the Sacramento County Planning Area. The threat of wildfire and potential losses constantly increase as human development and population increase in the wildland urban interface area in the County. This results in a highly likely rating for future occurrence.

Climate Change and Wildfire

Preliminary Draft - Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan (CAP), Ascent Environmental 2016 Analysis

According to the Sacramento County Phase 1 Vulnerability Assessment, contained within the 2016 Preliminary Draft CAP, which utilized Cal Adapt to model potential climate change impacts to Sacramento County, changes in precipitation patterns and increased temperatures associated with climate change will alter the distribution and character of natural vegetation and associated moisture content of plants and soils. Increased temperatures will increase the rate of evapotranspiration in plants, resulting in a greater presence of dry fuels in forests and grasslands and creating a higher potential for wildfire risks. Warmer temperatures will also create a more favorable habitat for bark beetles and other pests that will deteriorate tree health, increasing their vulnerability to wildfires. Thus, increasing heat coupled with declining precipitation can lead to a secondary impact of climate change – an increase in the frequency and intensity of wildfires. The Sacramento Metropolitan Fire District's CWPP also predicts an overall increase in the frequency and intensity of wildfires as a result of the changes associated with climate change.

Cal-Adapt's wildfire tool predicts the potential increase in the amount of burned areas for the year 2085, as compared to current (2010) conditions. Based on this model, Cal-Adapt predicts that wildfire risk in Sacramento County will increase slightly in the near term, and subside during mid-to late-century. However, wildfire models can vary depending on the parameters used. Cal-Adapt does not take landscape and fuel sources into account in their model. In all likelihood, in Sacramento County, precipitation patterns, high levels of heat, topography, and fuel load will determine the frequency and intensity of future wildfire.

Wildfires and Air Quality. In addition to a probable increase in wildfire risk, wildfires within the Sierra Nevada and areas outside the County affect air quality in Sacramento County and across the Sacramento Valley. Particulate matter from wildfire dissipates throughout the Central Valley degrading air quality conditions for short or extended periods of time. An increase in air pollutants can cause or exacerbate health conditions. The duration of wildfire-related particulate matter in the County's air is further linked to wind patterns (i.e., the Delta Breeze) originating from the Sacramento-San Joaquin Delta that disperse air pollutants north of the Sacramento Valley. However, during about half of the days from July to September (high fire season), a phenomenon called the "Schultz Eddy" prevents this from occurring. All of these factors will affect the severity of wildfire-related air pollution in Sacramento County. Climate change has already significantly lengthened California's fire season, as well as the intensity, frequency and size of individual wildfires around the state, and this trend is likely to continue without further mitigation. It is likely that Sacramento County will experience worsened air quality from increased wildfires throughout Northern California and even Oregon.

4.2.22. Natural Hazards Summary

Table 4-38 summarizes the results of the hazard identification and hazard profile for the Sacramento County Planning Area based on the updated hazard identification data and input from the HMPC. For each hazard profiled in Section 4.2, this table includes the likelihood of future occurrence and whether the hazard is considered a priority hazard for the Sacramento County Planning Area.

Table 4-38 Hazard Identification/Profile Summary and Determination of Priority Hazard: Sacramento County Planning Area

Hazard	Likelihood of Future Occurrence	Priority Hazard
Agricultural Hazards	Highly Likely	Y
Bird Strike	Highly Likely	Y
Climate Change	Highly Likely	Y
Dam Failure	Unlikely	Y
Drought and Water Shortage	Likely	Y
Earthquake	Occasional	Y
Earthquake: Liquefaction	Occasional	Y
Flood: 100/200/500-year	Occasional/Unlikely	Y
Flood: Localized Stormwater Flooding	Highly Likely	Y
Landslides	Unlikely	N
Levee Failure	Occasional	Y
River/Stream/Creek Bank Erosion	Highly Likely	Y
Severe Weather: Extreme Temperatures – Cold/Freeze	Likely	N
Severe Weather: Extreme Temperatures – Heat	Highly Likely	Y
Severe Weather: Fog	Highly Likely	N
Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning)	Highly Likely	Y
Severe Weather: Wind and Tornadoes	Highly Likely	N
Subsidence	Highly Likely	N
Volcano	Unlikely	N
Wildfire	Highly Likely	Y

4.3 Vulnerability Assessment

Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Requirement §201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

Requirement §201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Requirement §201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

With Sacramento County's hazards identified and profiled, the HMPC conducted a vulnerability assessment to describe the impact that each hazard would have on the Sacramento County Planning Area. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to natural hazards and estimates potential losses. This section focuses on the risks to the County as a whole. Data from the individual participating jurisdictions was also evaluated and is integrated here and in the jurisdictional annexes, and noted where the risk differs for a particular jurisdiction within the Planning Area.

This vulnerability assessment followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses. The vulnerability assessment first describes the total vulnerability and values at risk and then discusses vulnerability by hazard.

Data Sources

Data used to support this assessment included the following:

- ArkStorm at Tahoe - Stakeholder Perspectives on Vulnerabilities and Preparedness for an Extreme Storm Event in the Greater Lake Tahoe, Reno and Carson City Region. 2014.
- birdnature.com Pacific Flyway
- California Adaptation Planning Guide
- Cal-Adapt
- CAL FIRE GIS datasets
- California Department of Finance, E-1 Report
- California Department of Finance, E-4 Report
- California Department of Finance, P-1 Report
- California Department of Fish and Game's Natural Diversity Database
- California Department of Food and Agriculture

- California Native Plant Society
- California Office of Historic Preservation
- County GIS data (hazards, base layers, and assessor's data)
- Delta Risk Management Strategy. June 2011.
- Existing plans and studies
- Federal Aviation Administration National Wildlife Database
- FEMA's HAZUS-MH 2.2 GIS-based inventory data
- FEMA Digital Flood Insurance Rate Map. June 16, 2015.
- FEMA Sacramento County Flood Insurance Study. June 16, 2015.
- Liu, J.C., Mickley, L.J., Sulprizio, M.P. et al. Climatic Change. 138: 655. doi:10.1007/s10584-016-1762-6. 2016.
- Kenward, Alyson PhD, Adams-Smith, Dennis, and Raja, Urooj. Wildfires and Air Pollution – The Hidden Health Hazards of Climate Change. Climate Central. 2013.
- National Drought Mitigation Center – Drought Impact Reporter
- National Park Service – Historic American Buildings Survey and Historic American Engineering Record
- Personal interviews with planning team members and staff from the County and participating jurisdictions
- Preliminary Draft – Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan
- Sacramento County 2035 General Plan
- Sacramento County Department of Water Resources
- Sacramento County General Plan Environmental Impact Report
- Sacramento County General Plan Open Space Element Background
- Sacramento County of Governments Population Projections for 2008, 2020, and 2035
- Sacramento General Plan Background Report
- Sacramento Municipal Utility District Dam inundation maps
- South Sacramento Habitat Conservation Plan
- State Department of Water Resource's Delta Atlas
- Statewide GIS datasets compiled by the California Office of Emergency Services to support mitigation planning
- University of California – Integrated Pest Management Program
- US Census Bureau 2010 Household Population Estimates
- US Department of Agriculture Farm Service Agency
- US Fish and Wildlife Service
- US Fish and Wildlife Service's National Wetlands Inventory maps
- Written descriptions of inventory and risks provided by participating jurisdictions

4.3.1. Sacramento County Vulnerability and Assets at Risk

As a starting point for analyzing the Planning Area's vulnerability to identified hazards, the HMPC used a variety of data to define a baseline against which all disaster impacts could be compared. If a catastrophic disaster was to occur in the Planning Area, this section describes significant assets at risk in the Planning Area. Data used in this baseline assessment included:

- Total assets at risk;

- Critical facility inventory;
- Cultural, historical, and natural resources; and
- Growth and development trends.

Total Assets at Risk

The total assets at risk for Sacramento County is intended to capture the values associated with assessed assets located within the Sacramento County Planning Area. The 2016 GIS parcel layer, obtained from Sacramento County GIS and the 2015 Sacramento County Assessor's Data – Certified Roll obtained from the County Assessor was used for this analysis. This data provided by Sacramento County represents best available data.

Understanding the total assessed value of Sacramento County is a starting point to understanding the overall value of the Planning Area. When the total assessed values are combined with potential values associated with other community assets such as natural resources, cultural and historic resources, and public and private critical infrastructure, the big picture emerges as to what is potentially at risk and vulnerable to the damaging effects of natural hazards within the County Planning Area.

Data Limitations & Notations

Although based on best available data, the resulting information should only be used as an initial guide to overall values in the County.

The County GIS parcel data contained 445,518 records and the County Assessor data contained 474,727 records. Both tables were joined together within the GIS environment, and a total of 444,089 records were linked. In some cases, it is possible that the Assessor data may contain duplicate records under one parcel identification number (APN). For the purpose of this study, 1 Assessor record corresponds to 1 GIS parcel. In total, there were 2,429 Assessor records that are not included in the Total Assets at Risk Tables detailed below and are also excluded from further hazard analyses as these records were not matched to the GIS records.

In the event of a disaster, infrastructure and improvements are at the greatest risk of damage. Depending on the type of hazard and resulting damages, the land itself may not suffer a significant loss. For that reason, the values of infrastructure and improvements are of greatest concern. As such, it is critical to note a specific limitation to the assessed values data within the County, due to Proposition 13. Instead of adjusting property values annually, no adjustments are made until a property transfer occurs. As a result, overall property value information is most likely low and may not reflect current market or true potential loss values for properties within the County.

Methodology

Sacramento County's 2015 Assessor Data provided by the County Assessor's office, were used as the basis for the inventory of assessed values for both improved and unimproved parcels within the Planning Area. The source GIS parcel data used for this analysis provides the land and improved values assessed for each parcel, along with information about property use and ownership. The jurisdiction in which the parcel resides is also indicated in the source parcel data.

Sacramento County Use Codes provide detailed descriptive information about how each property is generally used, such as irrigated farm, apartment, restaurant, or industrial warehouse. The many use codes were logically grouped into the following simplified categories for the hazards analysis: Agricultural, Care/Health, Church/Welfare, Industrial, Miscellaneous, Office, Public/Utilities, Recreational, Residential, Retail/Commercial, Vacant, and No Data. Once Use Codes were grouped into categories, the number of total and improved parcels were inventoried by jurisdiction.

Values associated with land, and improved structure values were identified and summed in order to determine total values at risk in the Sacramento County Planning Area, and specific to each jurisdiction. Together, the Land Value and Improved Structure Value make up the total value associated with each identified parcel or asset. Improved parcel counts were based on the assumption that a parcel was improved if a structure value was present.

The Sacramento County Planning Area has a total land value of $38.87 billion, improved structure value of $90.9 billion, and a total value of $ $129.7 billion. Unincorporated Sacramento County has 157,818 improved parcels with a total value (both land and improvements) of close to $47.1 billion. Table 4-39 shows the total assets or exposure for the entire Sacramento County Planning Area, by jurisdiction. The values for the Sacramento County Planning Area are broken out by property use and are provided in Table 4-40. The values for unincorporated Sacramento County are broken out by property use type and are provided in Table 4-41. More information on assets at risk for each jurisdiction can be found in their respective annexes.

Table 4-39 Sacramento County Planning Area – Total Assets at Risk by Jurisdiction

Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Citrus Heights	24,479	23,505	$1,821,701,542	$4,048,528,628	$5,870,230,170
Elk Grove	51,367	47,402	$4,715,438,843	$12,083,762,602	$16,799,201,445
Folsom	23,072	20,597	$3,174,056,439	$7,683,643,073	$10,857,699,512
Galt	7,407	6,775	$458,313,638	$1,207,447,807	$1,665,761,445
Isleton	525	334	$16,873,341	$28,552,704	$45,426,045
Rancho Cordova	20,487	18,092	$1,920,584,312	$4,678,740,531	$6,599,324,843
City of Sacramento	145,102	131,085	$11,595,915,150	$29,128,632,405	$40,724,547,555
Unincorporated County	171,650	157,818	$15,118,073,272	$32,019,808,313	$47,137,881,585
Total	**444,089**	**405,608**	**$38,820,956,537**	**$90,879,116,063**	**$129,700,072,600**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Table 4-40 Sacramento County Planning Area – Total Assets at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	2,611	1,373	$767,692,839	$482,974,390	$1,250,667,229
Care/Health	657	578	$285,193,234	$1,868,570,719	$2,153,763,953

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Church/Welfare	1,152	1,000	$278,262,900	$1,288,936,722	$1,567,199,622
Industrial	4,323	3,737	$1,453,868,813	$3,697,428,752	$5,151,297,565
Miscellaneous	5,066	23	$10,160,514	$441,341	$10,601,855
Office	3,297	2,982	$1,812,286,238	$6,904,196,029	$8,716,482,267
Public/Utilities	8,148	27	$18,100,245	$17,165,874	$35,266,119
Recreational	339	247	$141,449,975	$302,617,324	$444,067,299
Residential	395,142	389,263	$28,744,320,158	$70,213,156,500	$98,957,476,658
Retail/Commercial	6,360	5,731	$3,189,209,185	$6,041,970,640	$9,231,179,825
Vacant	16,969	637	$2,118,289,106	$59,314,963	$2,177,604,069
No Data	25	10	$2,123,330	$2,342,809	$4,466,139
Total	**444,089**	**405,608**	**$38,820,956,537**	**$90,879,116,063**	**$129,700,072,600**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Table 4-41 Unincorporated Sacramento County – Total Assets at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	2,530	1,353	$679,920,436	$480,921,531	$1,160,841,967
Care/Health	320	297	$123,738,793	$560,655,489	$684,394,282
Church/Welfare	454	396	$127,584,797	$572,325,056	$699,909,853
Industrial	1,431	1,158	$537,734,087	$1,300,231,985	$1,837,966,072
Miscellaneous	1,648	13	$4,015,960	$110,909	$4,126,869
Office	1,114	1,019	$412,752,708	$1,204,253,632	$1,617,006,340
Public/Utilities	3,120	19	$10,432,623	$14,668,775	$25,101,398
Recreational	170	129	$63,680,892	$104,357,747	$168,038,639
Residential	153,070	151,060	$11,348,721,940	$25,812,071,443	$37,160,793,383
Retail/Commercial	2,189	2,031	$1,074,762,890	$1,942,470,967	$3,017,233,857
Vacant	5,592	339	$733,182,032	$26,933,649	$760,115,681
No Data	12	4	$1,546,114	$807,130	$2,353,244
Total	**171,650**	**157,818**	**$15,118,073,272**	**$32,019,808,313**	**$47,137,881,585**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facility Inventory

For purposes of this plan, a critical facility is defined as:

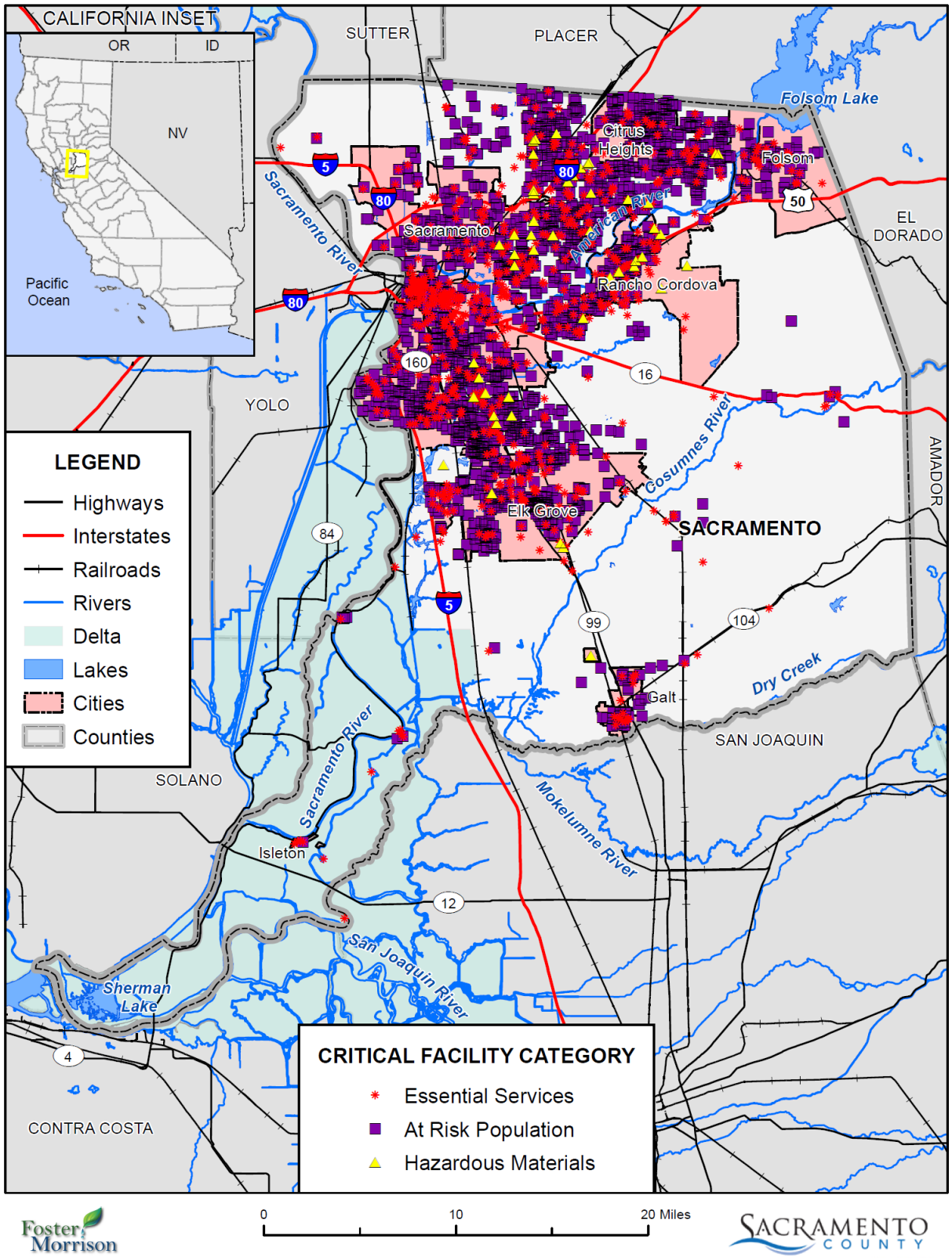
Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.

A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) Hazardous Materials Facilities, (3) At-risk Populations Facilities.

- Essential Services Facilities include, without limitation, public safety, emergency response, emergency medical, designated emergency shelters, communications, public utility plant facilities and equipment, and government operations. Sub-Categories:
  - ✓ Public Safety - Police stations, fire and rescue stations, emergency operations centers
  - ✓ Emergency Response - Emergency vehicle and equipment storage and essential governmental work centers for continuity of government operations.
  - ✓ Emergency Medical - Hospitals, emergency care, urgent care, ambulance services - EXCLUDING clinics, doctors offices, and non-urgent care medical facilities.
  - ✓ Designated Emergency Shelters
  - ✓ Communications - Main hubs for telephone, main broadcasting equipment for television systems, radio and other emergency warning systems - EXCLUDING towers, poles, lines, cables and conduits.
  - ✓ Public Utility Plant Facilities - including equipment for treatment, generation, storage, pumping and distribution (hubs for water, wastewater, power (EXCLUDING hydroelectric facilities) and gas - EXCLUDING towers, poles, power lines, buried pipelines, transmission lines, distribution lines and service lines.
  - ✓ Essential Government Operations - Public records, courts, jails, building permitting and inspection services, government administration and management, maintenance and equipment centers.
- At Risk Population Facilities include, without limitation, pre-schools, public and private primary and secondary schools, before and after school care centers with 12 or more students, daycare centers with 12 or more children, group homes, and assisted living residential or congregate care facilities with 12 or more residents.
- Hazardous Materials Facilities include, without limitation, any facility that could, if adversely impacted, release of hazardous material(s) in sufficient amounts during a hazard event that would create harm to people, the environment and property.

A fully detailed list of all critical facilities in the planning are can be found in Appendix E. A summary of critical facilities in the County can be found in Figure 4-66 and Table 4-42.

Figure 4-66 Sacramento County Planning Area –Critical Facilities Inventory



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

Table 4-42 Sacramento County Planning Area –Critical Facilities Inventory

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Airport	10
	Arena	1
	Bus Terminal	8
	Convention Center	1
	Corporation Yard	1
	Detention Basin	45
	Dispatch Center	2
	Drainage	6
	Emergency Evacuation Shelter	233
	Emergency Rooms	1
	EOC	2
	Fire Station	94
	Gas Storage	1
	General Acute Care Hospital	9
	Government Facilities	68
	Hospitals	1
	Light Rail Stop	52
	Medical Health Facility	200
	Police	22
	Sand Bag	5
	Stadium	3
	State and Fed Facilities	1
	State Facility	1
	Traffic Operations Center	1
	Train Station	1
	Urgent Care Facilities	2
	Vehicle and Equipment Storage	2
	Water Treatment Plant	3
	Essential Services Facilities Total	**776**
At Risk Population Facilities	Adult Day Care	26
	Adult Education School	12
	Adult Residential	308
	Alternative Education School	7
	Assisted Living Centers	58
	Charter School	25
	Children's Home	2

Critical Facility Category	Facility Type	Facility Count
	College/University	7
	Community Day School	9
	Day Care Center	416
	Detention Center	3
	Group Home	96
	Hotel	50
	Independent Study School	2
	Infant Center	33
	JAIL	1
	Prison	1
	Private Elementary School	65
	Private High School	30
	Private K-12 School	37
	Public Continuation High School	22
	Public Elementary School	230
	Public High School	35
	Public Middle School	43
	Residential Care/Elderly	414
	Residential Facility Chronically	1
	School	38
	School-Age Day Care Center	97
	Senior Center	1
	Social Rehabilitation Facility	4
	Special Education School	10
	Total	2,083
Hazardous Materials Facilities	Oil Collection Center	45
	OTHER	1
	Propane Storage	1
	Sewer Treatment Plant	2
	Total	**49**
Grand Total		**2,908**

Source: Sacramento County GIS

Cultural, Historical, and Natural Resources

Assessing Sacramento County's vulnerability to disaster also involves inventorying the cultural, historical, and natural, assets of the area. This step is important for the several reasons:

- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- In the event of a disaster, an accurate inventory of natural, historical and cultural resources allows for more prudent care in the disaster's immediate aftermath when the potential for additional impacts is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, for example, wetlands and riparian and sensitive habitat which help absorb and attenuate floodwaters and thus support overall mitigation objectives.

Cultural and Historical Resources

Sacramento County has a large stock of historically significant homes, public buildings, and landmarks. To inventory these resources, the HMPC collected information from a number of sources. The California Department of Parks and Recreation Office of Historic Preservation (OHP) was the primary source of information. The OHP is responsible for the administration of federally and state mandated historic preservation programs to further the identification, evaluation, registration, and protection of California's irreplaceable archaeological and historical resources. OHP administers the National Register of Historic Places, the California Register of Historical Resources, California Historical Landmarks, and the California Points of Historical Interest programs. Each program has different eligibility criteria and procedural requirements.

- The **National Register of Historic Places** is the nation's official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.
- The **California Register of Historical Resources** program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance and identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under the California Environmental Quality Act. The Register is the authoritative guide to the state's significant historical and archeological resources.
- **California Historical Landmarks** are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Landmarks #770 and above are automatically listed in the California Register of Historical Resources.
- **California Points of Historical Interest** are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Points designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register.

Historical resources included in the programs above are identified in Table 4-43.

Table 4-43 Sacramento County Planning Area Historical Resources

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
A. W. Clifton House, Compton Mansion (C17)			X		2/1/2002	Sacramento
Adams And Company Building (607)		X			5/22/1957	Sacramento
Alkali Flat Central Historic District (N1294)	X				7/26/1984	Sacramento
Alkali Flat North Historic District (N1279)	X				4/19/1984	Sacramento
Alkali Flat West Historic District (N1295)	X				7/26/1984	Sacramento
Alta Mesa Farm Bureau Hall (N1476)	X				1/7/1987	Wilton
American River Grange Hall #172 (P823)	X			X	5/15/1996	Rancho Cordova
Archway, The (P614)				X	5/18/1983	Rio Linda
B. F. Hastings Building (606)		X			5/22/1957	Sacramento
Blue Anchor Building (N1171)	X				2/3/1983	Sacramento
Brewster Building (N2099)	X				8/16/2000	Galt
Brewster House (N638)	X				6/23/1978	Galt
Brighton School (N952)	X				4/3/1981	Sacramento
Brown, John Stanford, House (N2252)	X				7/28/2004	Walnut Grove
Business & Professional Building, Consumer Affairs Building (C8)			X		2/10/2000	Sacramento
California Almond Growers Exchange Processing Facility (967)		X			10/1/1985	Sacramento
California Governor's Mansion (N60)	X				11/10/1970	Sacramento
California State Capitol (N222)	X				4/3/1973	Sacramento
California's Capitol Complex (872)	X	X			5/6/1974	Sacramento
California's First Passenger Railroad (526)		X			3/7/1955	Sacramento
Calpak Plant No. 11 (N1285)	X				5/17/1984	Sacramento
Camp Union, Sutterville (666)		X			11/5/1958	Sacramento
Capitol Extension District (N1288)	X				5/24/1984	Sacramento
Chevra Kaddisha (Home Of Peace Cemetery) (654)		X			7/28/1958	Sacramento
Chinese Diggings, Natoma Station Ground Sluice (P712)				X	11/22/1988	Folsom
Chung Wah Cemetery (N1918)	X				8/21/1995	Folsom

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
Cohn House (N1001)	X				1/21/1982	Folsom
Coloma Road at Nimbus Dam (746)		X			7/5/1960	Folsom
Coloma Road at Sutter's Fort (745)		X			7/5/1960	Sacramento
Coolot Company Building (N671)	X				9/20/1978	Sacramento
Cranston--Geary House (N2010)	X				1/23/1998	Sacramento
Crocker, E. B., Art Gallery (N86)	X	X			5/6/1971	Sacramento
Curran Farmhouse (P666)				X	12/17/1985	Sacramento
D. O. Mills Bank Building (609)		X			5/22/1957	Sacramento
Delta Meadows Site (N130)	X				11/5/1971	Locke
Dunlap's Dining Room (N1764)	X				4/2/1992	Sacramento
Eagle Theater (595)		X			5/22/1957	Sacramento
Eastern Star Hall (P754)	X			X	8/8/1991	Sacramento
Ebner's Hotel (602)		X			5/22/1957	Sacramento
Ehrhardt, William, House (N2209)	X				7/10/2003	Elk Grove
Elk Grove Grammar School / Elk Grove Unified School Distr (P717)				X	6/12/1989	Elk Grove
Elk Grove Historic District (N1553)	X				3/1/1988	Elk Grove
Fifteen Mile House-Overland Pony Express Route in California (698)		X			9/11/1959	Rancho Cordova
Fire Station No. 6 (N1686)	X				4/25/1991	Sacramento
Firehouse No. 3 (N1743)	X				10/29/1991	Sacramento
First Transcontinental Railroad (780)		X			11/20/1962	Sacramento
First Transcontinental Railroad-Western Base of The Sierra Nevada (780)		X			11/20/1962	Sacramento
Five Mile House-Overland Pony Express Route in California (697)		X			9/11/1959	Sacramento
Folsom Depot (N1035)	X				2/19/1982	Folsom
Folsom Powerhouse (N258)	X				10/2/1973	Folsom
Folsom-Overland Pony Express Route in California (702)		X			9/11/1959	Folsom
Galarneaux, Mary Haley, House (N2121)	X				2/12/2001	Sacramento
George Hack House (P800)				X	8/5/1994	Sacramento
Goethe House (N1036)	X				2/19/1982	Sacramento
Governor's Mansion (823)		X			6/7/1968	Sacramento
Grave of Alexander Hamilton Willard (657)		X			9/26/1958	Franklin

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
Grave of Elitha Cumi Donner Wilder (719)		X			12/2/1959	Elk Grove
Greene, John T., House (N1092)	X				4/15/1982	Sacramento
Headquarters of The Big Four (600)		X			5/22/1957	Sacramento
Heilbron House (N462)	X				12/12/1976	Sacramento
Hotel Regis (N1147)	X				10/29/1982	Sacramento
Hotel Senator (N782)	X				5/30/1979	Sacramento
Howe, Edward P., Jr., House (N1037)	X				2/19/1982	Sacramento
Hubbard-Upson House (N543)	X				12/2/1977	Sacramento
I Street Bridge (N1094)	X				4/22/1982	Sacramento
Imperial Theatre (N1148)	X				10/29/1982	Walnut Grove
Indian Stone Corral (N349)	X				4/16/1975	Orangevale
Isleton Chinese And Japanese Commercial Districts (N1674)	X				3/14/1991	Isleton
J Street Wreck (N1692)	X				5/16/1991	Sacramento
Jean Harvie School, Walnut Grove Community Center (P665)				X	8/20/1985	Walnut Grove
Joe Mound (N121)	X				10/14/1971	Sacramento
Johnson, J. Neely, House (N438)	X				9/13/1976	Sacramento
Joseph Hampton Kerr Homesite (P126)				X	6/6/1969	Sacramento
Judah, Theodore, School (N1985)	X				7/25/1997	Sacramento
Kuchler Row (N1121)	X				6/25/1982	Sacramento
Lady Adams Building (603)		X			5/22/1957	Sacramento
Lais, Charles, House (N1350)	X				2/28/1985	Sacramento
Libby Mcneil And Libby Fruit and Vegetable Cannery (N1050)	X				3/2/1982	Sacramento
Liberty Schoolhouse (P579)				X	12/21/1981	Galt
Locke Historic District (N87)	X				5/6/1971	Locke
McClatchy, C.K., Senior High School (N2148)	X				11/2/2001	Sacramento
Merchants National Bank of Sacramento (N1936)	X				2/16/1996	Sacramento
Merrium Apartments (N1654)	X				9/13/1990	Sacramento
Mesick House (N1002)	X				1/21/1982	Sacramento
Michigan (468)		X			8/30/1950	Sacramento
Motor Vehicle Building, Department of Food & Agriculture (C4)			X		11/5/1999	Sacramento

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
Murphy's Ranch (680)		X			5/11/1959	Elk Grove
Negro Bar (P798)				X	5/31/1994	Folsom
New Helvetia Cemetery (592)		X			5/22/1957	Sacramento
Nisenan Village Site (N562)	X				3/21/1978	Carmichael
Nisipowinan Village Site (900)	X	X			6/16/1976	Sacramento
Old Elk Grove Hotel Site (P532)				X	6/29/1979	Sacramento
Old Fair Oaks Bridge (N2342)	X				9/25/2006	Fair Oaks
Old Folsom Powerhouse (633)		X			3/3/1958	Folsom
Old Folsom Powerhouse-Sacramento Station A (633)		X			3/3/1958	Sacramento
Old Sacramento (812)	X	X			12/30/1965	Sacramento
Old Tavern (N1242)	X				9/15/1983	Sacramento
Original Sacramento Bee Building (611)		X			5/22/1957	Sacramento
Overton Building (610)		X			5/22/1957	Sacramento
Pioneer Telegraph Station (366)		X			10/9/1939	Sacramento
Pony Express Terminal (N66000220)	X				10/15/1966	Sacramento
Prairie City (464)		X			8/30/1950	Prairie City
Public Works Office Building, Caltrans Building (C5)			X		11/5/1999	Sacramento
Rae House (P743)				X	5/8/1991	Galt
River Mansion (P149)				X	11/3/1969	Sacramento
Rosebud Ranch (N846)	X				12/31/1979	Hood
Ruhstaller Building (N1003)	X				1/21/1982	Sacramento
Runyon House (N2109)	X				10/27/2000	Courtland
Rusch Home (P737)				X	2/11/1991	Citrus Heights
Sacramento Air Depot Historic District (N1747)	X				1/21/1992	North Highlands
Sacramento Bank Building (N1004)	X				1/21/1982	Sacramento
Sacramento City Cemetery (566)		X			2/25/1957	Sacramento
Sacramento City Library (N1784)	X				7/30/1992	Sacramento
Sacramento Hall of Justice (N2067)	X				9/24/1999	Sacramento
Sacramento Junior College Annex and Extensions (N1874)	X				8/22/1994	Sacramento
Sacramento Masonic Temple (N2131)	X				5/17/2001	Sacramento
Sacramento Memorial Auditorium (N566)	X				3/29/1978	Sacramento

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
Site of China Slough (594)		X			5/22/1957	Sacramento
Site of Congregational Church (613)		X			5/22/1957	Sacramento
Site of First and Second State Capitols at Sacramento (869)		X			1/11/1974	Sacramento
Site of First County Free Library Branch in California (817)		X			6/1/1967	Elk Grove
Site of Grist Mill Built by Jared Dixon Sheldon (439)		X			6/2/1949	Slough house
Site of Home of Newton Booth (596)		X			5/22/1957	Sacramento
Site of Orleans Hotel (608)		X			5/22/1957	Sacramento
Site of Sacramento Union (605)		X			5/22/1957	Sacramento
Site of Sam Brannan House (604)		X			5/22/1957	Sacramento
Site of Stage and Railroad (First) (598)		X			5/22/1957	Sacramento
Site of The First African American Episcopal Church Established on The Pacific Coast (1013)		X			5/5/1994	Sacramento
Site of The First Jewish Synagogue Owned by A Congregation on The Pacific Coast (654)		X			7/28/1958	Sacramento
Site of Pioneer Mutual Volunteer Firehouse (612)		X			5/22/1957	Sacramento
Slocum House (N744)	X				1/31/1979	Fair Oaks
Sloughhouse (575)		X			5/17/1957	Sloughhouse
Southern Pacific Railroad Company's Sacramento Depot (N353)	X				4/21/1975	Sacramento
Southern Pacific Railroad Superintendent House (N2411)	X				6/13/2008	Folsom
St. Elizabeth's Church (P611)				X	3/2/1983	Sacramento
Stanford-Lathrop House (614)		X			5/22/1957	Sacramento
Sutter's Fort (525)		X			11/1/1954	Sacramento
Sutter's Landing (591)		X			5/22/1957	Sacramento
Sutterville (593)		X			5/22/1957	Sacramento
Temporary Detention Camps for Japanese Americans-Sacramento Assembly Center (934)		X			5/13/1980	Sacramento
Terminal of California's First Passenger Railroad (558)		X			12/31/1956	Folsom
The Villa (Serve Our Seniors, Incorporated) (P764)				X	2/14/1992	Orangevale

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed	City/Area
Tower Bridge (N1116)	X				6/24/1982	Sacramento
Travelers' Hotel (N680)	X				10/19/1978	Sacramento
U.S. Post Office, Courthouse and Federal Building (N855)	X				1/25/1980	Sacramento
Utah Condensed Milk Company Plant (N650)	X				8/3/1978	Galt
Van Voorhies House (N535)	X				11/17/1977	Sacramento
Wagner, Anton, Duplex (N923)	X				11/10/1980	Sacramento
Walnut Grove Chinese-American Historic District (N1630)	X				3/22/1990	Walnut Grove
Walnut Grove Commercial/Residential Historic District (N1634)	X				4/12/1990	Walnut Grove
Walnut Grove Gakuen Hall (N882)	X				6/17/1980	Walnut Grove
Walnut Grove Japanese-American Historic District (N1631)	X				3/22/1990	Walnut Grove
Western Hotel (601)		X			5/22/1957	Sacramento
Westminster Presbyterian Church (N2203)	X				5/22/2003	Sacramento
Wetzlar, Julius, House (N1183)	X				3/31/1983	Sacramento
What Cheer House (597)		X			5/22/1957	Sacramento
Whitter Ranch (Originally Saylor Ranch), Witter Ranch (P744)				X	5/8/1991	Sacramento
Winters House (N2046)	X				1/25/1999	Sacramento
Witter, Edwin, Ranch (N1675)	X				3/14/1991	Sacramento
Woodlake Site (N88)	X				5/6/1971	Sacramento
Yeong Wo Cemetery (P810)				X	5/30/1995	Folsom

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) document America's architectural and engineering heritage. Table 4-44 lists the HABS and HAER structures in Sacramento County:

Table 4-44 Sacramento County Planning Area HABS and HAER Structures

Area	Historic Building/Structure
	Drew-Sherwood Farm, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA

Area	Historic Building/Structure
Elk Grove Vicinity	Drew-Sherwood Farm, Barn, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA
	Drew-Sherwood Farm, House, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA
	Drew-Sherwood Farm, Shed, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA
	Drew-Sherwood Farm, Tank House, 7927 Elk Grove Boulevard, Elk Grove vicinity, Sacramento, CA
	Nunes Dairy, 9854 Bruceville Road, Elk Grove, Sacramento, CA
	Nunes Dairy, Clay Tile Silo, 9854 Bruceville Road, Elk Grove, Sacramento, CA
	Nunes Dairy, Worker's Residence No. 2, 9854 Bruceville Road, Elk Grove, Sacramento, CA
Folsom Vicinity	Folsom Powerhouse, Adjacent to American River, Folsom vicinity, Sacramento, CA
	Keefe-McDerby Mine Ditch, East of East Bidwell Street between Clarksville Road & Highway 50, Folsom vicinity, Sacramento, CA
	Natomas Ditch System, Blue Ravine Segment, Juncture of Blue Ravine & Green Valley Roads, Folsom vicinity, Sacramento, CA
Folsom	Folsom Powerhouse, Adjacent to American River, Folsom vicinity, Sacramento, CA.
	Guiseppe Murer House, 1121 Folsom Boulevard, Folsom, Sacramento, CA
	House, Folsom, Sacramento, CA
	Keefe-McDerby Mine Ditch, East of East Bidwell Street between Clarksville Road & Highway 50, Folsom vicinity, Sacramento, CA
	Methodist Episcopal Church, Folsom, Sacramento, CA
	Natomas Ditch System, Blue Ravine Segment, Juncture of Blue Ravine & Green Valley Roads, Folsom vicinity, Sacramento, CA
	Natomas Ditch System, Rhodes Ditch, West of Bidwell Street, north of U.S. Highway 50, Folsom, Sacramento, CA
	Trinity Episcopal Church, Folsom, Sacramento, CA
	Wells Fargo & Company Building, Folsom, Sacramento, CA
Isleton	Sacramento River Bridge, Spanning Sacramento River South of Locke, Isleton, Sacramento, CA
Locke	Town of Locke, Boat House, River Road, Locke, Sacramento, CA
	Town of Locke, Christian Center, 13937 Key Street, Locke, Sacramento, CA
	Town of Locke, Commercial Building, 13927 River Road, Locke, Sacramento, CA
	Town of Locke, Commercial Building, 13931 River Road, Locke, Sacramento, CA
	Town of Locke, Commercial Building, 13943 River Road, Locke, Sacramento, CA
	Town of Locke, Commercial Building, 13947 River Road, Locke, Sacramento, CA
	Town of Locke, Commercial Building, 13952 Main Street, Locke, Sacramento, CA
	Town of Locke, Commercial Building, 13955 River Road, Locke, Sacramento, CA
	Town of Locke, Commercial Building, 13959 Main Street, Locke, Sacramento, CA
	Town of Locke, Commercial Building, 13963 River Road, Locke, Sacramento, CA
	Town of Locke, Commercial-Residential Structure, 13935 Main Street, Locke, Sacramento, CA
	Town of Locke, Dai Loy Gambling Museum, 13951 Main Street, Locke, Sacramento, CA
	Town of Locke, House, 13915 Main Street, Locke, Sacramento, CA

Area	Historic Building/Structure
	Town of Locke, House, 13919 Main Street, Locke, Sacramento, CA
	Town of Locke, House, 13927 Main Street, Locke, Sacramento, CA
	Town of Locke, House, 13936 Main Street, Locke, Sacramento, CA
	Town of Locke, House, Key Street, Locke, Sacramento, CA
	Town of Locke, House, Main & Levee Roads, Locke, Sacramento, CA
	Town of Locke, Jan Ying Association, 13947 Main Street, Locke, Sacramento, CA
	Town of Locke, Joe Shoong Chinese School, 13920 Main Street, Locke, Sacramento, CA
	Town of Locke, Locke, Sacramento, CA
	Town of Locke, Residential Building, 13931 Main Street, Locke, Sacramento, CA
	Town of Locke, Residential Building, 13939 Main Street, Locke, Sacramento, CA
	Town of Locke, Residential Building, River & Levee Roads, Locke, Sacramento, CA
	Town of Locke, Residential Structure, 13955 Main Street, Locke, Sacramento, CA
	Town of Locke, Restaurant, 13943 Main Street, Locke, Sacramento, CA
	Town of Locke, Star Theatre, 13939 River Road, Locke, Sacramento, CA
	Town of Locke, The Tules, River Road, Locke, Sacramento, CA
	Town of Locke, Warehouse, 13923 Main Street, Locke, Sacramento, CA
	Town of Locke, Yuen Chong Market, 13923 River Road, Locke, Sacramento, CA
Michigan Bar	Heath's Store, Michigan Bar (historical), Sacramento, CA
Sacramento Vicinity	Reclamation District 1000, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
	Reclamation District 1000, Pump Plant No. 1, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
	Reclamation District 1000, Pump Plant No. 2, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
	Reclamation District 1000, Pump Plant No. 3, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
Sacramento	Adams & Company Building, 1014 Second Street, Sacramento, Sacramento, CA
	Albert Gallatin House, 1527 H Street, Sacramento, Sacramento, CA
	Apollo Building, 228-230 K Street, Sacramento, Sacramento, CA
	Aschenauer Building, 1022 Third Street, Sacramento, Sacramento, CA
	B. F. Hastings Bank Building, 128-132 J Street, Sacramento, Sacramento, CA
	Bank Exchange Building, 1030 Second Street, Sacramento, Sacramento, CA
	Bee Building, 1016-1020 Third Street, Sacramento, Sacramento, CA
	Big Four Building, 220-226 K Street, Sacramento, Sacramento, CA
	Blake-Waters Assay Office, 222 J Street, Sacramento, Sacramento, CA
	Booth Building, 1019-1021 Front Street, Sacramento, Sacramento, CA
	Brannon Building, 106-110 J & Front Streets, Sacramento, Sacramento, CA
	California State Library & Courts Building, 914 Capitol Mall, Sacramento, Sacramento, CA

Area	Historic Building/Structure
	California State Office Building No. 1, 915 Capitol Mall, Sacramento, Sacramento, CA
	California State Printing Office, 1020 O Street, Sacramento, Sacramento, CA
	Cavert Building, 1207 Front Street, Sacramento, Sacramento, CA
	Central Pacific Transcontinental Railroad, Sacramento to Nevada state line, Sacramento, Sacramento, CA
	Cienfugo Building, 1119 Second Street, Sacramento, Sacramento, CA
	City Market, 118 J Street, Sacramento, Sacramento, CA
	Collicott Drug Store, 129 J Street, Sacramento, Sacramento, CA
	Coolot Building, 812 J Street, Sacramento, Sacramento, CA
	Crocker Art Gallery, 216 O Street, Sacramento, Sacramento, CA
	Democratic State Journal Building, Second & K Streets, Sacramento, Sacramento, CA
	Diana Saloon, 205 J Street, Sacramento, Sacramento, CA
	Dingley Spice Mill, 115 I Street, Sacramento, Sacramento, CA
	E. P. Figg Building, 224 J Street, Sacramento, Sacramento, CA
	Ebner's Hotel, 116 K Street, Sacramento, Sacramento, CA
	Esquire Theater, 1217 K Street, Sacramento, Sacramento, CA
	Eureka Swimming Baths, 908-910 Second Street, Sacramento, Sacramento, CA
	Fashion Saloon, 209 J Street, Sacramento, Sacramento, CA
	Francis William Fratt Building, 1103-1109 Second Street, Sacramento, Sacramento, CA
	Gregory-Barnes Store, 126 J Street, Sacramento, Sacramento, CA
	Heywood Building, 1001-1009 Second Street, Sacramento, Sacramento, CA
	Howard House, 109-111 K Street, Sacramento, Sacramento, CA
	Hudson-Cippa-Wolf Ranch, Bunkhouse, Sorento Road, Sacramento, Sacramento, CA
	Hudson-Cippa-Wolf Ranch, Granary, Sorento Road, Sacramento, Sacramento, CA
	Hudson-Cippa-Wolf Ranch, Hay Barn, Sorento Road, Sacramento, Sacramento, CA
	Hudson-Cippa-Wolf Ranch, Main House, Sorento Road, Sacramento, Sacramento, CA
	Hudson-Cippa-Wolf Ranch, Milk Barn, Sorento Road, Sacramento, Sacramento, CA
	Hudson-Cippa-Wolf Ranch, Sorento Road, Sacramento, Sacramento, CA
	I. & S. Wormser Building, 128 J Street, Sacramento, Sacramento, CA
	J Street (Commercial Buildings), Sacramento, Sacramento, CA
	Lady Adams Building, 113-115 K Street, Sacramento, Sacramento, CA
	Latham Building, 221-225 J Street, Sacramento, Sacramento, CA
	Leggett Ale House, 1023 Front Street, Sacramento, Sacramento, CA
	Leland Stanford House, 800 N Street, Sacramento, Sacramento, CA
	Lincoln School, 418 P Street, Sacramento, Sacramento, CA
	Luhrs Hall & Company Building, 912-916 Second Street, Sacramento, Sacramento, CA
	Mechanics Exchange Hotel, 116-122 I Street, Sacramento, Sacramento, CA

Area	Historic Building/Structure
	Morse Building, 1025-1031 Second Street, Sacramento, Sacramento, CA
	Old U. S. Post Office, K & Seventh Streets, Sacramento, Sacramento, CA
	Our House Saloon, 926 Second Street, Sacramento, Sacramento, CA
	P. B. Cornwall Building, 1011-1013 Second Street, Sacramento, Sacramento, CA
	Pioneer Hall & Bakery, 120-124 J Street, Sacramento, Sacramento, CA
	Pioneer Telegraph Building, 1015 Second Street, Sacramento, Sacramento, CA
	Reclamation District 1000, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
	Reclamation District 1000, Pump Plant No. 1, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
	Reclamation District 1000, Pump Plant No. 2, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
	Reclamation District 1000, Pump Plant No. 3, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
	Rialto Building, 225-230 J Street, Sacramento, Sacramento, CA
	Rivett-Fuller Building, 128 K Street, Sacramento, Sacramento, CA
	Sacramento Army Depot, Fruitridge Road, Sacramento, Sacramento, CA
	Sacramento City Hall, 915 I Street, Sacramento, Sacramento, CA
	Sacramento Engine Company No. 3, 1112 Second Street, Sacramento, Sacramento, CA
	Sacramento Junior College, Library, 3835 Freeport Boulevard, Sacramento, Sacramento, CA
	Sacramento River Bridge, Spanning Sacramento River at CA State Highway 275, Sacramento, Sacramento, CA
	Sacramento River Water Treatment Plant Intake Pier & Access Bridge, Spanning Sacramento River approximately 175 feet west of eastern levee on river; roughly .5 mile downstream from confluence of Sacramento & American Rivers, Sacramento, Sacramento, CA
	Sacramento, General View, Sacramento, Sacramento, CA
	Sacramento, General View,1865, Sacramento, Sacramento, CA
	Sacramento, Historic View, Sacramento, Sacramento, CA
	Sacramento, Historic View, Sacramento, Sacramento, CA
	Sazerac Building, 131 J Street, Sacramento, Sacramento, CA
	Southern Pacific Railroad Depot, Railroad Terminal Post Office & Express Building, Fifth & I Streets, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Blacksmith Shop, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Boiler Shop, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Car Machine Shop, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Car Shop No. 3, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Erecting Shop, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Paint Shop, 111 I Street, Sacramento, Sacramento, CA

Area	Historic Building/Structure
	Southern Pacific, Sacramento Shops, Pitless Transfer Table, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Planing Mill, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Privy, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Turntable, 111 I Street, Sacramento, Sacramento, CA
	Southern Pacific, Sacramento Shops, Water Tower, 111 I Street, Sacramento, Sacramento, CA
	Stanford Brothers Store, 1203 Front Street, Sacramento, Sacramento, CA
	Stein Building, 218 J Street, Sacramento, Sacramento, CA
	Strub Building, Sacramento, Sacramento, CA
	Studio Theater, 1227 K Street, Sacramento, Sacramento, CA
	Sutter's Fort, L & Twenty-Seventh Streets, Sacramento, Sacramento, CA
	Union Hotel (Annex), 125 K Street, Sacramento, Sacramento, CA
	Union Hotel, 1024-1028 Second Street, Sacramento, Sacramento, CA
	Vernon-Brannan House, 112-114 J Street, Sacramento, Sacramento, CA
	W.I. Elliott Building, 1530 J Street, Sacramento, Sacramento, CA

Source: The Library of Congress, American Memory, http://memory.loc.gov/ammem/collections/habs_haer/

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Natural Resources

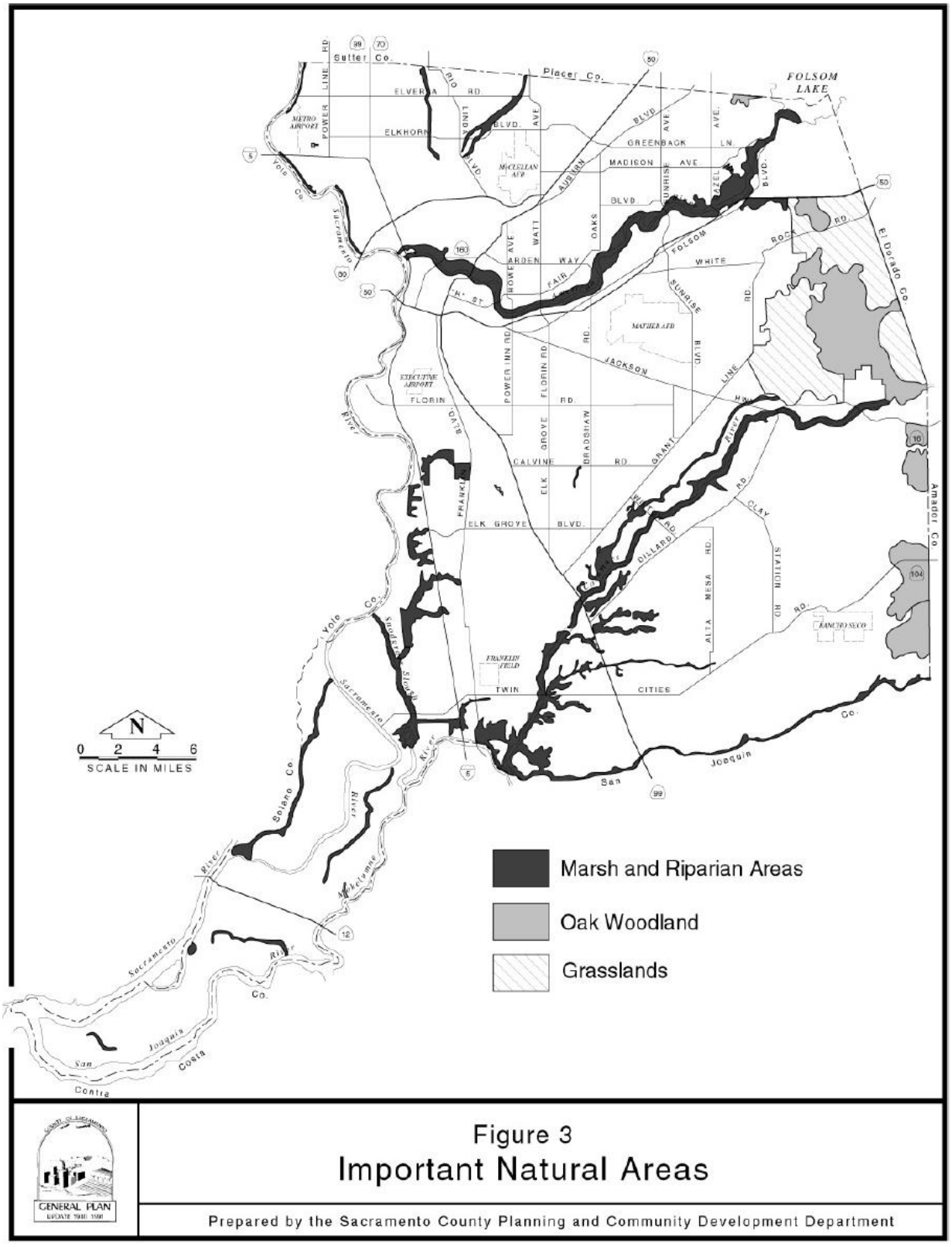
Natural resources are important to include in cost/benefit analyses for future projects and may be used to leverage additional funding for mitigation projects that also contribute to community goals for protecting sensitive natural resources. Awareness of natural assets can lead to opportunities for meeting multiple objectives. For instance, protecting wetlands areas protects sensitive habitat as well as reducing the force of and storing floodwaters.

Sacramento County once supported limited oak savannah and riparian woodland, with an herbaceous layer of perennial grasses and both annual and perennial wildflowers. These woodland areas were centered on the County's three main rivers: Sacramento, American and Cosumnes. Expansive native valley grassland, also referred to as California prairie, stretched out from the edge of these woodlands and blanketed the bulk of the County's landscape. Vernal pools were scattered in both low and high density clusters throughout the valley grassland habitat. After European settlement of the County, many of the native perennial grasses were replaced by Mediterranean annual grasses. However, within the vernal pools native vegetation uniquely suited to spring time inundation survived. Today these vernal pools harbor a number of listed plant and animal species. In addition to vernal pools, other seasonal and emergent wetlands occurred,

mostly in association with the many natural drainage systems that previously flowed through the County, but which are now either channelized or confined within a system of artificial levees.

The County of Sacramento is fortunate to have several locations where vestiges of the once vast and diverse Central Valley natural habitat areas still exist. Habitat areas include riparian zones, riverine habitats, wetlands, woodlands, and grasslands. These are shown in Figure 4-67. This map delineates areas considered primarily natural such as riparian zones, marshlands, and oak woodlands. The boundaries are drawn based on review of reports and maps of public and private agencies including the U.S. Fish and Wildlife Service's National Wetlands Inventory maps, the State Department of Water Resource's Delta Atlas, the California Department of Fish and Game's Natural Diversity Database, and aerial photography.

Figure 4-67 Important Natural Areas in Sacramento County



Source: Sacramento County General Plan Open Space Element Background

Remaining marsh and riparian areas in the County include backwater basins and riparian woodlands along the Sacramento, American, and Cosumnes Rivers and other smaller waterways, and in the Delta. These biologically dynamic areas host thousands of waterfowl migrating along the Central Valley leg of the Pacific Flyway. In addition, numerous other migratory and resident species, some of which are listed as threatened or endangered, inhabit the County's natural areas. Species include majestic colony birds such as the American egret and great blue heron, the opportunistic coyote, the industrious beaver, deer, and elusive grey fox and bobcat.

The wetland and riparian areas are regarded as the County's most important resource. Such habitat becomes all the more significant when viewed against the acreage lost since the time of European settlement. Approximately 95 percent of the Central Valley's wetlands have disappeared in the last 100 years, reducing habitat for millions of migratory waterfowl. Riparian habitat has suffered a similar fate. In the Sacramento River Valley only 25,000 of the estimated 500,000 acres of the riparian habitat existing in 1850 exists today.

The aquatic environment of the County supports tens of thousands of anadromous fish and rears a comparable amount of resident species. Anadromous fish include salmon, bass, shad, and sturgeon. Resident fish include trout, catfish, sunfish, and bullhead. With the development of urban areas and water projects, fisheries have declined. This loss has been generated by habitat destruction, water diversion, and temperature increases.

Extending out from the riparian zone are the distinctive upland habitats of the Central Valley, scattered with oak, blanketed with grazing lands, and dotted with vernal pools. Native oaks, signature trees of the Central Valley have declined in population over the years to accommodate agriculture and development. Concentrated efforts will need to be undertaken if the County is to preserve the isolated groves and diminishing woodlands. Native grasslands have virtually disappeared due to grazing and development. The once prolific and well adapted bunchgrass has been displaced by invasive weeds from the Mediterranean region. The vernal pools which once dotted vast areas of the Central Valley landscape, are found only in concentrations in the southern section of the County (see the discussion in the next section of the South Sacramento Habitat Conservation Plan). The pools sustain flora and fauna adapted to the ephemeral nature of these small yet vibrant habitats.

Wetlands: Natural and Beneficial Functions

Wetlands are habitats in which soils are intermittently or permanently saturated or inundated. Wetland habitats vary from rivers to seasonal ponding of alkaline flats and include swamps, bogs, marshes, vernal pools, and riparian woodlands. Wetlands are considered to be waters of the United States and are subject to the jurisdiction of the U.S. Army Corps of Engineers as well as the California Department of Fish and Wildlife (CDFW). Where the waters provide habitat for federally endangered species, the U.S. Fish and Wildlife Service may also have authority.

Wetlands are a valuable natural resource for communities providing beneficial impact to water quality, wildlife protection, recreation, and education, and play an important role in hazard mitigation. Wetlands provide drought relief in water-scarce areas where the relationship between water storage and streamflow regulation is vital, and reduce flood peaks and slowly release floodwaters to downstream areas. When surface runoff is dampened, the erosive powers of the water are greatly diminished. Furthermore, the

reduction in the velocity of inflowing water as it passes through a wetland helps remove sediment being transported by the water.

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flow. Wetlands perform a variety of ecosystem functions including food web support, habitat for insects and other invertebrates, fish and wildlife habitat, filtering of waterborne and dry-deposited anthropogenic pollutants, carbon storage, water flow regulation (e.g., flood abatement), groundwater recharge, and other human and economic benefits.

Wetlands, and other riparian and sensitive areas, provide habitat for insects and other invertebrates that are critical food sources to a variety of wildlife species, particularly birds. There are species that depend on these areas during all parts of their lifecycle for food, overwintering, and reproductive habitat. Other species use wetlands and riparian areas for one or two specific functions or parts of the lifecycle, most commonly for food resources. In addition, these areas produce substantial plant growth that serves as a food source to herbivores (wild and domesticated) and a secondary food source to carnivores.

Wetlands slow the flow of water through the vegetation and soil, and pollutants are often held in the soil. In addition, because the water is slowed, sediments tend to fall out, thus improving water quality and reducing turbidity downstream.

These natural floodplain functions associated with the natural or relatively undisturbed floodplain that moderates flooding, such as wetland areas, are critical for maintaining water quality, recharging groundwater, reducing erosion, redistributing sand and sediment, and providing fish and wildlife habitat. Preserving and protecting these areas and associated functions are a vital component of sound floodplain management practices for the Sacramento County Planning Area.

Natural site features such as wetlands with native plants and hydric soils have long disappeared and they no longer can function as they should. Landowners are encouraged to plant native plants on their property. These plants will assist with absorption and filtration of water. They will help to hold soils to keep erosion and siltation from occurring in the waterway. Landowners are also encouraged to remove any obstructions which might restrict water conveyance during high water events.

The South Sacramento Habitat Conservation Plan (SSHCP) was created to identify and protect natural habitats in the southern portion of Sacramento County. In this plan, floodplains and wetlands were identified, and the inter-relationship between the two is explained in greater detail. Floodplains can have natural and beneficial functions. Two types are described in the SSHCP and summarized in the sections that follow.

Preservation of Wetlands

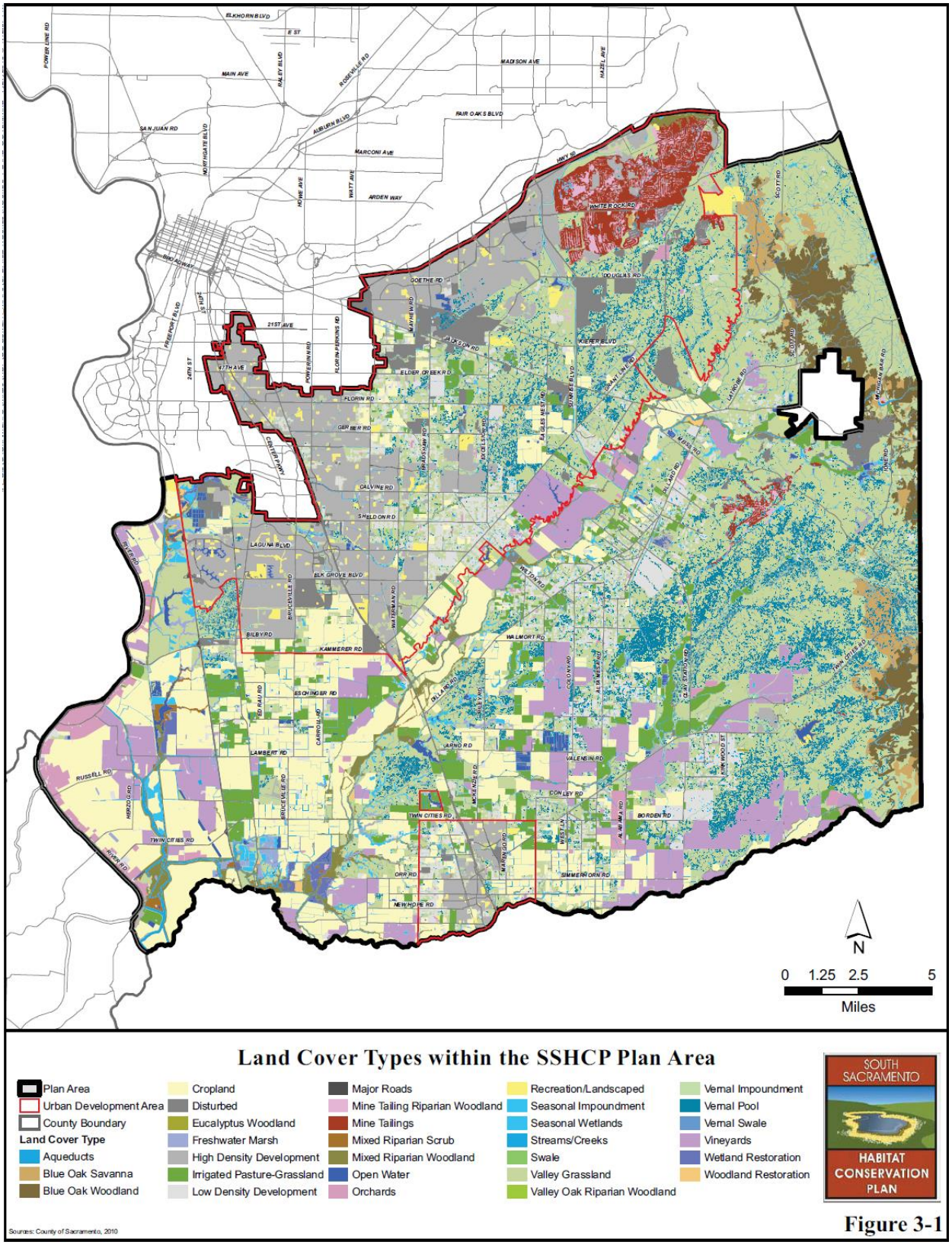
Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and flood waters. Trees, root mats, and other wetland vegetation also slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion. Wetlands within and downstream of urban areas are particularly valuable, counteracting the greatly increased rate and volume of surface- water runoff from pavement and buildings. The holding capacity of wetlands helps control floods and prevents water logging

of crops. Preserving and restoring wetlands, together with other water retention, can often provide the level of flood control otherwise provided by expensive dredge operations and levees. In the SSHCP, the following types of wetlands were identified and defined:

- Freshwater Marsh
- Open Water
- Seasonal Impoundment
- Seasonal Swale
- Seasonal Wetlands
- Vernal Pools
- Vernal Swales
- Vernal Impoundments
- Streams and Creeks
- Wetland Restoration

Figure 4-68 shows the wetlands and other land cover types in the SSHCP plan area.

Figure 4-68 Land Cover in the SSHCP



Source: South Sacramento Habitat Conservation Plan

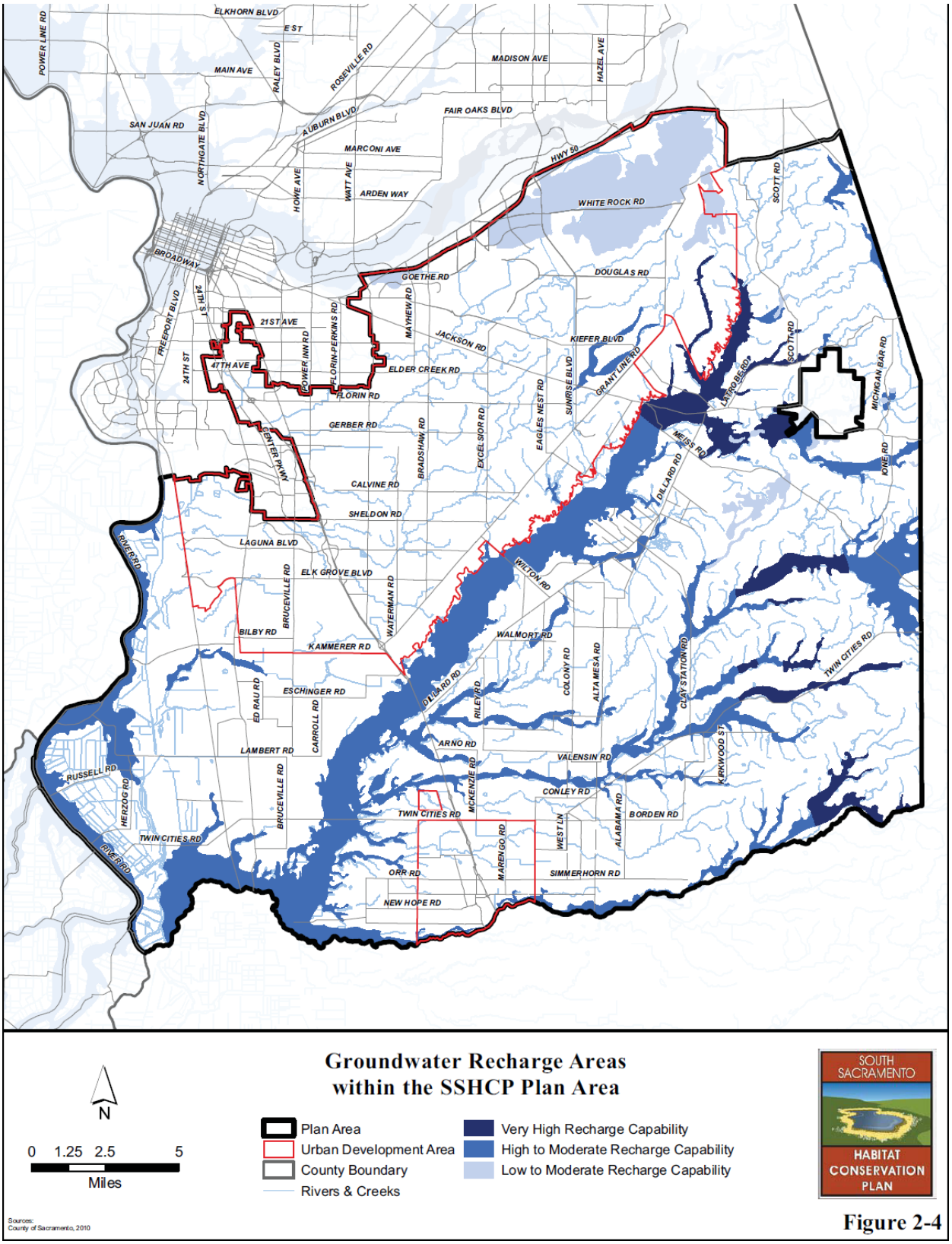
The SSHCP Plan Area includes lands that have already been preserved through past mitigation or conservancy acquisitions. The largest grouping of conservation sites inside the Urban Development Area (UDA) occurs in the Sacramento Valley Vernal Pool Preserve area located south of Jackson Highway between Excelsior and Eagles Nest roads north of Grant Line Road. The preserve area includes lands under conservation easement or owned by the Sacramento Valley Conservancy and three mitigation banks: Klotz, Arroyo Seco, and Bryte Ranch. Outside the UDA, significant preserves and mitigation banks are established at or near the Stone Lakes National Wildlife Refuge, within the Cosumnes River floodplain, and in eastern Sacramento County.

Groundwater Recharge

The SSHCP Plan Area is entirely within the 20,000-square-mile Central Valley Aquifer System, but is split between two basins, the Sacramento Valley Groundwater Basin and the San Joaquin Valley Groundwater Basin. Precipitation that does not run off, or is not lost through evaporation and transpiration, travels beneath the surface as subsurface water. The pattern of movement of water, from the time it enters the ground to the time it emerges either naturally or by pumping from a well, is controlled by the subsurface conditions encountered. Upon entering the ground, water moves downward until it reaches a zone of saturation. This happens whenever water from precipitation, stream flow, applied irrigation, and various other water sources sinks into the ground through the open spaces in permeable materials. The size of these open spaces ranges from minute pores in clays to intergranular openings in deposits of sand and gravel, and open crevices along bedrock fractures. The area over which this is accomplished is called a recharge area.

Within the SSHCP Plan Area, most recharge occurs in locations along river channel deposits where they cross exposures of water-transmitting rocks. Here the channel deposits are very permeable, allowing for rapid infiltration of water down to water-bearing materials. Water flows over these recharge areas during the entire year and affords partial replenishment of the groundwater body (Figure 4-69). In addition to river channel recharge, recharge can occur through percolation of precipitation, percolation of irrigation return flows, and subsurface boundary inflow from adjacent aquifers.

Figure 4-69 Groundwater Recharge in Sacramento County



Source: South Sacramento Habitat Conservation Plan

Special Status Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify at-risk species (i.e., endangered species) in the Planning Area. The Fish and Game Department maintains a list of threatened and endangered species in California. State and federal laws protect the habitat of these species through the environmental review process. Several additional species are of special concern or candidates to make the protected list. The Department's classification scheme is defined as follows:

- A species is a candidate when the Fish and Game Commission has formally noticed it as being under review by the Department to determine whether listing as threatened or endangered is warranted, or when it is the subject of a proposed rulemaking by the Commission to list as threatened or endangered.
- A species is threatened when although not presently threatened with extinction, it is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.
- A species is endangered when it is in serious danger of becoming extinct throughout all, or a significant portion of, its range due to one or more causes, including loss of habitat, change of habitat, overexploitation, predation, competition or disease.

Table 4-45 summarizes Sacramento's special status animal species.

Table 4-45 California Native Plant Society's Threatened and Endangered Plant Classification for Sacramento County

Scientific Name Common Name	Legal Status (Federal/State)	CNPS	Habitat
Aster chilensis var lentus Suisun marsh aster	C/-	RE	Brackish marsh
Downingea humilis Dwarf downingea	-/-	RE	Vernal pools
Gratiola heterosepal Boggs lake hedgehyssop	C/E	RE	Vernal pools
Hibiscus californicus California hibiscus	C/-	RE	Freshwater marsh
Lathyrus jepsonii var jepsonii Delta tule pea	C/-	RE	Brackish marsh
Legenere limosa Green's legenere	C/R	RE	Vernal pools
Lilaeopsis masonii Mason's liaeopsis	-/E	RE	Brackish marsh
Orcuttia viscida Sacramento orcutt grass	E/E	RE	Vernal pools
Orcuttia tenuis Slender orcutt grass	E/E	RE	Vernal pools
Oenothera deltoides howellii Antioch dunes evening primrose	E/E	RE	Inland dunes

Scientific Name Common Name	Legal Status (Federal/State)	CNPS	Habitat
Plagiobothrys hystriculus Bearded popcorn flower	C/-	RE	Vernal pools

Source: California Native Plant Society
Legal status abbreviations are C = Candidate, R = Rare, E = Endangered

The California Native Plant Society's inventory of rare and endangered vascular plants in California lists 10 species that have been found in Sacramento County, which are characterized as rare or endangered according to either federal, state or California Native Plant Society definitions (Table 4-46). Six species are vernal pool species. California Hibiscus is found along the Sacramento River and is severely threatened by channelization of the river. The Antioch Dunes Evening Primrose is extremely rare and known from only one site in Sacramento County.

Table 4-46 Endangered, Threatened, and Candidate Animal Species in Sacramento County

Species	Legal Status (Federal/State)	Habitats	Occurrence
Valley elderberry longhorn beetle (Desmocerus californicus dimorphus)	T/C	Elderberry shrubs in riparian habitats.	At least 7 reported sites in Sacramento
Giant garter snake	C/T	Marshlands, ditches, and adjacent uplands	At least 20 reported sites in Sacramento
American white pelican	-/SSC	Feeds in shallow waters	Migrants occur in spring & early summer
Double-crested cormorant	-/SSC	Nests in trees; forages in water bodies	Year-round resident Nesting sites reported at North Stone Lake
Bald eagle	E/E	Feeds in winter at lakes visitor.	An irregular winter Nesting sites at Folsom Lake just outside County
Northern harrier	-/SSC	Dense, tall grasslands or seasonal marsh for nesting; grasslands & marsh for feeding	Beach Lake/Stone Lake & treatment plant breeding areas.
Cooper's hawk	-/SSC	Riparian and oak woodland;	Regular migrant and winter resident; breeds in oak woodland of east County and American River.
Swainson's hawk	C/T	Large trees for nesting; alfalfa or hay fields for feeding	Common throughout the County
Peregrine falcon	E/E	Marsh, grassland	Possible irregular migrant.
Prairie falcon	-/SSC	Grassland	Possible irregular migrant and wintering bird.
California gull	-/SSC	Water bodies	Non-breeding resident
California yellow-billed cuckoo	C/T	Extensive riparian woodland	No records.
Burrowing owl	-/SSC	Natural or artificial burrows for nesting; grasslands for foraging	Nests at several locations in Sacramento County.

Species	Legal Status (Federal/State)	Habitats	Occurrence
Short-eared owl	-/SSC	Dense grasslands and marshlands	Probable irregular winter visitor
Willow flycatcher	-/SSC	Willow scrub	Probable migrant
Purple martin	-/SSC	Riparian woodland	Reported nesting sites found in or near downtown Sacramento
Tricolored blackbird	-/SSC	Emergent wetlands for breeding; marsh and nesting sites in grasslands for feeding.	At least 24 reported in Sacramento
Bank swallow	-/T	Riparian river bluffs	Reported nesting site on Cosumnes River near Rancho Murieta.
Longeared Owl	-/SSC	Riparian woodland	Known to nest in Sacramento County.
Black Shouldered Kite	-/P	Grasslands	Roost in Sacramento County

Source: US Fish and Wildlife Service

Legal status abbreviations are: E = Endangered, T = Threatened, C = Candidate for listing, and SSC = Species of special concern. P = Protected

Significant Natural Areas of Sacramento County

From information provided in the Sacramento County General Plan Background Report, Table 4-47 below outlines the location and rationale for listing of significant natural areas in Sacramento County.

Table 4-47 Description of Significant Natural Areas in Sacramento County

Location	Comments
Mokelumne/Cosumnes Drainage	
Lower Cosumnes River	Support more than 100,000 waterfowl; sandhill crane here; important and unique natural area; variety of hydrological conditions in small area at merging of Valley River and Delta systems; undammed, represents unaltered valley ecosystem; system of sloughs and marshes each slightly different in its ecological balance; intermixing of habitats enhances ecological diversity.
Deer Creek - Cosumnes Riparian Corridor	Good riparian woodland cover along most of both banks of both water courses; occasional clear spots; generally is narrow band along each watercourse, occasionally widens to hardwood forest in valley portion.
Badger Creek	Wetlands, riparian and valley oaks amid valley grassland. Excellent example of historical Sacramento Valley habitat. Especially scenic from Highway 99.
Lower Mokelumne, Dry Creek, Grissley and Bear Sloughs	Riparian vegetation along all water courses; excellent grassland, riparian, woodland mix along Bear Slough; some of grassland and woodland along Mokelumne has been leveled since 1973.
Mokelumne River	Riparian vegetation on levee side of river.
Dry Creek	Riparian corridor occasionally widening to woodland areas.
Laguna Creek	Intermittent stream with riparian habitat; two miles of riparian woodland with large trees; lower reaches include seasonal marsh along creek and tributaries.

Location	Comments
Stones Lake/Delta	
Beach Lake/ Morrison Creek*	Permanent and seasonal marsh in what used to be Beach Lake; riparian forest along Morrison Creek, essentially intact since 1937, dominated by cottonwood and willow; a riparian area abundantly rich in wildlife and plant communities.
Lower Laguna Creek*	Seasonal wetland, ponds and vernal pools with adjacent grassland; channel modifications in conjunction with upstream improvements along Laguna Creek.
North Stone Lake*	Morrison Creek levee on north, I-5 on east, Hood-Franklin Road on south and Southern Pacific Railroad on west.
South Stone Lake	Includes 93 acres riparian, 446 acres marsh, 186 acres upland, 121 acres water; rest of 3,480 acres is agriculture; supports excellent warm water fishery; supplements North Stone Lake as important wildlife area; part of number one ranked site for new western National Wildlife Refuge; with North Stone Lake, is one of the most important ecological complexes in Delta.
Snodgrass Slough	Shrub brush and occasional riparian woodland along northernmost Delta slough in Sacramento.
Delta Meadows*	Significant prime natural resource area; remnant of valley oak woodland; in excess of 110 bird species, abounds with small mammals; state park acquisition project.
Lost Slough	Waterway and adjacent riparian habitat linking Lower Cosumnes and Delta Meadows, Snodgrass Slough and the Delta river system.
Steamboat Slough	Riparian shrub-brush and woodland at south end near Howard Landing and along north portion.
Grand Island Tip	Mason's lilaeopsis, Delta tule pea, and Sacramento anthacid beetle found here; state designated significant natural area.
Georgiana Slough	Shrub-brush and occasional woodland riparian along open slough.
Seven Mile Slough	Riparian trees and shrub-brush along a little-used slough.
Brannan Island*	Site of Antioch Dunes evening primrose, very rare plant; state designated significant nature area.
Mayberry Slough	Deadend slough, isolated for wildlife habitat.
Southwest Tip of County	Upland habitat; blue heron rookery; several rare and endangered species.
Chain Island	Isolated island, formerly diked with coastal brackish marsh habitat; Mason's ilaeopsis and Suisun marsh aster; state designated significant natural area.
Eastern Sacramento County	
Upper Laguna Creek	Dense stand of riparian vegetation listed as one of three most important sections on Laguna Creek (the other two are now urban creek sections).
Sloughhouse South	One of best sites of valley elderberry longhorn beetle habitat; state designated significant natural area.
Meiss-Ione Road Overlook	Only lesser nighthawks in Sacramento County; vernal pools with unusual dwarf plant.
Scott Road Raptor Area	Open shortgrass prairie with sparse to dense valley and blue oak thickets, mostly in southern area; dense cottonwood-willow riparian vegetation along stream courses; habitat for one of largest concentrations of raptoral birds in Sacramento region; grand wildflower displays in spring.
Sloughhouse Vernal Pools	Concentrations of vernal pools; very rare Sacramento orcutt grass found near County dump; state designated significant natural area.
Rancho Seco Lake*	About 500 plants of Sacramento orcutt grass; state designated significant natural area.

Location	Comments
Jackson Highway Oak Woodland	None
Twin Cities Road Oak Woodland	None
South Area Vernal Pools	Quality of pools is unknown; may contain rare and endangered plants.
North Sacramento	
Garden Highway	Greatest concentration of riparian woodland in Sacramento County along Sacramento River; riparian woodlands are seven times greater in extent than disturbed riprap areas to south; coexists with several homes; Swainson's hawk nests.
Alder Creek	Excellent riparian area; diverse vegetation and wildlife; spillway and marsh; upstream ponds add diversity; good beaver and muskrat habitat.
Fair Oaks Bald Spot*	Excellent examples of vernal pools with Sacramento orcutt grass; state designated significant natural area.
Lake Natoma*	American River bluffs, 100 feet high, cut by several small canyons; rich foothill woodland plant community; some of most varied and dense floral displays in Sacramento County; cottonwood dredger tailing riparian at Negro Bar with jungle-like mixture of oak, buckeye, elderberry, et al on higher ground.
East Main Drain*	Waterfowl habitat; year round habitat; much disturbance, dumping.
Dry Creek*	Dual channel with grassland/farming in between creates good wildlife habitat. Good riparian cover along creek channels.
American River Parkway*	Mix of riparian, freshwater marsh, oak woodland, grassland, inhabited by great variety of plant and wildlife species.

Source: Sacramento General Plan Background Report

* indicates all or a major part of the area is in public or quasi-public ownership

Williamson Act

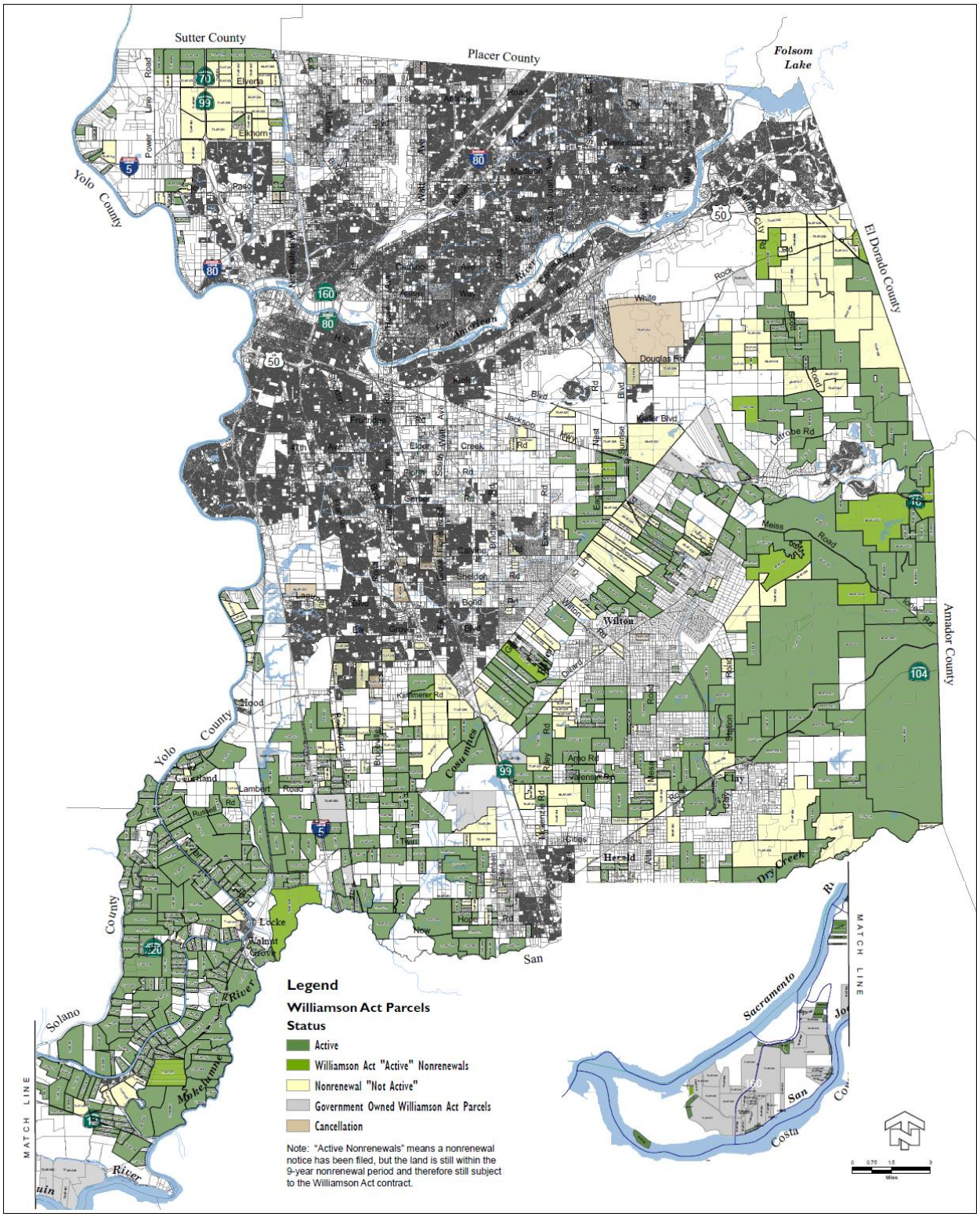
The Williamson Act, also known as the California Land Conservation Act of 1965, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. When the County enters into a contract with the landowners under the Williamson Act, the landowner agrees to limit the use of the land to agriculture and compatible uses for a period of at least ten years and the County agrees to tax the land at a rate based on the agricultural production of the land rather than its real estate market value. The County has designated areas as agricultural preserves within which the county will enter into contracts for the preservation of the land in agriculture. The County has 164,162 acres under Williamson Act Contract as of 2016. This is tabulated in Table 4-48 shown in Figure 4-70.

Table 4-48 Williamson Act Parcels Acreage 2016

STATUS	ACRES
Active	164,161.92
Active Nonrenewal	11,217.58
Cancellation	5,505.85
Nonrenewal	62,179.93

Source: Sacramento County GIS

Figure 4-70 Williams Act Contracts in Sacramento County as of 2016



Source: Sacramento County

State Inventory of Important Farmland

The Farmland Mapping and Monitoring Program was established in 1984 to document the location, quality, and quantity of agricultural lands and conversion of those lands over time. The program provides impartial analysis of agricultural land use changes throughout California. For inventory purposes, several categories were developed to describe the qualities of land in terms of its suitability for agricultural production. The State Department of Conservation utilizes the following classification system:

- The Prime Farmland category describes farmland with the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- Farmland of Statewide Importance is farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- Unique Farmland is farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
- Farmland of Local Importance is either currently producing crops or has the capability of production. This farmland category is determined by each county's board of supervisors and a local advisory committee.

For Sacramento County, this classification refers to lands which do not qualify as Prime, Statewide, or Unique designation but are currently irrigated crops or pasture or non-irrigated crops; lands that would be Prime or Statewide designation and have been improved for irrigation but are now idle; and lands which currently support confined livestock, poultry operations, and aquaculture.

Growth and Development Trends

As part of the planning process, the HMPC looked at changes in growth and development, both past and future, and examined these changes in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability. Information from the Sacramento County General Plan Housing Element, the California Department of Finance, and the Sacramento County Planning Department form the basis of this discussion.

More specific information on growth and development for each participating jurisdiction can be found in the jurisdictional annexes.

Current Status and Past Development

The estimated population of Sacramento County for January 1, 2015 was 1,470,912, representing a ten-fold increase from just over 141,000 people in 1930. Table 4-49 and Table 4-50 illustrate the pace of population growth in Sacramento County dating back to 1930 along with more recent population trends for each jurisdiction. The data on population and housing growth shows that Sacramento County has seen consistent growth during the last decades, with major periods of growth in the 1950s and 1960s.

Table 4-49 Sacramento County Population Growth 1930-2015

Year	Population	Percent Change
1930	141,199	–
1940	170,333	20.0%
1950	277,140	62.7%
1960	502,778	81.4%
1970	631,498	25.6%
1980	783,381	24.1%
1990	1,041,219	32.9%
2000	1,223,499	17.5%
2010	1,445,327	18.1%
2015	1,470,912	1.8%

Sources: US Census Bureau, California Department of Finance

Table 4-50 Population Growth for Jurisdictions in Sacramento County, 2000-2015

Area	2000	2010	2015	% Change 2000 to 2015
Citrus Heights	85,071	87,752	85,147	0.1%
Elk Grove*	0	121,803	162,899	–
Folsom	51,884	66,242	74,909	44.4%
Galt	19,472	22,856	24,607	26.4%
Isleton	828	822	820	-0.9%
Rancho Cordova*	0	55,099	69,112	–
Sacramento	407,018	453,592	480,105	18.0%
Unincorporated	659,226	560,483	573,313	-13.0%**
Total	**1,223,499**	**1,445,327**	**1,470,912**	**20.2%**

Source: US Census Bureau, California Department of Finance

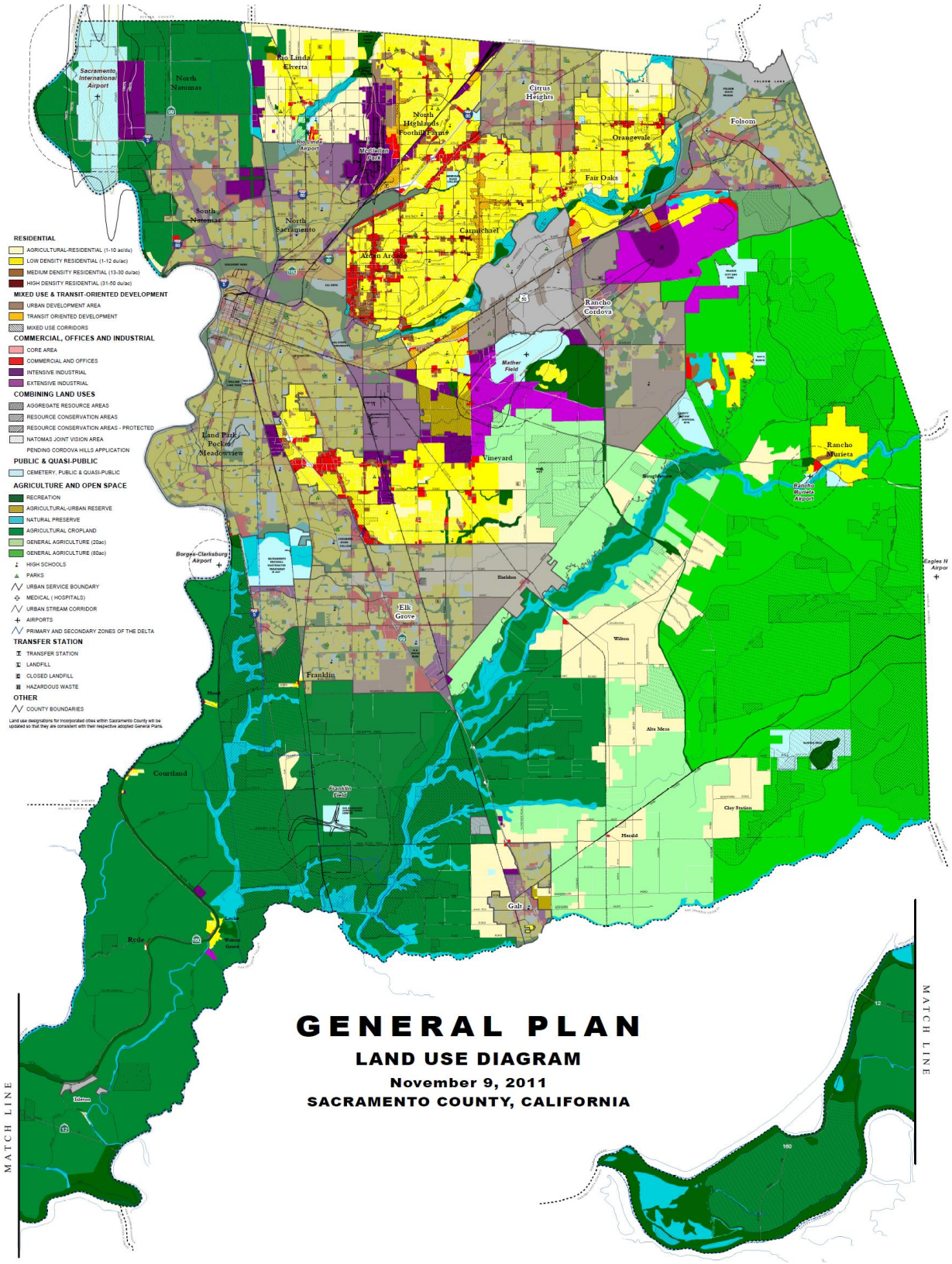
*Elk Grove was incorporated in 2000; Rancho Cordova was incorporated in 2002

**This number is misleading, as two current cities were unincorporated County in 2000.

Current Land Use/Zoning

Future land use and growth management strategies in Sacramento County aim to concentrate future development into and toward existing communities through various policies relating to zoning and minimum development standards and requirements. Zoning designations prescribe allowed land uses and minimum lot sizes for the purpose of supporting efficient infrastructure design, conservation of natural resources, and to avoid conflicting uses. Figure 4-71 shows current land use designations in Sacramento County.

Figure 4-71 Sacramento County Land Use Diagram



Source: Sacramento County General Plan

Development since 2011 Plan

As shown in Table 4-51, the Sacramento County Planning Area has seen a growth of about 2% between 2010 and January 1, 2015.

Table 4-51 Sacramento County Planning Area Population Growth Since 2010

Year	Population	Population Change	Percent Change
2010	1,445,327	–	–
2015	1,470,912	25,585	1.8%

Sources: US Census Bureau California Department of Finance

The Sacramento County Building Department tracked total building permits issued since 2011 for Unincorporated Sacramento County. These are tracked by total development, property use type, and hazard risk area. These are shown in Table 4-52 and Table 4-53. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people living in the area potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the unincorporated County to identified priority hazards.

Table 4-52 Unincorporated Sacramento County Total Development Since 2011

Property Use	2011	2012	2013	2014	2015
Residential	755	732	674	870	1,338
Commercial/ Industrial	588	400	464	491	558
Other	0	0	0	0	0
Total	**1,343**	**1,132**	**1,138**	**1,361**	**1,896**

Source: Sacramento County Building Department

Table 4-53 Unincorporated Sacramento County Development in Hazard Areas since 2011

Property Use	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Residential	38 (SFD only)	N/A	unknown	N/A
Commercial	119[2]	N/A	unknown	N/A
Industrial	Included w' commercial	N/A	unknown	N/A
Other	N/A	N/A	unknown	N/A
Total		N/A	unknown	N/A

Source: Sacramento County Building Department

[1]Moderate or higher wildfire risk area

[2]Includes 5 properties in the FEMA A99 zone.

Future Development

As indicated in the previous section, Sacramento County has been steadily growing over the last seven decades. Long term forecasts by the California Department of Finance project population growth in Sacramento County continuing through the 2060. Table 4-54 shows the population projections for the County as a whole through 2060.

Table 4-54 Population Projections for Sacramento County Planning Area, 2010-2060

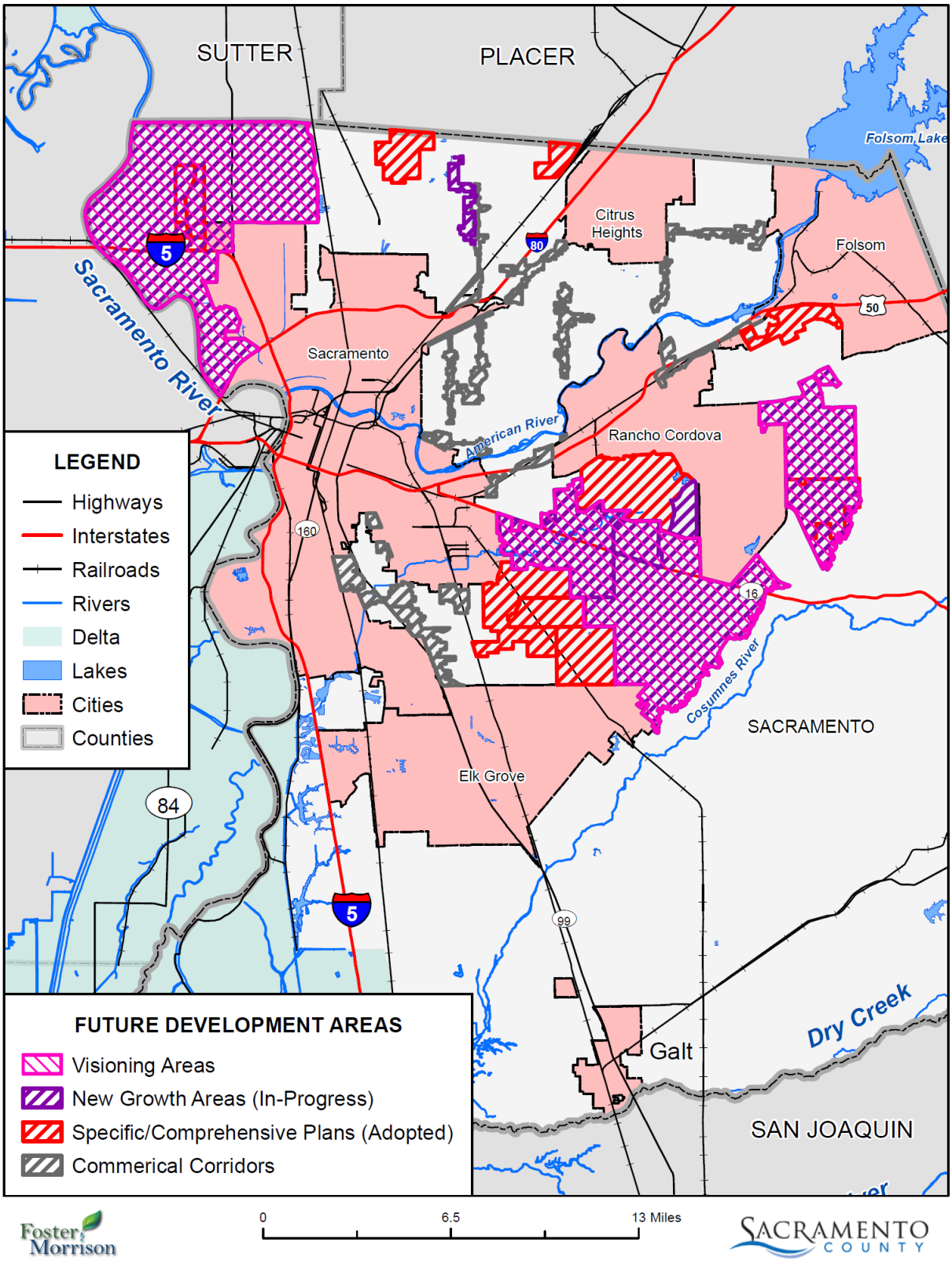
Year	Sacramento County Population Projection
2010	1,421,236
2015	1,475,381
2020	1,554,022
2025	1,639,613
2030	1,730,276
2035	1,823,985
2040	1,912,838
2045	1,989,722
2050	2,047,662
2055	2,100,788
2060	2,153,833

Source: California Department of Finance, P-1 Report

Future Development Areas

The Sacramento County planning department identified future development areas for the unincorporated County separated out into four categories which are described further below: Visioning Areas, New Growth Areas, Specific/Comprehensive Plans, and Commercial Corridors. Mapping of these Future Development Areas are included in Figure 4-72

Figure 4-72 Future Development Areas in Sacramento County



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

New Growth and Visioning Areas

In addition to those areas for which Specific Plans and Comprehensive Plans have been adopted and identified below, the County has also identified one distinct new growth area in the General Plan. Additionally, the County prepared visioning concept maps for the Natomas, Jackson Highway and Grant Line East Visioning Areas. The visioning process is a way of gaging how landowners view the future development of an area. It involves no changes to General Plan designations or zoning, and does not provide any entitlement. It is included here as an indication of potential future development.

Since the adoption of the 2030 General Plan in 2011, the Board of Supervisors has initiated five growth area Master Plans including Mather South, Natomas North Precinct and the Jackson Corridor Master Plans: NewBridge, West Jackson and Jackson Township. No plans have yet been adopted for these identified new growth areas.

Specific Plan and Comprehensive Plan Areas

Specific Plans provide direction for entire communities or other defined new geographic areas. They take different forms depending on the specific needs of our communities and typically set forth policy and implementation strategies for such items as land use, transportation, urban design, parks, school facilities and public services. Comprehensive Plans are very similar in nature to Specific Plans, but may not include a detailed financing plan which is required under state law to be considered a Specific Plan. These plans help implement the County General Plan on area-specific basis. In addition, the County has initiated and implemented special planning programs for projects that are unique and controversial in nature. Specific Plans and Comprehensive Plans are shown in Figure 4-72. Specific Plans and Comprehensive Plans adopted prior to the update of the 2030 General Plan are:

- Specific Plans
  - ✓ Cordova Hills
  - ✓ Easton Project
  - ✓ East Antelope
  - ✓ Elverta
  - ✓ Mather Field
  - ✓ Metro Airpark
  - ✓ North Vineyard Station

- Comprehensive Plans
  - ✓ Florin Vineyard Gap (2010)
  - ✓ Vineyard Springs (2000)

No Specific Plans or Comprehensive Plans have been adopted since the adoption of the 2030 General Plan. Those in process are part of the Master Plan projects, identified above.

Commercial Corridors

The General Plan Update Land Use Element identifies the following fourteen commercial corridors for redevelopment, reinvestment, and/or intensification.

- North Watt Area
- Florin Road Area
- Auburn Blvd. North
- Fair Oaks Blvd. Central
- Franklin Blvd.
- Greenback Lane
- Stockton Blvd South
- Auburn Blvd. Central
- Fair Oaks Blvd. East
- Fair Oaks Blvd. West
- Fulton Avenue
- Stockton Blvd. Central
- Watt Avenue Central
- Folsom Blvd.

These corridors, shown in green on Figure 4-72, were identified as having substantial vacant and underutilized land, which could accommodate additional commercial and mixed use growth. Potential scenic resources on some of these properties may include landmark trees, native trees, heritage oak trees, urban streams, and/or historic structures of local interest.

Data for these Visioning areas, New growth areas, specific plan and comprehensive plan areas, and commercial corridors is maintained by Sacramento County and was made available for this plan. An analysis was performed to inventory and quantify parcels within these development areas in total as well as those that fall within mapped hazard areas. Mapping of these areas, including hazard overlays, can serve as a guide for how and where to grow in the future.

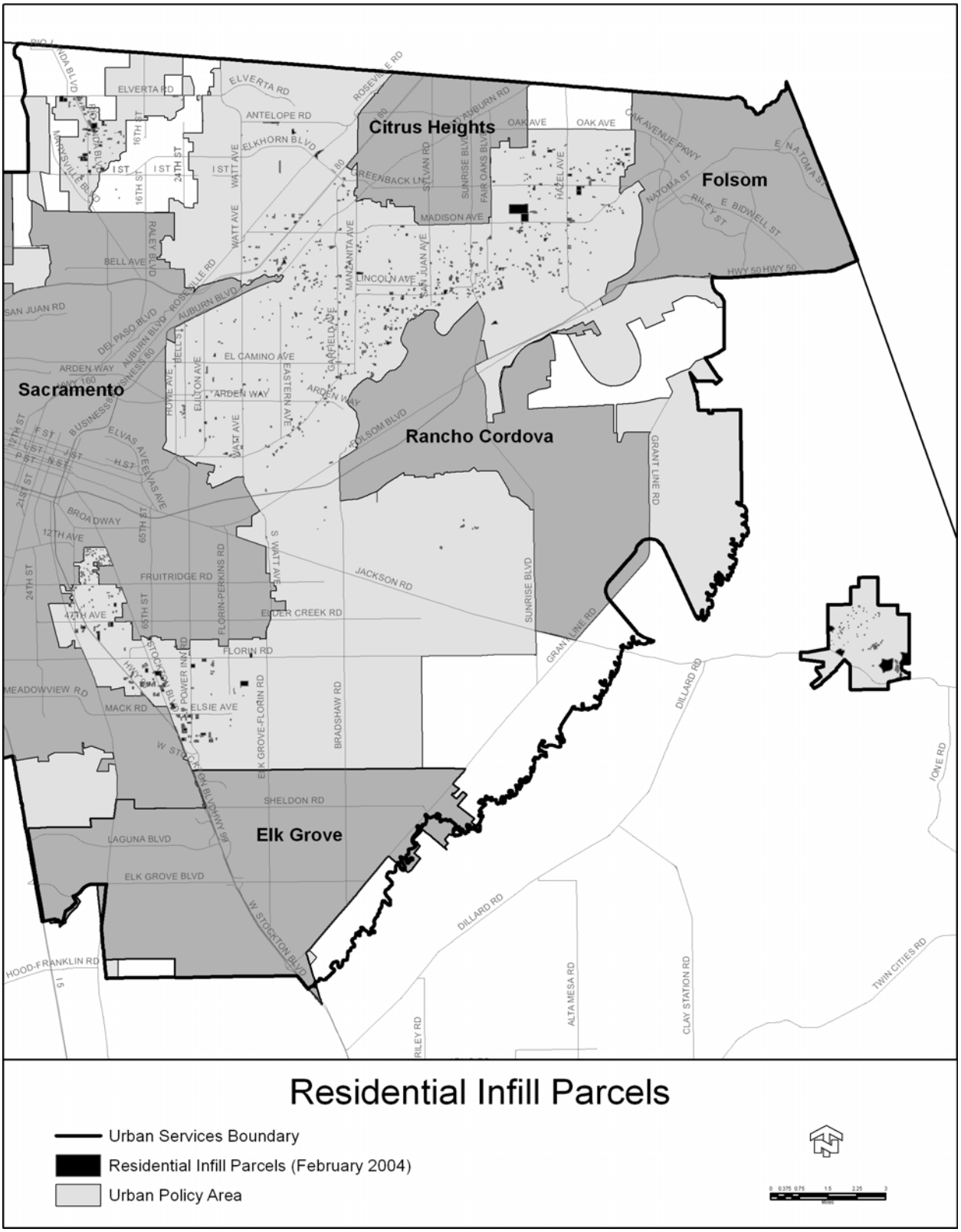
Methodology and analysis of vulnerability of these future development areas to dam, flood, levee failure, and wildfire can be found in their respective hazard vulnerability assessments:

- Dam Failure (Section 4.3.6)
- Flood (Section 4.3.10)
- Levee Failure (Section 4.3.12)
- Wildfire (Section 4.3.16)

Infill

Finally, the County has developed an infill strategy. The County's infill strategy is comprised of four components: 1) maximize residential development opportunity on vacant lands planned for residential use in the established urban community; 2) reuse or redevelop abandoned, unsafe or blighted structures; 3) when appropriate, support rezoning of excess commercial and/or industrial lands to residential uses; 4) increase intensity and density of development on underutilized lands when found to be appropriate. The residential infill parcels identified in the 2030 General Plan Update Land Use Element (Figure 4-73) are scattered throughout established urban communities within Urban Policy Area (UPA) of the unincorporated County. The UPA is intended to provide an adequate supply of developable land sufficient to accommodate projected growth.

Figure 4-73 Sacramento County Infill Parcels



Source: Sacramento County General Plan Environmental Impact Report

4.3.2. Sacramento County Vulnerability to Specific Hazards

DMA regulations require that the HMPC evaluate the risks associated with each of the hazards identified in the planning process. This section summarizes the possible impacts and quantifies, where data permits, the Sacramento County Planning Area's and unincorporated Sacramento County's vulnerability to each of the hazards identified as a priority hazard in Section 4.2.22 Natural Hazards Summary. Where specific hazards vary across the County, additional information can be found in the jurisdictional annexes. Based on information developed for the hazard profiles, the priority hazards evaluated further as part of this vulnerability assessment include:

- Agricultural Hazards
- Bird Strike
- Climate Change
- Dam Failure
- Drought and Water Shortage
- Earthquake
- Earthquake: Liquefaction
- Flood: 100/200/500-year
- Flood: Localized/Stormwater Flooding
- Levee Failure
- River/Stream/Creek Bank Erosion
- Severe Weather: Extreme Temperatures – Heat
- Severe Weather: Heavy Rain and Storms
- Wildfire

An estimate of the vulnerability of the Planning Area and unincorporated County to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Other information can be collected in regard to the hazard area,

such as the location of critical community facilities, historic structures, and valued natural resources. Together, this information conveys the impact, or vulnerability, of that area to each hazard.

The HMPC identified five hazards in the Planning Area for which specific geographical hazard areas have been defined and for which sufficient data exists to support a quantifiable vulnerability analysis. These five hazards are dam failure, earthquake, flood, levee failure, and wildfire. Because these hazards have discrete hazard risk areas, their risk varies by jurisdiction. The vulnerability of the dam failure, flood (100/500-year), levee failure, and wildfire were analyzed using GIS and County parcel and assessor data. For these four hazards, HMPC inventoried the following for each community, to the extent possible, to quantify vulnerability in identified hazard areas:

- General hazard-related impacts, including impacts to life, safety, and health
- Assets at risk (i.e., types, numbers, and value of land and improvements)
- Identification of population at risk
- Identification of cultural and natural resources at risk
- Identification of critical facilities at risk
- Overall community impact
- Future development/development trends within the identified hazard area

The HMPC used FEMA's loss estimation software, HAZUS-MH, to analyze the County's vulnerability to earthquakes. Though not fully mapped, a limited analysis was performed on the localized flood hazard to estimate possible damages to localized flooding.

The vulnerability and potential impacts from priority hazards that do not have specific mapped areas nor the data to support additional vulnerability analysis are discussed in more general terms. These include:

- Bird Strike
- Climate Change
- Drought and Water Shortage
- Earthquake: Liquefaction
- River/Stream/Creek Bank Erosion
- Severe Weather: Extreme Temperatures – Heat
- Severe Weather: Heavy Rain and Storms

The vulnerability sections below are presented alphabetically.

4.3.3. Agricultural Hazard Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

According to the USDA, every year natural disasters, such as droughts, earthquakes, extreme heat and cold, floods, fires, earthquakes, hail, landslides, and tornadoes, challenge agricultural production. Because agriculture relies on the weather, climate, and water availability to thrive, it is easily impacted by natural events and disasters. Agricultural impacts from natural events and disasters most commonly include: contamination of water bodies, loss of harvest or livestock, increased susceptibility to disease, and

destruction of irrigation systems and other agricultural infrastructure. These impacts can have long lasting effects on agricultural production including crops, forest growth, and arable lands, which require time to mature. Specific impacts by hazard are listed below:

- Drought's most severe effects on agriculture include water quality and quantity issues. Other impacts include decreased crop yields, impact to feed and forage, and altered plant populations.
  - ✓ The County has been in a drought for the last 5 years. The County Agricultural Commissioner has written a "Letter of Loss" to the USDA/FSA (USDA/Farm Services Agency) for the Livestock Forage Disaster Program, every year since 2011 due to losses in pasture or forage areas. The FSA has various ag insurance programs to assist growers. Growers can enroll in crop insurance programs for all natural causes of loss listed in their policies (such as fire, flood, extreme temperatures). For those without insurance, NAP (the Non-insured Crop Disaster Assistance Program) managed by USDA's Farm Service Agency provides financial assistance to producers of non-insurable crops when low yields, loss of inventory or due to natural disasters. The county agricultural commissioners can write a "Letter of Ag Loss", identifying the crop & % of loss, to allow growers to receive either low cost loans or monetary compensation.
- Earthquakes can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on agricultural production and the environment. These impacts could include loss of harvest or livestock and destruction of irrigation systems and other agricultural infrastructure.
- Extreme cold may result in loss of crops, livestock, increased deicing, downed power lines, and increased use of generators. Deicing can impact agriculture by damaging local ecosystems and contaminating water bodies.
- Hot weather and extreme heat can worsen ozone levels and air quality as well as leading to drought conditions. Excessive heat and prolonged dry or drought conditions can impact agriculture by creating worker safety issues for farm field workers, severely damaging crops, and reducing availability of water and food supply for livestock.
- Wildfires can spread quickly and devastate thousands of acres of land, which may include agricultural lands. This devastation could lead to large losses in crops, forestry, livestock, and agricultural infrastructure.
- Flooding causes many impacts to agricultural production, including water contamination, damage to crops, loss of livestock, increased susceptibility of livestock to disease, flooded farm machinery, and environmental damage to and from agricultural chemicals.
  - ✓ Reclamation Districts and Flood Control Districts are responsible for maintenance of levees. There are also private levees maintained by the landowners. Vegetation and vertebrates (ground squirrels) are controlled to maintain the integrity of the levees. There are permanent crops and winter crops which may be affected during the times of year when flooding is most likely to occur. Permanent crops such as vineyards and orchards can withstand temporary flooding, such as 1-2 days, before permanent damage may begin to occur. Winter wheat and young plantings may be washed away in a flood event.
- Landslides and debris flows occur in all 50 states and commonly occur in connection with other major natural disasters such as earthquakes, volcanoes, wildfires, and floods. Some of the threats from landslides and debris flow include rapidly moving water and debris that can cause trauma; broken electrical, water, gas, and sewage lines; and disrupted roadways and railways. This can lead to

agricultural impacts including contamination of water, change in vegetation, and harvest and livestock losses.

- High Winds and microbursts can appear without much warning and have the potential to devastate an area very quickly. This devastation can impact agriculture by contaminating water and destroying crops, livestock, and other farm property.

In addition to impacts from natural hazards, the County noted that invasive pests can cause economic damage, affecting the ability to ship agricultural commodities oversees, inter-state and intra-state. Trade can be impacted significantly. The CDFA is responsible for managing invasive pests statewide. CDFA works closely with the CAC's to manage the pests through quarantines, detection and eradication programs. USDA is also responsible for managing invasive pests which have the potential to impact agriculture nationally. USDA works in partnership with CDFA and the CACs to manage pests.

The County also noted that there are possible threats of bioterrorism. Bioterrorism threats to agriculture would be handled by the USDA, in cooperation with CDFA and the CAC's.

Future Development

Future development in the County is not likely to have an impact on agricultural hazards in Sacramento County.

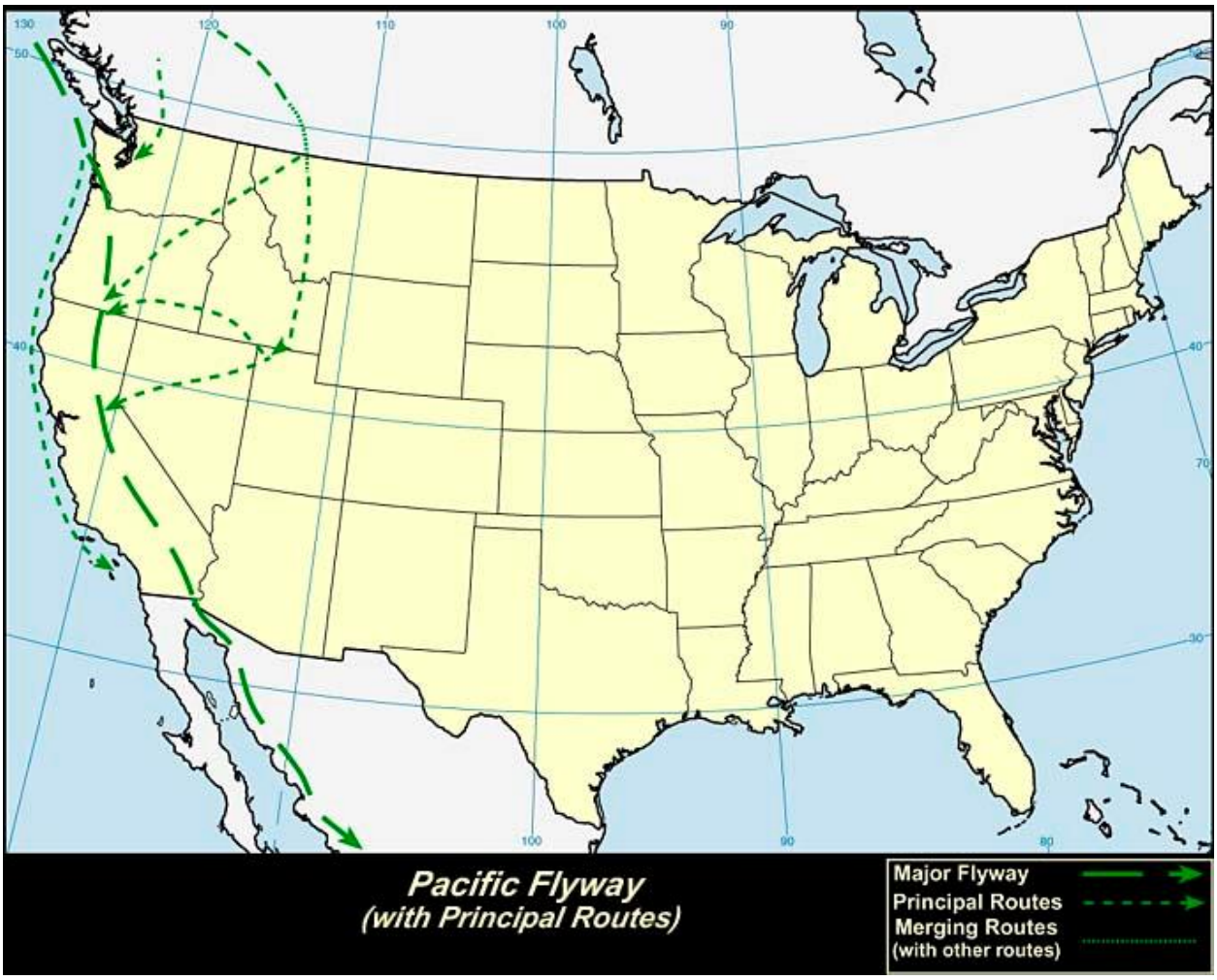
4.3.4. Bird Strike Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Collisions between wildlife and aircraft (wildlife strikes) are a threat to civil and military aircraft, causing billions of dollars in aircraft damage. Globally, wildlife strikes killed 229 people and destroyed over 210 aircraft between 1988 and 2008. According to the FAA National Wildlife Database (Wildlife Database), almost 90,000 reported wildlife strikes occurred in the United States (U.S.) 1990 through 2008, with 7,516 strikes in 2008 alone. Birds account for more than 97 percent of wildlife strikes. Most bird strikes happen fairly close to the ground, with sixty percent occurring within 100 feet or less above ground level (AGL), 73 percent at 500 feet AGL or less, and 92 percent at 3,000 feet AGL or less.

In Sacramento County, there are five public, and 17 private airports. The Sacramento airports are in the Pacific flyway for migratory birds and reports more bird strikes annually than any other airport in the Western U.S. (see Figure 4-74).

Figure 4-74 Pacific Flyway Routes



Source: birdnature.com. http://www.birdnature.com/pacific.html

Not only are airplane passengers and crew vulnerable to bird strike, downed aircraft can cause possible death and damage to property should the plane not be able to return to the airport runway. Most vulnerable are those who live or work within the direction of the takeoff or landing zones under 3,000 feet above ground level, as 92 percent of bird strikes occur in that zone.

The California State Aeronautics Act (codified in the CA Public Utilities Code) provides guidance for conducting airport land use compatibility planning. Thus, even though on a national average 92 percent of strikes occur below 3,000 feet AGL, in California there is a mechanism for minimizing incompatible land uses, such as residential housing, within the area where aircraft would operate at this elevation.

In the case of SMF, the airport is comprised of about 6,000 acres, about half of which comprises the airport itself. The remaining acreage, located north and south of the airport in alignment with approaching and departing aircraft, is undeveloped land under the operational control of the Sacramento County Airport System. No incompatible land uses occur in this area. It is managed exclusively for safe aircraft approach, departure, and circling operations.

The area adjacent to SMF is rural, consisting primarily of agriculture. Thus, if an unfortunate combination of circumstances were to occur, an aircraft experiencing a damaging bird strike below 3,000 AGL would be unlikely to have an uncontrolled landing in a developed area. In all likelihood, damage to property and people on the ground would be minimal, with most or all of the damage occurring to the aircraft.

Unlike other some other airports like JFK or LAX, SMF is surrounded by neither large bodies of water nor dense urban development. The area encompassed within aircraft overflights below 3,000 AGL is therefore quite different here than at those airports.

Future Development

Future development is not expected to be affected by the bird strike hazard in Sacramento County.

4.3.5. Climate Change Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Low

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change.

The APG: Defining Local and Regional Impacts focuses on understanding the ways in which climate change can affect a community. According to this APG, climate change impacts (temperature, precipitation, sea level rise, ocean acidification, and wind) affect a wide range of community structures, functions and populations. These impacts further defined by regional and local characteristics are discussed by secondary impacts and seven sectors found in local communities: Public Health, Socioeconomic, and equity impacts; Ocean and Coastal Resources; Water Management; Forest and Rangeland; Biodiversity and Habitat; Agriculture; and Infrastructure.

Sacramento County Climate Change Impacts

The APG: Understanding Regional Characteristics identified the following impacts specific to the Bay-Delta region in which the Sacramento County Planning Area is part of:

- Temperature increases
- Reduced precipitation
- Sea level rise
- Flooding – increased flows in areas below sea level, exacerbated by levee failure
- Reduced agricultural productivity
- Reduced water supply
- Public health – heat & air pollution
- Decline in Biodiversity

Ascent Environmental Climate Change Vulnerability Assessment

According to the Preliminary Draft – Climate Change Vulnerability Assessment for the Sacramento County Climate Adaptation Plan (CAP) prepared by Ascent Environmental (Ascent), climate change is already affecting and will continue to alter the physical environment throughout the Central Valley and Sacramento County; however, specific implications of climate change effects vary with differing physical, social, and economic characteristics within the County. Their report followed the nine-phase APG process for local and regional climate vulnerability assessment and adaption strategy development. The APG vulnerability assessment is a five step process of determining: Exposure, Sensitivity, Potential Impacts, Adaptive Capacity, and Risk and Onset.

At the time of this LHMP Update, Ascent had completed the initial exposure assessment for Sacramento County. The methodology for the exposure assessment is described below and Information specific to the exposure assessment is included in each of the affected natural hazard profiles. Additional County-specific vulnerability assessment data developed through preparation of Sacramento County's CAP will be included in the next five-year update to this LHMP.

CAP Exposure Methodology

Where predictive data exists, climate change effects are characterized by two milestone years: midcentury (2050) and end of century (2100). Historical data are used to set the baseline for describing the degree of change occurring by these two future dates. This exposure assessment evaluated the direct, or primary, effects of climate change in Sacramento to include deviations in average temperature, annual precipitation and seal-level rise. Secondary impacts, which could occur as result of one or more of these effects are also analyzed and include extreme heat and its frequency, wildfire risk, flooding, and snowpack amount and retention. Ascent utilized Cal-Adapt to forecast potential climate change impacts over time. Cal-Adapt is a climate change scenario planning tool developed by the California Energy Commission and the University of California Berkeley Geospatial Innovation Facility. Cal-Adapt downscales global climate simulation model data to local and regional resolution under two emissions scenarios: the A-2 scenario represents a higher, future GHG emissions scenario, and the B-1 scenario represents a lower future GHG emissions scenario. Which scenario occurs in the future depends on the effectiveness of programs implemented to reduce GHG emissions. Because the degree of effectiveness is not yet known, results from both emissions scenarios are considered in this vulnerability assessment and distinguished, where possible.

Future Development

Sacramento County in general could see population fluctuations as a result of climate impacts relative to those experienced in other regions, and these fluctuations are expected to impact demand for housing and other development. For example, sea level rise may disrupt economic activity and housing in coastal communities, resulting in migration to inland urban areas like the Sacramento region. Other interior western states may experience an exodus of population due to challenges in adapting to heat even more extreme than that which is projected to occur here. While there are currently no formal studies of specific migration patterns expected to impact the Sacramento region, climate-induced migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2015 and is expected to be the focus of future studies.

Climate change, coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development. Demand may increase for smaller dwellings that are less resource intensive, more energy efficient, easier to maintain and can be more readily adapted or even moved in response to changing conditions. Compact, mixed-use and infill developments that can help residents avoid long commutes and vulnerabilities associated with the transportation system will likely continue to grow in popularity. The value of open space and pressure to preserve it will likely increase, due in part to its restorative, recreational, environmental and habitat benefits but also for its ability to sequester carbon, help mitigate the accumulation of greenhouse gas in the atmosphere and slow down the global warming trend. Higher flood risks, especially if coupled with increased federal flood insurance rates, may decrease market demand for housing and other types of development in floodplains, while increased risk of wildfires may do the same for new developments in the urban-wildland interface. Flood risks may also inspire new development and building codes that elevate structures while maintaining streetscapes and neighborhood characteristics.

Climate change will stress water resources. Water is an issue in every region, but the nature of the potential impacts varies. Drought, related to reduced precipitation, increased evaporation, and increased water loss from plants, is an important issue in many U.S. regions, especially in the West. Floods, water quality problems, and impacts on aquatic ecosystems and species are likely to be amplified by climate change. Declines in mountain snowpack are important in Sacramento County the Sierra Nevada Mountains and across the state, where snowpack provides vital natural water storage and supply. The ability to secure and provide water for new development requires on-going monitoring and assurances. It is recommended that the ability to provide a reliable water supply from the appropriate water purveyor, continue to be in the conditions for project approval, and such assurances shall be verified and in place prior to issuing building permits.

Similarly, protecting and enhancing water supply will also need to be addressed. California's Sustainable Groundwater Management Act (SGMA) will contribute to addressing groundwater and aquifer recharge needs. Good groundwater management will provide a buffer against drought and climate change, and contribute to reliable water supplies regardless of weather patterns. California depends on groundwater for a major portion of its annual water supply, and sustainable groundwater management is essential to a reliable and resilient water system. Protection of critical recharge areas should be addressed across the County in the respective Groundwater Management Plans. Further, these plans should include provisions that guide development or curtail development in areas that would harm or compromise recharge areas. In South Sacramento County the South Sacramento Habitat Conservation Plan (SSHCP) covers a significant area of prime groundwater recharge areas. Including SGMA Plans that overlap with SSHCP for purposes of protecting these areas and having a robust mitigation program makes sense and should be further explored.

Climate change will affect transportation. The transportation network is vital to the county and the region's economy, safety, and quality of life. While it is widely recognized that emissions from transportation have impacts on climate change, climate will also likely have significant impacts on transportation infrastructure and operations Examples of specific types of impacts include softening of asphalt roads and warping of railroad rails; damage to roads; flooding of roadways, rail routes, and airports from extreme events; and interruptions to flight plans due to severe weather. Sacramento Area Council of Governments (SACOG) adopted a Transportation Climate Adaptation Plan that discusses the

vulnerabilities associated with climate. Climate change impacts considered in the plan include: extreme temperatures; increased precipitation, runoff and flooding; increased wildfires; and landslides. Although landslides are not a direct result of climate change, these events are expected to increase in frequency due to increased rainfall, runoff, and wildfire. These events have the potential to cause injuries or fatalities, environmental damage, property damage, infrastructure damage, and interruption of operations. Separately, new communities currently being master planned are including amenities such as bike and walking trails, separated facilities from roadways. During flood events, these trails serve as secondary transportation facilities when roadways are blocked or otherwise impassible. During Hurricane Sandy, bicycles were one of the primary modes used to deliver food and water to residents stranded in their homes due to flood. Including dual or multi-purpose facilities and amenities as part of all new development provides not just desirable community amenities but critical infrastructure for climate resiliency.

Climate change will affect land uses and planning. Climate change coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development. Demand may increase for smaller dwellings that are less resource intensive, more energy efficient, easier to maintain and can be more readily adapted or even moved in response to changing conditions. Compact, mixed-use and infill developments that can help residents avoid long commutes and vulnerabilities associated with the transportation system will likely continue to grow in popularity. The value of open space, urban greening, green infrastructure, tree canopy expansion and pressure to preserve it will likely increase, due in part to its restorative, recreational, environmental, and habitat, and physical and mental health benefits but also for its ability to sequester carbon and cool the surrounding environment.

Climate change will affect Utilities. California is already experiencing impacts from climate change such as an increased number of wildfires, sea level rise and severe drought1. Utility efforts to deal with these impacts range from emergency and risk management protocols to new standards for infrastructure design and new resource management techniques. Utilities are just beginning to build additional resilience and redundancy into their infrastructure investments from a climate adaptation perspective, but have been doing so from an overall safety and reliability perspective for decades. Significant efforts are also being made in those areas that overlap with climate change mitigation2 such as diversification of resources, specifically the addition of more renewables to the portfolio mix, as well as implementation of demand response efforts to curb peak demand. Efforts are also under way to upgrade the distribution grid infrastructure, which should add significant resilience to the grid as well. Through the DOE Partnership for Energy Sector Climate Resilience member utilities including SMUD and PG&E are preparing Vulnerability Assessments to identify priority climate and weather-related vulnerabilities. Next, they will issue a guidance document that expands upon the vulnerability assessments phase and includes plans for resilience solutions including cost/benefit analysis methodologies. The outcomes of this work will help to inform next steps on how infrastructure, the grid and other related operations will be modified to address climate change. New development will have to adapt and incorporate these new approaches as they evolve. Existing and new development will be affected from impacts that includes not only diminished capacity from all of the utility assets from generation to transmission and distribution, but also the cost consequences resulting from prevention, replacement, outage, and energy loss. These have the potential for greatly impacting not just residential development but commercial and industrial and all utility users.

Addressing Urban Heat Islands and Heat Events. New development will contribute to urban heat island (UHI) impacts and will need to incorporate urban greening methods into all aspects of development; interior

and exterior of buildings, surrounding environment and beyond. The Sacramento County Phase 1 Vulnerability Assessment already described that heat generated from the developed and urbanized areas of Sacramento moves across the county and region, settling and impacting the lower foothill communities. New development will need to reduce its impacts to the overall UHI impacts affecting the county and surrounding region. On-going and expanding heat wave awareness and assistance will also affect new development. During heat waves in Sacramento, a heat alert is issued and news organizations are provided with tips on how vulnerable people can protect themselves. Programs used by health departments to engage with thousands of block captains to check on elderly and other vulnerable residents, along with public cooling places extending their hours, or local businesses welcoming residents into their businesses for purposes of staying cool are examples of programs and services that will be necessary. Other programs to consider that could further involve hospitals and clinics are operating a "heatline" with nurses or other healthcare professionals ready to assist callers with heat-related health problems. In addition, continued funding for weatherization, reduced utility rates and similar programs that offers assistance to elderly, low-income residents to install roof insulation, solar, trees and cool surfaces to save energy and lower indoor temperatures.

4.3.6. Dam Failure Vulnerability Assessment

Likelihood of Future Occurrence—Unlikely
Vulnerability—Medium

Dam failure flooding can occur as the result of partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall and flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam.

A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions.

Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding. Based on the risk assessment, it is apparent that a major dam failure could have a devastating impact on the Planning Area. Dam failure flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect crops and livestock as well as lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, and the local and regional economies.

According to the Sacramento County General Plan Background report, there are four major and two minor dams which, if they fail, may impact the people and resources of this jurisdiction. The major dams are comprised of Shasta on the Sacramento, Oroville on the Feather, Comanche on the Mokelumne and Folsom on the American. The minor dams include Nimbus and Rancho Seco. All of these 6 dams are high hazard dams. More specific information about these dams can be found in Figure 4-22 and Table 4-25 in Section 4.2.9. According to the report, a catastrophic failure of any of these dams could have a significant impact on the County. The failure of any of these dams would cause downstream flooding and would likely result in loss of life and property. The potential magnitude of a dam failure depends on the time of year and the

base flow of the river when the failure occurs. During the winter months, when river flows are higher, the impact to the area would be much greater and evacuation times much less.

Folsom Dam (including the earth-filled dikes) would have the greatest impact on Sacramento County should it fail. The flood waters from this system would affect the cities of Sacramento and Folsom and the surrounding unincorporated area. Due to limited availability of data of these six dams with the potential to impact the County, further vulnerability analyses was limited to a catastrophic failure of Folsom Dam.

The earthen dikes to the north of Folsom Dam would impact those people in the relatively low areas of Sacramento County leading to Roseville. The water would then flow into the Natomas Area of the City of Sacramento and then, depending on which levees held, this water could fill the old Lake Natomas bed and possibly flood the North Highlands and Rio Linda areas. Failure of the earthen dikes to the south of Folsom Dam would impact the City of Folsom immediately. Water would then flow into the American River basin, eventually arriving in downtown Sacramento.

Nimbus Dam has a capacity of 8,760 acre-feet. The Flood Operations Branch, Department of Water Resources, State of California, believes that the American River Channel will not flood unless the levees fail or there is a catastrophic release. SMUD inundation map indicates that a failure of the Rancho Seco Dam would flow to the Laguna Creek Basin and stop approximately at Stockton Boulevard. Failure of Shasta Dam would affect populations south along the Sacramento River basin to about Knights Landing where it would lose momentum. An Oroville Dam failure would impact populations southwest along the Feather River basin to about the Yolo Bypass. Sacramento County would not be affected unless all dams fail at once. A failure at Comanche Dam would affect the Delta and possibly slow the flow of other rivers through the Delta. The Bureau of Reclamation indicated the water would stop short of the Sacramento-San Joaquin County line at Interstate 5.

Assets at Risk

As described above, Folsom Dam would have the greatest impact on the Planning Area should a failure occur. Sacramento County provided a GIS inundation layer to determine the possible impacts of a Folsom Dam failure within the County and how the risk varies across the Planning Area. The methodology detailed below was followed in determining assets at risk to a dam failure. Analysis on assets at risk is provided for two different areas in this Base Plan:

- Sacramento County Planning Area
- Unincorporated Sacramento County

The Sacramento County Planning Area includes both the unincorporated County and each jurisdiction, essentially the entire geographical area of Sacramento County. Summary tables for the Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the participating jurisdictions are included in their respective annexes to this plan.

Folsom Dam and Inundation Mapping

The Folsom Dam and Reservoir Project is located on the American River, about 20 miles upstream of the City of Sacramento, California. It was designed and built by the Corps of Engineers during the period 1948

to 1956, and is now owned and operated by the U.S. Bureau of Reclamation. The reservoir has a storage capacity of 1 million acre-ft at gross pool. The project includes about 4.5 miles of man-made water retaining structure that have a crest elevation of 480.5ft above sea level. Although flood control improvements to the Folsom Dam are ongoing, this Folsom Dam inundation study still represents a worst case scenario for the Planning Area.

The Bureau of Reclamation performed an inundation study in an attempt to determine the magnitude of flooding that would result from various breach scenarios of structures located around the reservoir. The structures are Folsom Dam itself, its right wing dam, dikes 4, 5, 6, 7, 8, and Mormon Island. The results of these hydrodynamic simulations are used to generate potential inundation maps that can aid in the development of emergency actions plans and other plans such as this LHMP

Methodology

GIS was used to quantify assets at risk to a Folsom Dam failure in the County. Sacramento County provided the inundation mapping as a GIS layer for the Folsom Dam system, as part of the following breaks:

- Folsom Right Wing
- Folsom Mormon
- Folsom Dike 4
- Folsom Dike 5
- Folsom Dike 6
- Folsom Dike 7
- Folsom Dike 8
- Folsom Dam

Sacramento's parcel and associated secured roll assessor 2015 data was used as the basis for the countywide inventory of parcels and structure value. GIS was used to create a centroid, or point representing the center of the parcel polygon. The Folsom Inundation data was then overlaid on the parcel centroids to determine how much value is at risk to this worst case scenario dam failure.

The model assumes that every parcel with a structure or other improved value greater than zero is improved in some way. This approach was used to support the parcel layer analysis as there was no associated building layer available for this analysis. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessors database and the GIS parcel layer.

The property use summary categories (derived from the Use Code categories) previously assigned to the detailed assessor database were used to develop content value and show potential loss from hazards. These are shown in Table 4-55.

Table 4-55 Sacramento County Property Use Type Hazus Assignments

Hazus Property Use Category	Sacramento County Property Use Types
Residential	Residential
Agricultural	Agricultural

Hazus Property Use Category	Sacramento County Property Use Types
Commercial	Office Retail / Commercial
Institutional	Care / Health Church / Welfare
Other	Miscellaneous No Data Public / Utilities Recreational
Industrial	Industrial
Vacant Land	Vacant

Content values estimations are based on FEMA Hazus methodologies, which estimates value as a percent of improved structure values by property type/use. Table 4-68 shows the breakdown of the different property types in Sacramento County and their estimated content replacement value percentages.

Table 4-56 Content Replacement Factors

Property Use	Content Replacement Values
Residential	50%
Agricultural	100%
Commercial	100%
Institutional	100%
Other	100%
Industrial	150%
Vacant Land	0%

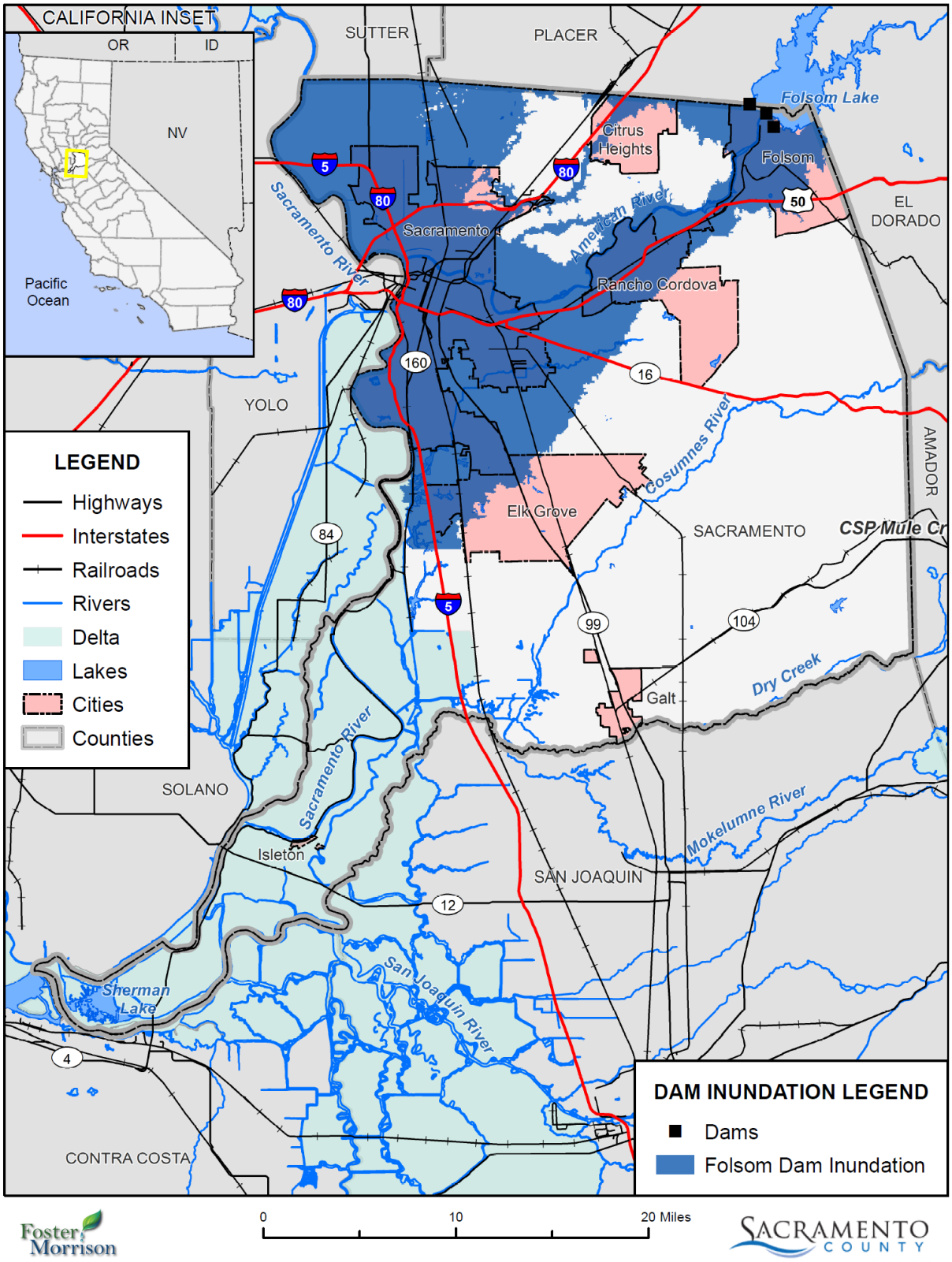
Source: Hazus

Values at Risk

Losses are related to a number of potential factors including inundation depth, velocity, and building type and construction. The loss estimate for dam inundation is based on the total of improved and contents value. Improved parcels include those with structures as well as other improvements identified in the Assessor's database. Only improved parcels and the value of their improvements were included in this dam inundation analysis.

The end result of the Folsom dam inundation analysis is an inventory of the numbers, types and values of parcels subject to the flood hazard. Figure 4-75 depicts possible dam inundation areas in the County from a failure of the Folsom Dam.

Figure 4-75 Sacramento County Planning Area Folsom Dam Inundation Scenario



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Sacramento County Planning Area

Table 4-57 contains dam inundation analysis results for the entire Sacramento County Planning Area. This includes unincorporated Sacramento County and the incorporated jurisdictions. This table shows the number of parcels and assets at risk to dam inundation from a Folsom Dam failure event. Table 4-57 shows the value of improved parcels by jurisdiction. Results of this analysis are presented for the Sacramento County Planning Area.

Table 4-57 Sacramento County Planning Area – Parcel Count and Values at Risk in Folsom Dam Break Inundation Area by Jurisdiction

Jurisdiction	Total Parcel Count	Imp. Parcel Count	Total Land Value	Improved Structure Value	Total Value
Citrus Heights	4,555	4,287	$290,331,369	$618,773,206	$909,104,575
Elk Grove	16,339	15,626	$1,373,897,822	$3,812,723,768	$5,186,621,590
Folsom	17,081	15,661	$2,174,391,545	$5,660,120,896	$7,834,512,441
Galt	0	0	$0	$0	$0
Isleton	0	0	$0	$0	$0
Rancho Cordova	15,601	14,480	$1,417,291,859	$3,788,739,950	$5,206,031,809
City of Sacramento	140,666	127,533	$11,337,851,499	$28,474,069,514	$39,811,921,013
Unincorporated Sacramento County	69,494	63,782	$6,106,346,512	$13,467,145,529	$19,573,492,041
Total	**263,736**	**241,369**	**$22,700,110,606**	**$55,821,572,863**	**$78,521,683,469**

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

Table 4-58 shows potential losses from a Folsom Dam failure with loss estimate and loss ratios for the Sacramento County Planning Area. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the unincorporated County) and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3-foot flood depth (30% damage), 6-foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table 4-58 Sacramento County Planning Area – Dam Inundation Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
Folsom Dam Inundation	241,369	$55,821,572,863	$36,931,038,925	$92,752,611,788	$27,825,783,536.40 $55,651,567,072.80 $92,752,611,788.00	21.4% 42.9% 71.5%

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table 4-57 and Table 4-58, the Sacramento County Planning Area has 241,369 improved parcels and roughly $92.8 billion of structure and contents value in the Folsom Dam inundation area. The 3-foot loss ratio of 21.4%, the 6-foot loss ratio of 42.9%, and the total loss ratio of 71.5% indicates that the Sacramento County Planning Area has large amounts of assets at risk to a possible Folsom Dam failure.

Unincorporated Sacramento County

Table 4-59 contains dam inundation analysis results for unincorporated Sacramento County. These tables show the number of parcels and assets at risk to dam inundation from a Folsom Dam failure event. Table 4-59 shows the value of improved parcels by land use. Results of this analysis are presented for the unincorporated Sacramento County.

Table 4-59 Unincorporated Sacramento County – Parcel Count and Structure Value in Folsom Dam Break Inundation Area

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	190	44	$70,372,280	$5,367,678	$75,739,958
Care / Health	119	110	$35,649,284	$207,960,127	$243,609,411
Church / Welfare	216	189	$67,899,492	$277,779,355	$345,678,847
Industrial	898	756	$344,047,576	$907,010,158	$1,251,057,734
Miscellaneous	535	3	$2,424,367	$33,114	$2,457,481
Office	564	509	$267,400,116	$842,663,098	$1,110,063,214
Public / Utilities	1,394	13	$6,055,285	$3,390,584	$9,445,869
Recreational	49	39	$24,751,939	$33,940,139	$58,692,078
Residential	61,968	61,049	$4,382,324,854	$10,184,187,333	$14,566,512,187
Retail / Commercial	1,038	963	$537,962,843	$996,790,236	$1,534,753,079
Vacant	2,519	107	$367,379,968	$8,023,707	$375,403,675
No Data	4	0	$78,508	$0	$78,508
Total	**69,494**	**63,782**	**$6,106,346,512**	**$13,467,145,529**	**$19,573,492,041**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Table 4-60 shows potential losses from a Folsom Dam failure with loss estimate and loss ratios for the unincorporated County. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the unincorporated County) and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3-foot flood depth (30% damage), 6-foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table 4-60 Unincorporated Sacramento County – Dam Inundation Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
Folsom Dam Inundation	63,782	$13,467,145,529	$8,820,533,235	$22,287,678,764	$6,686,303,629.20 13,372,607,258.40 $22,287,678,764.00	14.2% 28.4% 47.3%

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table 4-59 and Table 4-60, the unincorporated Sacramento County has 63,872 improved parcels and roughly $22.3 billion of structure and contents value in the Folsom Dam inundation area. The 3-foot loss ratio of 14.2%, the 6-foot loss ratio of 28.4%, and the total loss ratio of 47.3% indicates that while the County has large amounts of assets at risk to a possible Folsom Dam failure.

Population at Risk

As part of this Folsom Dam Inundation analysis, the population at risk to a Folsom Dam failure was determined. Using GIS, the Folsom Dam Inundation Zone was overlaid on the improved residential parcel data. Those residential parcel centroids that intersect the dam inundation area were counted and multiplied by the Census Bureau Sacramento County household factor for each jurisdiction; results were tabulated by jurisdiction (see Table 4-61). According to this analysis, there is a total population of 622,929 in the Folsom Dam Inundation Zone for the entire Sacramento County Planning Area. There are 165,443 people in the unincorporated County in the Folsom Dam Inundation Zone.

Table 4-61 Population in the Folsom Dam Inundation Area

Jurisdiction	Improved Residential Parcels	Total Population*
Citrus Heights	5,221	13,209
Elk Grove	15,475	49,211
Folsom	15,082	39,364
Galt	0	0
Isleton	0	0
Rancho Cordova	13,548	37,257
Sacramento	121,544	318,445
Unincorporated	61,049	165,443
Total	**231,919**	**622,929**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data, US Census Bureau

*Census Bureau 2010 average household sizes are: Citrus Heights – 2.53; Elk Grove – 3.18; Folsom – 2.61; Galt – 3.24; Isleton – 2.43; Rancho Cordova – 2.75; City of Sacramento – 2.62; Unincorporated County – 2.71

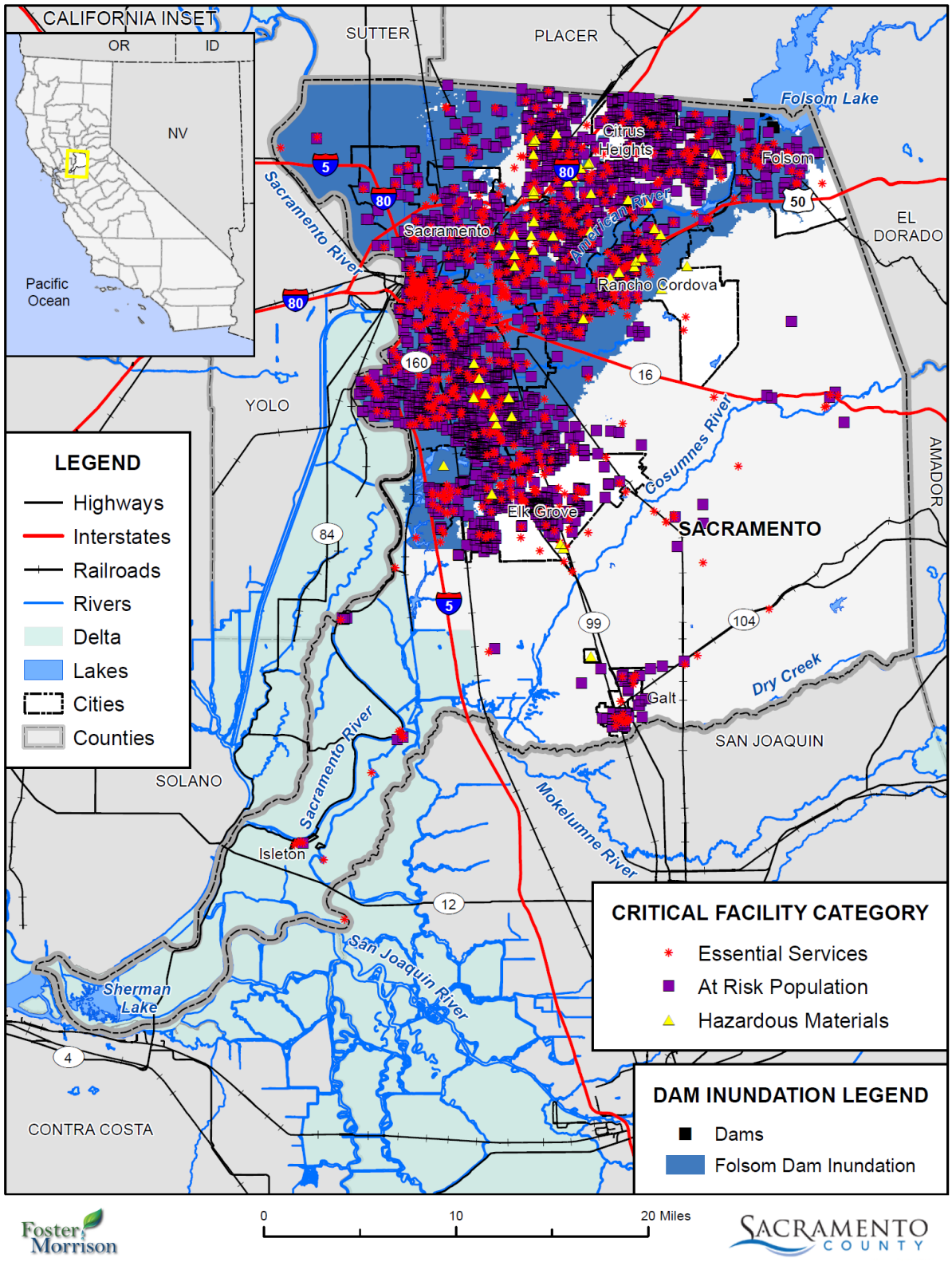
Cultural and Natural Resources at Risk

The Sacramento County Planning Area has significant cultural and natural resources located throughout the County as previously described. Vulnerability analysis of these resources specific to dam failure was not possible due to data limitations.

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect the dam inundation hazard area. There are 1,845 facilities in the inundation area, as shown in Figure 4-76, Table 4-62 (for the Planning area), and Table 4-63 (for the unincorporated County). Details of critical facility definition, type, name and address and jurisdiction in the Folsom dam inundation area are listed in Appendix E.

Figure 4-76 Sacramento County Planning Area Critical Facilities in the Folsom Dam Inundation Area



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table 4-62 Sacramento County Planning Area – Critical Facilities in the Folsom Dam Inundation Area

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Airport	5
	Arena	1
	Bus Terminal	7
	Convention Center	1
	Detention Basin	25
	Dispatch Center	1
	Drainage	6
	Emergency Evacuation Shelter	150
	Emergency Rooms	1
	EOC	1
	Fire Station	54
	Gas Storage	1
	General Acute Care Hospital	9
	Government Facilities	48
	Hospitals	1
	Light Rail Stop	52
	Medical Health Facility	156
	Police	9
	Sand Bag	2
	Stadium	3
	State Facility	1
	Traffic Operations Center	1
	Train Station	1
	Vehicle and Equipment Storage	1
	Water Treatment Plant	3
	Total	540
At Risk Population Facilities	Adult Day Care	16
	Adult Education School	8
	Adult Residential	222
	Alternative Education School	2
	Assisted Living Centers	14
	Charter School	18
	Children's Home	1
	College/University	7
	Community Day School	5

Critical Facility Category	Facility Type	Facility Count
	Day Care Center	291
	Detention Center	1
	Group Home	53
	Hotel	44
	Independent Study School	2
	Infant Center	25
	JAIL	1
	Prison	1
	Private Elementary School	36
	Private High School	20
	Private K-12 School	18
	Public Continuation High School	12
	Public Elementary School	147
	Public High School	20
	Public Middle School	27
	Residential Care/Elderly	210
	School	10
	School-Age Day Care Center	62
	Social Rehabilitation Facility	2
	Special Education School	4
	Total	**1,279**
Hazardous Materials Facilities	Oil Collection Center	25
	Sewer Treatment Plant	1
	Total	26
Total		**1,845**

Source: Sacramento County GIS

Table 4-63 Unincorporated Sacramento County – Critical Facilities in the Folsom Dam Inundation Area

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities Total	Airport	4
	Bus Terminal	1
	Detention Basin	3
	Emergency Evacuation Shelter	48
	Fire Station	23
	General Acute Care Hospital	1

Critical Facility Category	Facility Type	Facility Count
	Government Facilities	12
	Light Rail Stop	6
	Medical Health Facility	37
	Police	3
	Stadium	1
	Traffic Operations Center	1
	Vehicle and Equipment Storage	1
	Total	**141**
At Risk Population Facilities Total	Adult Day Care	4
	Adult Education School	3
	Adult Residential	83
	Charter School	4
	College/University	1
	Community Day School	3
	Day Care Center	77
	Detention Center	1
	Group Home	28
	Hotel	4
	Infant Center	9
	Private Elementary School	6
	Private High School	9
	Private K-12 School	8
	Public Continuation High School	7
	Public Elementary School	37
	Public High School	5
	Public Middle School	9
	Residential Care/Elderly	82
	School-Age Day Care Center	14
	Social Rehabilitation Facility	1
	Special Education School	1
	Total	**396**
Hazardous Materials Facilities	Oil Collection Center	14
	Sewer Treatment Plant	1
	Total	**15**
Total		**552**

Source: Sacramento County GIS

Overall Community Impact

Dam failure floods and their impacts vary by location, antecedent rainfall, type of dam failure, and will likely only affect certain areas of the County during specific times. Based on the risk assessment, it is evident that a dam failure flood could have potentially devastating economic impacts to certain areas of the County. Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community;
- Negative impact on commercial and residential property values; and
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed.
- Impact on the overall mental health of the community.

Future Development

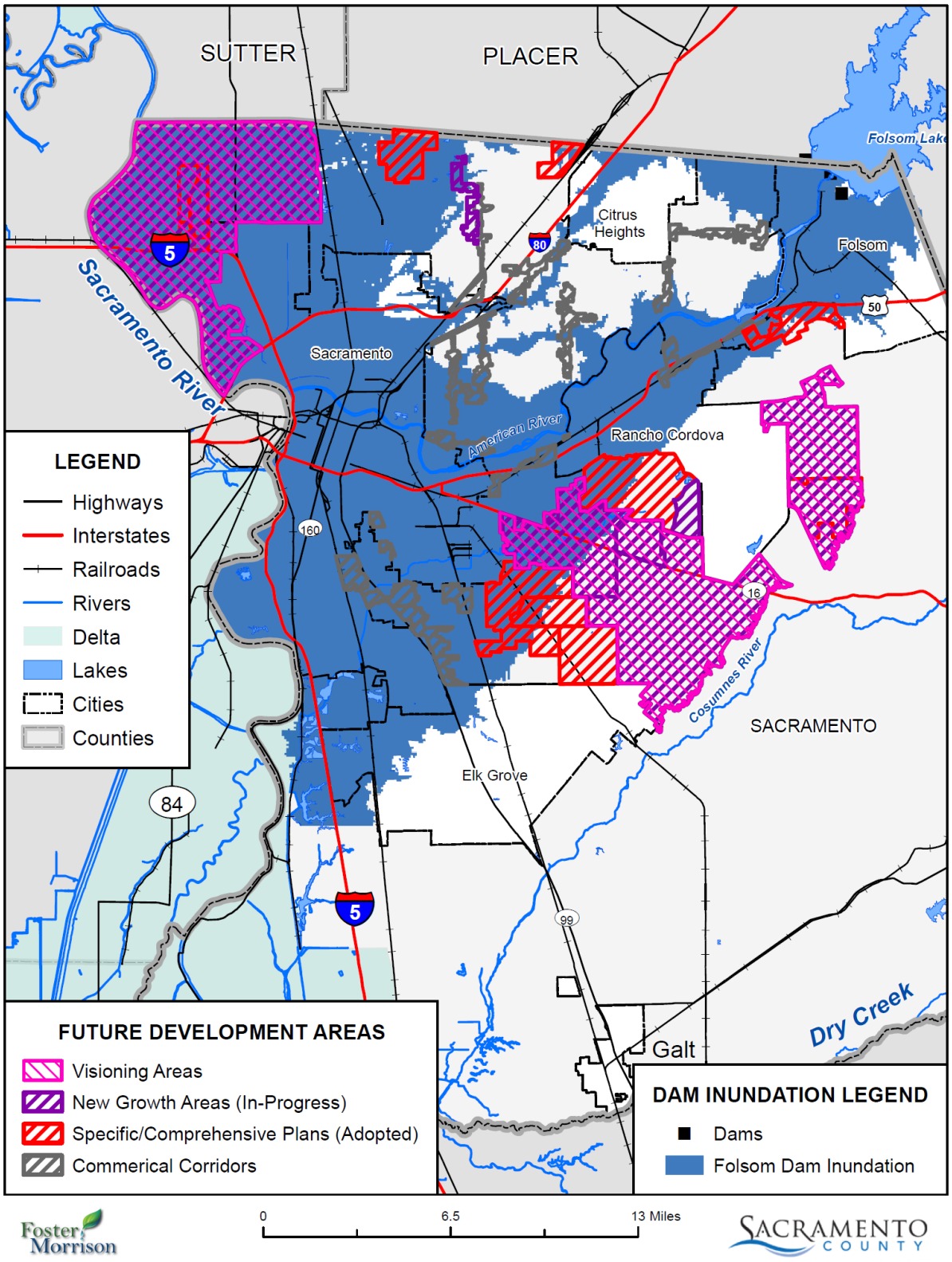
Although new growth and development corridors would fall in the area flooded by a dam failure, given the limited potential of total dam failure and the large area that a dam failure would affect, development in the dam inundation area will continue to occur.

Future Development: Inundation Analysis

Future development areas for unincorporated Sacramento County, which are broken out by visioning areas, new growth areas, specific/comprehensive plan areas, and commercial corridors, is maintained by Sacramento County and was made available for this Plan Update. An analysis was performed to quantify parcels within these future development areas that fall within dam inundation areas. This analysis provides information on how and where to grow in the future.

GIS was used to determine the number of parcels in the dam inundation zones within the four categories of future development areas. GIS was used to create a centroid, or point representing the center of the parcel polygon. Those parcels centroids that fall inside the future development areas and within the dam inundation zone are shown on Figure 4-77 and tabulated in Table 4-64.

Figure 4-77 Unincorporated Sacramento County– Future Development in Folsom Dam Inundation Area



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table 4-64 Unincorporated Sacramento County– Future Development in Folsom Dam Inundation Area

Future Development Area	Parcels	Acres	Dam Inundation Area
Visioning Areas			
Jackson	1,099	21,670	Yes
Natomas	907	24,504	Yes
Grantline East	48	8,198	No
New Growth Areas			
Mather South Master Plan	12	1,299	No
Natomas North	907	24,504	Yes
Jackson Township	61	1,909	Yes
West Jackson Highway	455	6,181	Yes
New Bridge	27	1,339	No
West of Watt	383	609	Yes
Specific/Commercial Plan Areas			
Cordova Hills Master Plan	26	2,436	No
East Antelope Specific Plan	1,425	601	Yes
Easton Project	19	1,409	Yes
Elverta Specific Plan	158	1,581	Yes
Florin-Vineyard Gap Community Plan	827	3,875	Yes
Jackson Township Master Plan	61	1,909	Yes
Mather Field	1,421	5,493	Yes
Mather South Master Plan	12	1,299	No
Metro Airpark	78	1,810	Yes
New Bridge Master Plan	27	1,339	No
North Vineyard Station Specific Plan	1,320	1,553	Yes
Vineyard Springs Comprehensive Plan	2,732	2,344	No
West Jackson Highway Master Plan	455	6,181	Yes
West of Watt	383	609	Yes
Commercial Corridor Areas			
Corridor 1	1,277	554	Yes
Corridor 2	533	226	Yes
Corridor 3	1,033	625	Yes
Corridor 4	626	532	Yes
Corridor 5	516	621	Yes
Corridor 6	579	311	Yes
Corridor 7	722	460	Yes
Corridor 8	126	136	Yes

Future Development Area	Parcels	Acres	Dam Inundation Area
Corridor 9	946	290	Yes
Corridor 10	593	101	Yes
Corridor 11	266	76	Yes
Corridor 12	2,537	1,929	Yes
Corridor 13	325	402	Yes
Corridor 14	30	155	Yes
Corridor 15	224	465	Yes
Corridor 16	31	11	Yes
Corridor 17	203	254	Yes
Corridor 18	3	1	Yes
Corridor 19	48	130	Yes

Source: Sacramento County GIS

4.3.7. Drought and Water Shortage Vulnerability Assessment

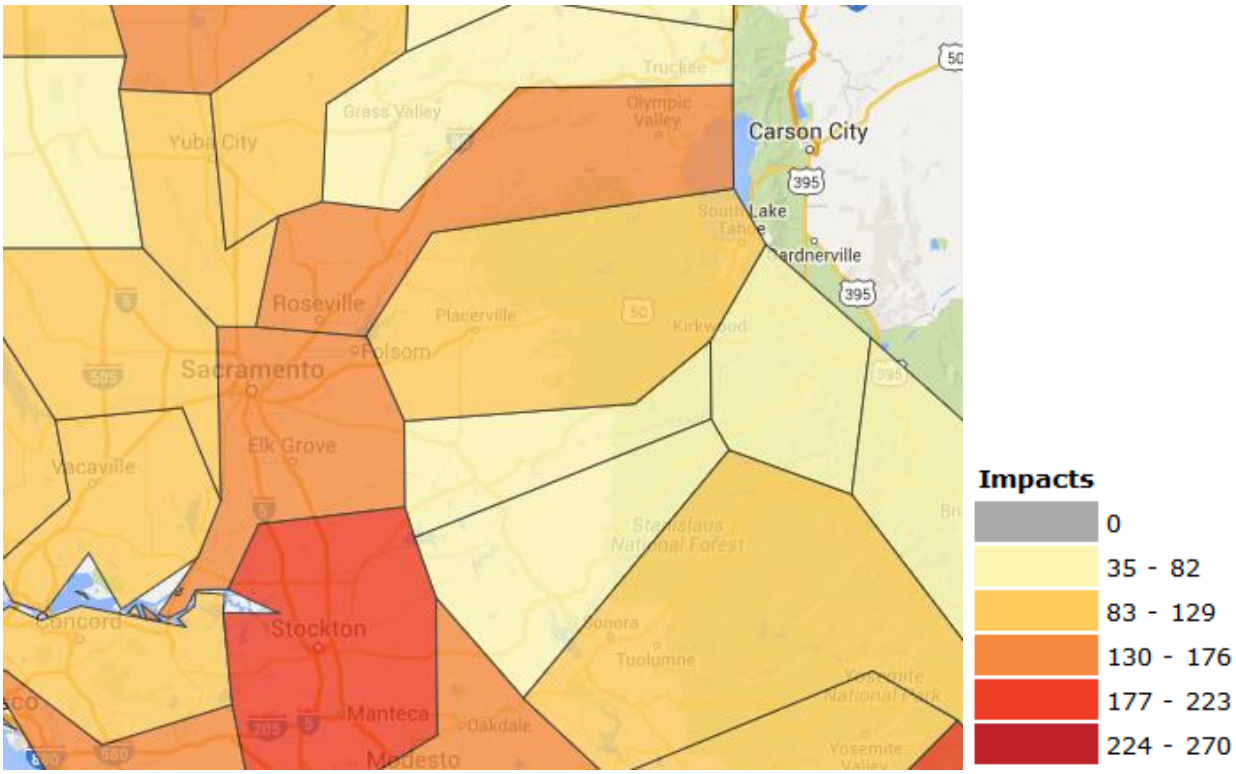
Likelihood of Future Occurrence—Likely
Vulnerability—Medium

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue for agricultural, manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Based on historical information, the occurrence of drought in California, including Sacramento County, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability of Sacramento County to drought is countywide, but impacts may vary and include reduction in water supply, agricultural losses, and an increase in dry fuels.

Drought impacts are wide-reaching and may be economic, environmental, and/or societal. Tracking drought impacts can be difficult. The Drought Impact Reporter from the NDMC is a useful reference tool that compiles reported drought impacts nationwide. Figure 4-78 and Table 4-65 show drought impacts for the Sacramento County Planning Area from 1850 to June 2016. The data represented is skewed, with the majority of these impacts from records within the past 15 years.

Figure 4-78 Drought Impact Monitor for Sacramento County, 1850 to 2016



Source: National Drought Mitigation Center

Table 4-65 Sacramento County Drought Impacts

Category	Number of Impacts
Agriculture	43
Business and Industry	8
Energy	3
Fire	14
Plants & Wildlife	49
Relief, Response, and Restrictions	84
Society and Public Health	41
Tourism and Recreation	12
Water Supply and Quality	95
Total	**349**

Source: National Drought Mitigation Center

The most significant qualitative impacts associated with drought in the Planning Area are those related to water intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation. Mandatory conservation measures are typically implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also

potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding.

It is difficult to quantitatively assess drought impacts to Sacramento County because not many county-specific studies have been conducted. Some factors to consider include: the impacts of fallowed agricultural land, habitat loss and associated effects on wildlife, and the drawdown of the groundwater table. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. The State has conducted some empirical studies on the economic effects of fallowed lands with regard to water purchased by the State's Water Bank; but these studies do not quantitatively address the situation in Sacramento County. It can be assumed, however, that the loss of production in one sector of the economy would affect other sectors.

The drawdown of the groundwater table is one factor that has been recognized to occur during repeated dry years. Lowering of groundwater levels results in the need to deepen wells, which subsequently lead to increased pumping costs. These costs are a major consideration for residents relying on domestic wells and agricultural producers that irrigate with groundwater and/or use it for frost protection. Land subsidence can also occur when the groundwater table is depleted.

Drought and Bark Beetles

One of the specific vulnerabilities of drought in Sacramento County is the increased risk to trees from beetle kill. Bark beetles mine the inner bark (the phloem-cambial region) on twigs, branches, or trunks of trees and shrubs. This activity often starts a flow of tree sap in conifers, but sometimes even in hardwoods like elm and walnut. Bark beetles frequently attack trees weakened by drought, disease, injuries, or other factors that may stress the tree. Bark beetles can contribute to the decline and eventual death of trees; however only a few aggressive species are known to be the sole cause of tree mortality (see Figure 4-79).

Figure 4-79 Monterey Pine Killed by Engraver Beetles

Source: University of California

In addition to attacking larger limbs, some species such as cedar and cypress bark beetles feed by mining twigs up to 6 inches back from the end of the branch, resulting in dead tips. These discolored shoots hanging on the tree are often referred to as "flagging" or "flags." (see Figure 4-80) Adult elm bark beetles feed on the inner bark of twigs before laying eggs. If an adult has emerged from cut logs or a portion of a tree that is infected by Dutch elm disease, the beetle's body will be contaminated with fungal spores. When the adult beetle feeds on twigs, the beetle infects healthy elms with the fungi that cause Dutch elm disease. Elms showing yellowing or wilting branches in spring may be infected with Dutch elm disease.

Figure 4-80 Flag Tips from Cypress Bark Beetle Feeding

Source: University of California

More information regarding tree mortality is discussed in the wildfire vulnerability in Section 4.3.16.

Future Development

According to the 2010 Urban Water Management Plan, Sacramento County, through the Sacramento County Water Agency, has access to large quantities of water through surface water, groundwater, and recycled water. However, population growth in the County will add additional pressure to water companies during periods of drought and water shortage. Water companies will need to continue to plan for and add infrastructure capacity for population growth.

4.3.8. Earthquake Vulnerability Assessment

Likelihood of Future Occurrence—Occasional
Vulnerability—Medium

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicentral location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault. In general, newer construction is more earthquake resistant than older construction because of improved building codes and their enforcement. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry, as was seen in the Oroville, Coalinga, Santa Cruz, and Paso Robles earthquakes.

Common impacts from earthquakes include damage to infrastructure and buildings (e.g., crumbling of unreinforced masonry, failure of architectural facades, rupturing of underground utilities, and road closures). Earthquakes also frequently trigger secondary hazards, such as dam failures, levee failures, explosions, and fires that can become disasters themselves.

A Hazus earthquake scenarios was developed for the Planning Area as presented in the 2011 LHMP. This scenario still provides a valid representation of potential impacts to the Planning Area and is captured below.

Estimating Potential Losses

Earthquake losses will vary across the Sacramento County Planning Area depending on the source and magnitude of the event. The earthquake scenarios run for the 2011 LHMP for the County provides a good estimate of loss to the Planning Area based on a realistic earthquake scenario. The results of these scenarios are reproduced below.

2011 Earthquake Scenario: Methodology

HAZUS-MH MR-4 was utilized to model earthquake losses for Sacramento County. Specifically, the probable magnitude used for Sacramento County utilized a 7.0 magnitude earthquake. Level 1 analyses were run, meaning that only the default data was used and not supplemented with local building inventory or hazard data. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis.

The methodology for running the probabilistic earthquake scenario used probabilistic seismic hazard contour maps developed by the USGS for the 2002 update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500-year return period analyzes ground shaking estimates with a 2 percent probability of being exceeded in 50 years, from the

various seismic sources in the area. The International Building Code uses this level of ground shaking for building design in seismic areas and is more of a worst case scenario.

The results of the probabilistic scenario are captured in Table 4-66. Key losses included the following:

- Total economic loss estimated for the earthquake was $8.3 billion, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $8.0 billion.
- Over 17 percent of the buildings in the County were at least moderately damaged. 3,041 buildings were completely destroyed.
- Over 57 percent of the building- and income-related losses were residential structures.
- 4 percent of the estimated losses were related to business interruptions.
- The mid-day earthquake caused the most casualties: 179.
- 48 percent of the households experienced a loss of potable water the first day after the earthquake.

Table 4-66 HAZUS-MH Earthquake Loss Estimation 2,500-Year Scenario Results

Type of Impact	Impacts to County	
Total Buildings Damaged	Slight: 133,703 Moderate: 57,825 Extensive: 11,039 Complete: 3,041	
Building Related Losses	$8,001,220,000	
Total Economic Losses (Includes building, income and lifeline losses)	$8,322,590,000	
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 1,345 Requiring hospitalization: 228 Life Threatening: 21 Fatalities: 39	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 2,595 Requiring hospitalization: 626 Life Threatening: 95 Fatalities: 179	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 1,995 Requiring hospitalization: 494 Life Threatening: 154 Fatalities: 135	
Transportation and Utility Lifeline Damage	One bridge and one ferry with at least moderate damage	
Households without Power/Water Service (Based on 252,940 total households)	Power loss @ Day 1: 1,159 Power loss @ Day 3: 647 Power loss @ Day 7: 227 Power loss @ Day 30: 36	Water loss @ Day 1: 217,486 Water loss @ Day 3: 204,011 Water loss @ Day 7: 174,736 Water loss @ Day 30: 1,705
Displaced Households	6,081	
Shelter Requirements	4,176	
Debris Generation	2.0 million tons	

Source: HAZUS-MH MR4

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. HAZUS uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 51,500 ignitions that will burn about 1.36 sq. mi (0.14 % of the region's total area.) The model also estimates that the fires will displace about 6,142 people and burn about $481 million of building value.

Future Development

Although new growth and development corridors would fall in the area affected by earthquake, given the small chance of major earthquake and the building codes in effect, development in the earthquake area will continue to occur.

4.3.9. Earthquake: Liquefaction

Likelihood of Future Occurrence—Occasional
Vulnerability—Medium

Earthquake is discussed in the Section 4.3.8, but is primarily focused on the vulnerability of buildings and people from earthquake shaking. This section deals with a secondary hazard associated with earthquake – the possible collapse of structural integrity of the ground underneath liquefaction prone areas. In Sacramento County, the HMPC identified two of these areas: downtown Sacramento and the Delta area, which could lead to a possible collapse of delta levees. This levee failure differs from the levee failure discussion in Section 4.3.12 which generally focuses on levee failure due to high water conditions or other types of structural failure. These two areas are described further below.

Downtown

A geological and seismological study in 1972 indicated that the Housing and Redevelopment Agency building site located downtown at the intersection of 7th and I Streets has a potential for liquefaction. This study also concluded that potential liquefaction problems may exist throughout the downtown area where loose sands and silts are present below the ground water table. Exact property value estimates are not available. Due to the fact that downtown Sacramento is located away from active faults, there may be limited vulnerability to damage from liquefaction.

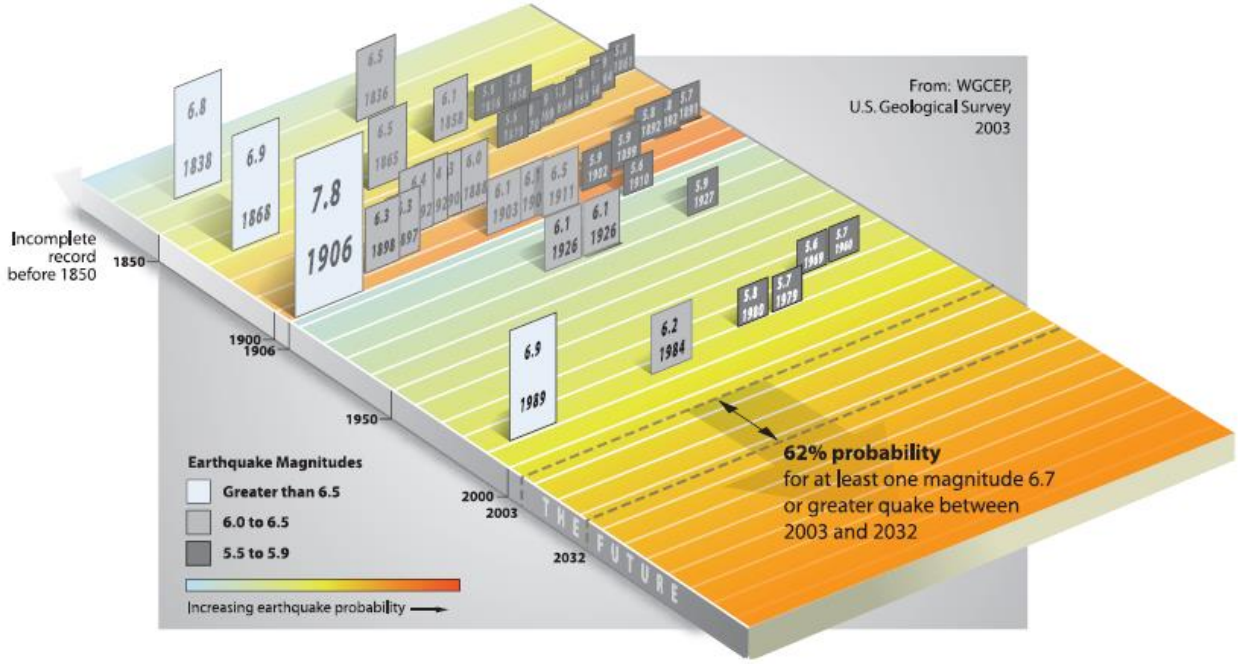
Delta

Historically, there have been 165 Delta and Suisun Marsh flood-induced levee failures leading to island inundations since 1900. Most of these failures occurred prior to 1990. Also, many of these failures were outside of Sacramento County. Since that time, there have been few levee failures due to improvements on the levee system in Sacramento as a whole.

No reports could be found to indicate that seismic shaking had ever induced significant damage or were the cause of the levee failures mentioned above. However, the lack of historical damage is not a reliable indicator that Delta levees are not vulnerable to earthquake shaking. Furthermore, the present-day Delta levees, at their current size, have not been significantly tested by moderate to high seismic shaking.

The USGS estimates that an earthquake of magnitude 6.7 or greater has a 62 percent probability of occurring in the San Francisco Bay Area between 2003 and 2032 (see Figure 4-81). Such an earthquake is capable of causing multiple levee failures in the Delta Region which could result in fatalities, extensive property damage and the interruption of water exports from the Delta for an extended period of time. Potential earthquakes on the Hayward, Calaveras or San Andreas faults pose the highest risk to Delta Region levees.

Figure 4-81 Past and Future Earthquakes in the San Francisco Bay Area and the Delta



Source: DRMS Risk Report (URS/JBA 2008c) Figure 13-8

The largest earthquakes experienced in recent history in the region include the 1906 Great San Francisco Earthquake and the 1989 Loma Prieta Earthquake. The 1906 earthquake occurred while the levees were in their early stages of construction. They were much smaller than they are today, and were not representative of the current configuration. The epicenter of the 1989 Loma Prieta earthquake was too distant and registered levels of shaking in the Delta too small to cause perceptible damage to the levees. In 2009, the California Department of Water Resources, in their document titled Delta Risk Management Strategy, performed a special simulation analysis of the 1906 Great San Francisco Earthquake to evaluate the potential effects of that event on the current levees.

In addition to the simulation of these largest regional earthquakes, recent smaller and closer earthquakes were also evaluated. They include: the 1980 Livermore Earthquake (M 5.8) and the 1984 Morgan Hill Earthquake (M 6.2). Except for the 1906 earthquake, which would have caused deformations of some of the weakest levees, the other earthquakes were either too small or too distant to cause any significant damage to the Delta levees. These results are consistent with the seismic vulnerability prediction model developed for this study.

General seismic performance observations were:

- The areas most prone to liquefaction potential are in the northern region and the southeastern region of the Delta. The central and western regions of the Delta and Suisun Marsh show discontinuous areas of moderate to low liquefaction potential.
- The vulnerability classes 1 through 4 are the most vulnerable levees to seismic loading. These include islands with liquefiable levee fill, and peat/organic soil deposits and potentially liquefiable sand deposits in the foundation. Such islands include but are not limited to Sherman, Brannan-Andrus, Twitchel, Webb, Venice, Bouldin, and many others.
- The majority of the islands have at least one levee reach in vulnerability classes 1 to 4,
- Levees composed of liquefiable fill are likely to undergo extensive damage as a result of a moderate to large earthquake in the region.
- The median probabilities of failure for classes with no liquefiable foundation sand and no liquefiable levee fill increase with peat thickness under the levee. When peat is absent, generally the probabilities of failure are small (less than 22 percent) for the largest ground motions of 0.5g. However, the probabilities of failure at the locations of the thickest peat (more than 25 feet) range from 30 percent to 60 percent for a PGA of 0.5g.
- Levees founded on liquefiable foundations are expected to experience large deformations (in excess of 10 feet) under a moderate to large earthquake in the region.

Assets at Risk – Flooding

A major earthquake can cause extensive damage to large sections of levees on multiple islands at the same time. As a result, many islands could be flooded simultaneously. For example, the DRMS report indicated that there is a 40 percent probability of a major earthquake causing 27 or more islands to flood at the same time in the 25-year period from 2005 to 2030. It is not specified which islands in Sacramento County would be included in this flooding.

The duration and cost of levee repairs increases with the number of islands that are flooded due to an earthquake, as shown in Table 4-67. This is not only due to the extensive amount of repairs required, but also to the availability of labor and materials to make the repairs. These numbers from the DRMS report are applicable to Sacramento County.

Table 4-67 Duration and Cost of Repairs for Earthquake-Induced Levee Failures

Number of flooded islands	Estimated range of cost of repair and dewatering	Estimated range of time to repair breaches and dewater [days]
1	$43,000,000 – $240,000,000	136 – 276
3	$204,000,000 – $490,000,000	270 – 466
10	$620,000,000 – $1,260,000,000	460 – 700
20	$1,400,000,000 – $2,300,000,000	750 – 1,020
30	$3,000,000,000 – $4,200,000,000	1,240 – 1,660

Source: DRMS Risk Report [URS/JBA 2008c], Table 13-9

In addition to dewatering costs, the Delta contains improved parcels at risk to flooding. More information about the Delta and its risk may be found in the Delta annex to this plan.

Water Quality Risk

Earthquake damage to levees and to the islands they protect could take years to repair following a major earthquake. One significant impact of levee failures would be to the state's water supply. For example, if 20 islands were flooded as a result of a major earthquake, the export of fresh water from the Delta could be interrupted for about a year and a half. Water supply losses of up to 8 million acre-feet would be incurred by State and federal water contractors and local water districts.

If subsided Delta islands are flooded due to levee breaches, significant amounts of dissolved organic carbon [DOC] would be released into Delta waters from the highly organic peat soils on these islands. Disinfectants used during the drinking water treatment process react with DOC to produce disinfection byproducts in treated water. Many of these chemical byproducts can increase cancer risks or cause other health effects.

Other water quality problems resulting from island flooding include increased algae blooms. Algae blooms can complicate drinking water treatment processes and can adversely affect some aquatic species.

Some soils in the Delta Region contain moderate levels of mercury due, among other things, to historical gold mining activities that occurred upstream of the Delta during the Gold Rush. Mercury in soils can, under certain circumstances, be converted to the highly toxic methylated form when islands are flooded. Methylated mercury can accumulate in the food chain potentially affecting fish. Humans and animals that consume fish contaminated with methylated mercury are at risk of poisoning.

Population at Risk

The Delta levees most likely to fail due to earthquakes and earthquake liquefaction are generally located in the central-west area of the Delta, some of which is likely to be in the Sacramento County portion of the Delta. Their failure will cause rapid flooding and leave little time for evacuation.

The greatest immediate public safety concern is for the people working and living on Delta islands, and for people traveling through the Delta on various roads and highways. According to the DRMS report, there is a 40 percent probability of 90 or more fatalities in the Delta from levee failures due to a seismic event in the 25-year period from 2005 through 2030. The expected fatalities from earthquake-related island flooding is high due to the lack of warning for earthquakes and because of the rapid rate of flooding likely to occur after an earthquake. It should be noted that these fatality figures are for the Delta as a whole, and not limited to those areas of the Delta lying within Sacramento County.

Natural Resources at Risk

In all seismic levee failure scenarios, the area of vegetation impacted increases with the area flooded. The degree of impact depends on the type of vegetation flooded. Results of the DRMS Project indicate potential losses of up to 39 percent of herbaceous wetland, seasonal grasses and low-lying vegetation, 29 percent of non-native trees, and 24 percent of shrub wetland due to an event where multiple islands are flooded. In addition, in Sacramento County, the Delta area at risk to liquefaction contains highly productive farmland. Should a levee fail, loss of crops would have a large economic impact. Information specific to the losses in Sacramento County were not available.

Future Development

The consequences of a major earthquake in the Delta Region will also increase with time. Because of increasing water demand and the state's growing population and economy, the economic consequences of an interruption in Delta water supply operations due to an earthquake will increase. Consequences to the Delta Region will also increase due to additional development. According to the DRMS report, total expected economic losses are anticipated to increase by about 200 percent by 2050 and by about 500 percent by 2100. The risk of fatalities is expected to increase, on average, by about 250 percent from 2005 to 2050. It should be noted that these economic figures are for the Delta as a whole, and not limited to those areas of the Delta lying within Sacramento County.

4.3.10. Flood: 100/200/500-year Vulnerability Assessment

Likelihood of Future Occurrence—100-year – Occasional; 200-/500-year – Unlikely
Vulnerability—Extremely High

Historically, Sacramento County has always been vulnerable to flooding because of its relatively flat terrain and the number of water courses that traverse the County. Flood zones in Sacramento County are quite extensive. High water levels are a common occurrence in winter and spring months due to increased flow from stormwater runoff and snowmelt. Several areas of the County are subject to flooding by the overtopping of rivers and creeks, levee failures, and the failure of urban drainage systems that cannot accommodate large volumes of water during severe rainstorms.

River flooding is the most significant natural hazard that Sacramento County faces. The Sacramento area has a good working knowledge of the 100-year flood, however, the statistical outlier flood is not well quantified. Sacramento is not just at high risk of flooding, but is at low risk of catastrophic flooding. When the 100-year event is exceeded, the consequences could be great as flood depths behind levees can range up to many feet deep in some urban areas.

In addition to the major rivers, there are many streams, channels, canals, and creeks that serve the drainage needs of the County. There is significant threat of flooding in large areas of the county from several of these streams. Many of these streams are prone to rapid flooding with little notice.

According to SAFCA, Sacramento's risk of flooding is the greatest of any major city in the country. Sacramento's flood risk is exceptionally high for two reasons:

1. The cores of today's levees are often the levees built by farmers and settlers as much as 150 years ago. Early levees were not constructed to current engineering standards, and little care was given to the suitability of foundation soils. It was believed prior to 1986 that the levees containing the Sacramento River and the American River were of sufficient height and stability to protect the county from 100-year or greater storms. The storms that occurred in February 1986 demonstrated that those levees are not always sufficient.
2. The quantity of water flowing out of the Sierra Nevada Mountains during large floods appears to be increasing. Folsom Dam was designed, based on historical data, to reduce flood flows in the American River to a flow rate that could be safely contained by the downstream levees. The first storm that

occurred after beginning the construction of Folsom Dam was larger than any occurring in the prior 45 years. Since that 1951 storm, Sacramento has experienced four more 'record floods' each somewhat larger than the previous. A comparative analysis run on the two periods (1905 to 1950 and 1950 to 2000) shows that a storm with one chance in 500 of occurring in any year based on the earlier period is approximately the same size as a storm with one chance in 50 of occurring using the entire 95-year period.

Historically, much of the growth in the County has occurred adjacent to streams, resulting in significant damages to property, and losses from disruption of community activities when the streams overflow. Additional development in the watersheds of these streams affects both the frequency and duration of damaging floods through an increase in stormwater runoff. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, losses of environmental resources, and certain health hazards.

Flooding has been frequent in the Sacramento County Planning Area and the vulnerability to flood damages is high to extremely high. This section quantifies the vulnerability of the Planning Area to floods.

Flood Hazard Assessment

This risk assessment for the Sacramento County LHMP Update assessed the flood hazard specific to Sacramento County. This included an evaluation of multiple flood hazards including the SFHA shown on the DFIRM; Repetitive Loss (RL) Areas; localized, stormwater flooding areas; other areas that have flooded in the past, but not identified on the DFIRM; other areas of shallow flooding identified through other studies and sources; levee failure flooding; dam failure flooding; erosion based flooding, and flooding caused by land subsidence especially in the Delta areas. This comprehensive flood risk assessment included an assessment of less-frequent flood hazards, areas likely to be flooded, and flood problems that are likely to get worse in the future as a result of changes in floodplain development and demographics, development in the watershed, and climate change or sea level rise. Existing studies, maps, historical data, and federal, state, and local community expertise and knowledge contributed to this current flood assessment for Sacramento County. An evaluation of the success of completed and ongoing flood control projects and associated maintenance aspects contributed to this flood hazard assessment and the resulting flood mitigation strategy for the Sacramento County Planning Area. This flood risk assessment for this LHMP Update includes an assessment of future flooding conditions based on historic development in the floodplains, proposed future development, climate change influences, and worst case flood scenarios such as the ARkStorm as further described throughout this plan. Due to GIS mapping constraints, the remainder of this flood vulnerability assessment focuses on the flood hazard based on the updated FEMA DFIRMs.

Assets at Risk

Unincorporated Sacramento County and its incorporated jurisdictions have mapped FEMA flood hazard areas. GIS was used to determine the possible impacts of flooding within the County and how the risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and assets at risk to the 1% annual chance flood event and 0.2% annual chance flood events. Analysis on assets at risk to floods in the County is provided for two different areas in this Base Plan:

- Sacramento County Planning Area
- Unincorporated Sacramento County

The Sacramento County Planning Area includes both the unincorporated County and each jurisdiction, essentially the entire geographical area of Sacramento County. Summary tables for the Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the participating jurisdictions are included in their respective annexes to this plan.

Note: For the Base Plan, the 2015 DFIRM was used for analysis. The City of Elk Grove Planning Team noted that many of the LOMRs that exist in the City were not considered in the creation of the new DFIRM. The Planning Team noted that the data from the previous plan was better represented the flood risk for the City than that provided for the Base Plan. As such, the 2011 methodology is carried forward into the City of Elk Grove's Annex only. This affects the flood zone, values at risk, population at risk, and critical facilities at risk sections in their annex and for those sections below..

Methodology

Sacramento County's 2016 parcel layer and 2015 Assessor's data were used as the basis for the countywide inventory of developed parcels, acres, and values. Sacramento County has a FEMA DFIRM dated June 16, 2015 which was utilized to perform the flood analysis.

In some cases there are parcels in multiple flood zones, such as Zone A, Zone X, or Shaded X. GIS was used to create a centroid, or point representing the center of the parcel polygon. DFIRM flood data was then overlaid on the parcel layer. For the purposes of this analysis, the flood zone that intersected a parcel centroid was assigned the flood zone for the entire parcel. The parcels were segregated and analyzed in this fashion for the entire Sacramento County Planning Area.

The model assumes that every parcel with a structure or other improved value greater than zero is improved in some way. This approach was used to support the parcel layer analysis as there was no associated building layer available for this analysis. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessors database and the GIS parcel layer.

The property use summary categories (derived from the Use Code categories) previously assigned to the detailed assessor database were used to develop content value and show potential loss from hazards. Content values estimations are based on FEMA Hazus methodologies, which estimates value as a percent of improved structure values by property type/use. Table 4-68 shows the breakdown of the different property types in Sacramento County and their estimated content replacement value percentages.

Table 4-68 Content Replacement Factors

Property Use	Content Replacement Values
Residential	50%
Agricultural	100%
Commercial	100%

Property Use	Content Replacement Values
Institutional	100%
Other	100%
Industrial	150%
Vacant Land	0%

Source: Hazus

The loss estimate for flood is based on the total of improved and contents value. Improved parcels include those with structures as well as other improvements identified in the Assessor's database such as mobile homes and winery equipment. Only improved parcels and the value of their improvements were included in the flood loss analysis. The value of land is not included in the loss estimates as generally the land is not at loss to floods, just the value of improvements and structure contents. The land value is represented in the detailed flood tables, but are only present to show the value of the land associated with each flood zone.

Once the potential value of affected parcels was calculated, a damage factor was applied to obtain loss estimates by flood zone. When a flood occurs, seldom does the event cause total destruction of an area. Potential losses from flooding are related to a variety of factors including flood depth, flood velocity, building type, and construction. The percent of damage is primarily related to the flood depth. FEMA's flood benefit/cost module uses a simplified approach to model flood damage based on building type and flood depth. The assets at risk in the flood analysis tables were refined by applying an average damage estimation of 20% of the total building value. The 20% damage estimate utilized FEMA's Flood Building Loss Table based on an average flood depth of 2 feet.

It also should be noted that the resulting flood loss estimates may actually be more or less than that presented in the below tables as the Planning Area may include structures located on parcels within the 100-year floodplain that are actually outside the floodplain boundaries or otherwise elevated at or above the level of the base flood elevation, according to local floodplain development requirements. Also, any recent or pending Physical Map Revisions (PMRs) or Letter of Map Revisons (LOMRs) are not reflected in this data and will change the analysis accordingly. In addition, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the 100-year floodplain.

Each of the DFIRM flood zones that begins with the letter 'A' depict the Special Flood Hazard Area, or the 1% annual chance flood event (commonly referred to as the 100-year flood). Table 4-69 explains the difference between DFIRM mapped flood zones within the 1% annual chance flood zone as well as other flood zones located within the Planning Area. The effective DFIRM maps for the Sacramento County Planning Area are shown on Figure 4-82.

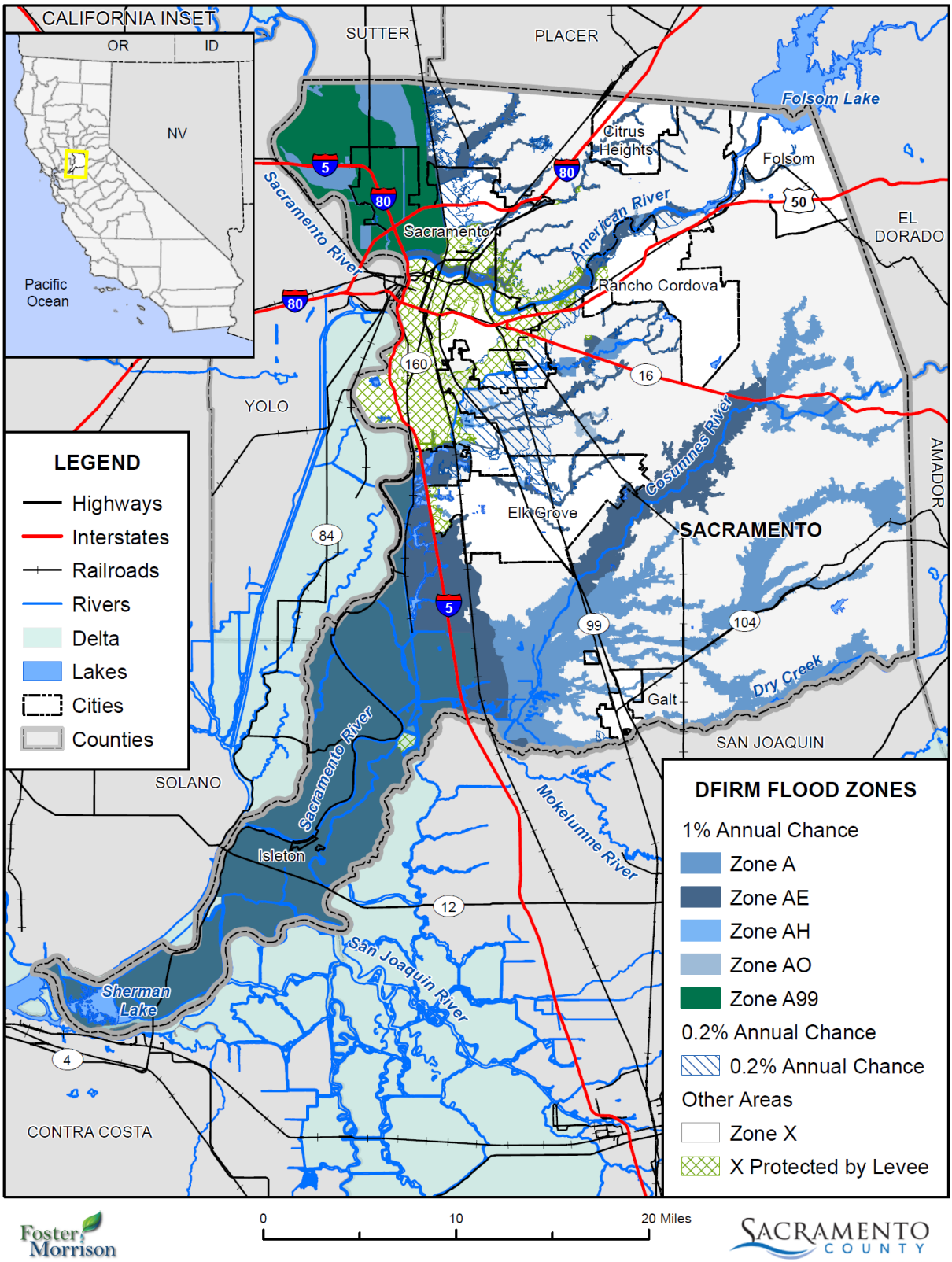
Table 4-69 Sacramento County Planning Area – DFIRM Flood Hazard Zones

Flood Zone	Description
A	100-year Flood: No base flood elevations provided
AE	100-year Flood: Base flood elevations provided

Flood Zone	Description
AH	An area inundated by 1% annual chance flooding (usually an area of ponding), for which BFEs have been determined; flood depths range from 1 to 3 feet
AO	Areas subject to inundation by 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones
Shaded X	500-year flood the areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood
X Protected by Levee	An area determined to be outside the 500-year flood and protected by levee from 100-year flood
X	No flood hazard

Source: FEMA

Figure 4-82 Sacramento County Planning Area – DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

The end result of the flood hazard analysis is an inventory of the numbers, types, and values of parcels subject to the flood hazard. Results are presented here first for the Sacramento County Planning Area and secondly for the unincorporated County. Results for the incorporated jurisdictions and the Delta are presented in their respective annexes to the plan.

In addition to the centroid analysis used to obtain numbers of parcels and assets at risk to flood hazards, parcel boundary analysis was performed to obtain total acres and flooded acres by flood zone for each parcel. The parcel layer was intersected with the FEMA DFIRM data to obtain the acres flooded. The results of the flooded acres analysis methodology and results are presented at the end of this section.

Sacramento County Planning Area

Table 4-70 and Table 4-71 contain flood analysis results for the entire Sacramento County Planning Area. This includes unincorporated Sacramento County and the incorporated jurisdictions. These tables show the number of parcels and assets at risk to the 1% and 0.2% annual chance event. Table 4-70 shows the value of improved parcels by jurisdiction. Table 4-71 shows the improved parcels by property use category in each flood zone for the entire Planning Area.

Table 4-70 Sacramento County Planning Area – Count and Improved Value of Parcels by 1% and 0.2% Annual Chance Flood Zones by Jurisdiction

Jurisdiction	1% Annual Chance			0.2% Annual Chance*		
	Total Parcel Count*	Improved Parcel Count**	Total Improved Value	Total Parcel Count	Improved Parcel Count	Total Improved Value
Citrus Heights	250	156	$29,175,678	303	276	$54,097,103
Elk Grove***	N/A	37	$35,703,353	N/A	3,949	$808,888,633
Folsom	31	8	$2,357,379	194	122	$153,125,451
Galt	23	1	$315,000	3	0	$0
Isleton	504	325	$27,074,049	0	0	$0
Rancho Cordova	60	21	$10,205,817	989	971	$158,395,013
City of Sacramento	29,693	24,861	$6,675,340,607	16,165	14,495	$2,822,713,159
Unincorporated Sacramento County	7,051	3,862	$1,504,417,212	23,182	21,778	$3,992,497,296
Total	**37,612**	**29,271**	**$8,284,589,095**	**40,836**	**41,591**	**$7,989,716,655**

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance floodplain.

**With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

***The City of Elk Grove's analysis from 2011 is carried forward here as noted at the beginning of this Section 4.3.10. Total parcel counts were not created for that plan.

*Table 4-71 Sacramento County Planning Area – Count and Improved Value by Property Use and 1% and 0.2% Annual Chance Flood Zone**

Property Use	1% Annual Chance Flood Zone			0.2% Annual Chance Flood Zone**		
	Total Parcel Count**	Improved Parcel Count**	Total Improved Value	Total Parcel Count	Improved Parcel Count	Total Improved Value
Agricultural	1,467	816	$267,807,574	6	4	$318,391
Care/Health	26	18	$54,069,366	49	46	$420,425,623
Church/Welfare	63	51	$85,344,771	125	105	$130,813,240
Industrial	351	255	$536,138,980	819	772	$828,718,388
Miscellaneous	983	5	$12,426	388	1	$935
Office	203	187	$704,911,767	171	150	$219,646,504
Public/Utilities	1,930	3	$2,211,598	651	1	$38,057
Recreational	99	73	$80,087,473	22	19	$10,103,789
Residential	28,212	27,636	$6,176,867,614	40,694	39,998	$5,827,191,977
Retail/Commercial	379	359	$449,769,895	558	513	$682,412,409
Vacant	4,286	96	$8,383,388	1,578	58	$6,364,539
No Data	2	0	$0	0	0	$0
Total	**38,001**	**29,499**	**$8,365,604,852**	**45,061**	**41,667**	**$8,126,033,852**

Source: FEMA DFIRM June 16, 2015, Sacramento County 2015 Parcel/Assessor's Data

* The City of Elk Grove's analysis from 2011 is carried forward here as noted at the beginning of this Section 4.3.10. Due to difficulites matching property use categories, this table contains data only from the 2016 analysis.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance floodplain.

***With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

Table 4-72 shows potential losses summarized by the 1% and 0.2% annual chance flood event with loss estimate and loss ratios for the Planning Area. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the Planning Area) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a flood. The County should keep in mind that the loss ratio could increase with additional development in the 1% and 0.2% annual chance floodplain, unless development is elevated in accordance with the local floodplain management ordinance.

Table 4-72 Sacramento County Planning Area – Flood Loss Estimates

Flood Zone	Improved Parcel Count*	Total Improved Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
1% Annual Chance	29,271	$8,284,589,095	$4,182,802,426	$12,467,391,521	$2,493,478,304.20	1.92%
0.2% Annual Chance**	40,836	$7,989,716,655	$4,063,016,926	$12,052,733,581	$2,410,546,716.20	1.86%
Total	**71,166**	**$16,491,638,704**	**$8,245,819,352**	**$24,520,125,102**	**$4,904,025,020.40**	**3.78%**

Source: FEMA DFIRM June 16, 2015, Sacramento County 2015 Parcel/Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance floodplain.

According to the information in Table 4-70 through Table 4-72, the Sacramento County Planning Area has 29,271 improved parcels and roughly $12.5 billion of structure and contents value in the 1% annual chance floodplain. There are 40,836 improved parcels and roughly $12.1 billion of structure and contents value in the 0.2% annual chance flood event. A loss ratio of 3.78% indicates that while the County does have assets at risk, those asset values do not indicate a disproportionate number of assets in the FEMA regulated floodplains.

Unincorporated Sacramento County

Table 4-73 and Table 4-74 contain information for unincorporated Sacramento County only. Table 4-73 shows the number of improved parcels, land value, and associated improved structure values at risk to the each of the FEMA flood zones using the DFIRM data in the unincorporated areas and Table 4-74 shows potential losses summarized by 1% and 0.2% annual chance flood events with loss estimates and loss ratios.

Table 4-73 Unincorporated Sacramento County – Count and Improved Value by Property Use and Detailed Flood Zone

Flood Zone	Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
A	Agricultural	314	$116,787,770	164	$68,069,670	$184,857,440
	Care / Health	0	$0		$0	$0
	Church / Welfare	0	$0		$0	$0
	Industrial	36	$13,904,226	3	$919,625	$14,823,851
	Miscellaneous	14	$11,617	0	$0	$11,617
	Office	0	$0			$0
	Public / Utilities	134	$455,096	1	$81,598	$536,694
	Recreational	4	$2,815,805	1	$2,003,644	$4,819,449
	Residential	187	$20,825,433	178	$35,660,701	$56,486,134

Flood Zone	Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
	Retail / Commercial	1	$198,216	1	$105,744	$303,960
	Vacant	84	$24,772,786	10	$276,033	$25,048,819
	No Data	0	$0		$0	$0
	Total	**774**	**$179,770,949**	**358**	**$107,117,015**	**$286,887,964**
AE	Agricultural	1,013	$237,154,495	629	$196,659,181	$433,813,676
	Care / Health	4	$999,696	3	$913,650	$1,913,346
	Church / Welfare	22	$3,350,133	16	$33,288,981	$36,639,114
	Industrial	84	$16,292,372	40	$20,716,328	$37,008,700
	Miscellaneous	277	$759,968	5	$12,426	$772,394
	Office	29	$15,123,953	27	$27,540,122	$42,664,075
	Public / Utilities	816	$1,124,615	0	$0	$1,124,615
	Recreational	73	$16,108,472	56	$15,847,312	$31,955,784
	Residential	2,273	$275,269,730	2,130	$509,854,352	$785,124,082
	Retail / Commercial	64	$8,477,968	60	$13,784,241	$22,262,209
	Vacant	672	$51,116,873	48	$5,307,705	$56,424,578
	No Data	1	$0	0	$0	$0
	Total	**5,328**	**$625,778,275**	**3,014**	**$823,924,298**	**$1,449,702,573**
AH	Agricultural	0	$0	0	$0	$0
	Care / Health	0	$0	0	$0	$0
	Church / Welfare	1	$253,064	1	$437,444	$690,508
	Industrial	0	$0	0	$0	$0
	Miscellaneous	0	$0	0	$0	$0
	Office	1	$64,608	1	$72,064	$136,672
	Public / Utilities	9	$0	0	$0	$0
	Recreational	0	$0	0	$0	$0
	Residential	104	$4,791,627	104	$11,214,428	$16,006,055
	Retail / Commercial	5	$2,582,709	3	$1,751,382	$4,334,091
	Vacant	7	$746,462	0	$0	$746,462
	No Data		$0	0	$0	$0
	Total	**127**	**$8,438,470**	**109**	**$13,475,318**	**$21,913,788**
AO	Agricultural	0	$0	0	$0	$0

Flood Zone	Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
	Care / Health	0	$0	0	$0	$0
	Church / Welfare	3	$538,580	3	$1,274,398	$1,812,978
	Industrial	0	$0	0	$0	$0
	Miscellaneous	0	$0	0	$0	$0
	Office	0	$0	0	$0	$0
	Public / Utilities	3	$0	0	$0	$0
	Recreational	0	$0	0	$0	$0
	Residential	70	$9,210,884	70	$9,295,754	$18,506,638
	Retail / Commercial	0	$0	0	$0	$0
	Vacant	15	$1,999,748	1	$5,225	$2,004,973
	No Data	0	$0	0	$0	$0
	Total	**91**	**$11,749,212**	**74**	**$10,575,377**	**$22,324,589**
A99	Agricultural	128	$38,469,123	22	$2,928,106	$41,397,229
	Care / Health	4	$3,204,228	1	$14,856,000	$18,060,228
	Church / Welfare	4	$834,959	4	$2,541,241	$3,376,200
	Industrial	174	$96,891,233	161	$404,210,512	$501,101,745
	Miscellaneous	24	$1,533,789	0	$0	$1,533,789
	Office	35	$19,145,702	32	$88,227,532	$107,373,234
	Public / Utilities	107	$152,106	1	$2,100,000	$2,252,106
	Recreational	4	$2,096,779	3	$2,421,221	$4,518,000
	Residential	75	$9,088,260	69	$20,352,195	$29,440,455
	Retail / Commercial	9	$7,261,001	9	$11,605,951	$18,866,952
	Vacant	166	$70,772,359	5	$82,446	$70,854,805
	No Data	1	$78,407	0	$0	$78,407
	Total	**731**	**$249,527,946**	**307**	**$549,325,204**	**$798,853,150**
Total 1% Annual Chance		**7,051**	**$1,075,264,852**	**3,862**	**$1,504,417,212**	**$2,579,682,064**
Shaded X (0.2% Annual Chance)**	Agricultural	5	$848,949	3	$105,144	$954,093
	Care / Health	27	$5,218,074	27	$36,436,591	$41,654,665
	Church / Welfare	51	$22,410,230	46	$85,076,951	$107,487,181
	Industrial	213	$100,697,813	198	$215,886,598	$316,584,411
	Miscellaneous	145	$513,998	1	$935	$514,933

Flood Zone	Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
	Office	87	$25,727,530	75	$72,281,415	$98,008,945
	Public / Utilities	281	$2,670,605	1	$38,057	$2,708,662
	Recreational	15	$8,562,883	12	$4,118,758	$12,681,641
	Residential	21,508	$1,217,040,070	21,098	$3,183,717,846	$4,400,757,916
	Retail / Commercial	312	$196,238,125	291	$393,654,669	$589,892,794
	Vacant	538	$75,853,555	26	$1,180,332	$77,033,887
	No Data	0	$0	0	$	$0
	Total	**23,182**	**$1,655,781,832**	**21,778**	**$3,992,497,296**	**$5,648,279,128**
X Protected by Levee	Agricultural	5	$1,160,373	5	$789,744	$1,950,117
	Care / Health	18	$7,758,946	13	$27,721,005	$35,479,951
	Church / Welfare	30	$10,824,424	25	$29,358,299	$40,182,723
	Industrial	95	$28,509,769	92	$69,653,665	$98,163,434
	Miscellaneous	45	$216,140	1	$31,352	$247,492
	Office	168	$88,235,208	145	$285,606,007	$373,841,215
	Public / Utilities	174	$353,474	4	$323,426	$676,900
	Recreational	8	$4,141,597	5	$8,942,031	$13,083,628
	Residential	9,922	$780,382,586	9,829	$1,775,227,193	$2,555,609,779
	Retail / Commercial	315	$143,381,393	297	$298,952,501	$442,333,894
	Vacant	207	$27,903,906	12	$2,997,130	$30,901,036
	No Data	1	$0	0	$0	$0
	Total	**10,988**	**$1,092,867,816**	**10,428**	**$2,499,602,353**	**$3,592,470,169**
X	Agricultural	1,065	$285,499,726	530	$212,369,686	$497,869,412
	Care / Health	267	$106,557,849	253	$480,728,243	$587,286,092
	Church / Welfare	343	$89,373,407	301	$420,347,742	$509,721,149
	Industrial	829	$281,438,674	664	$588,845,257	$870,283,931
	Miscellaneous	1,143	$980,448	6	$66,196	$1,046,644
	Office	794	$264,455,707	739	$730,526,492	$994,982,199
	Public / Utilities	1,596	$5,676,727	12	$12,125,694	$17,802,421
	Recreational	66	$29,955,356	52	$71,024,781	$100,980,137
	Residential	118,931	$9,032,113,350	117,582	$20,266,748,974	$29,298,862,324
	Retail / Commercial	1,483	$716,623,478	1,370	$1,222,616,479	$1,939,239,957
	Vacant	3,903	$480,016,343	237	$17,084,778	$497,101,121

Flood Zone	Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
	No Data	9	$1,467,707	4	$807,130	$2,274,837
	Total	**130,429**	**$11,294,158,772**	**121,750**	**$24,023,291,452**	**$35,317,450,224**

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/ 2015 Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Table 4-74 Unincorporated Sacramento County – Flood Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
1% Annual Chance	3,862	$1,504,417,212	$752,208,606	$2,256,625,818	$451,325,164	0.35%
0.2% Annual Chance	21,778	$3,992,497,296	$1,996,248,648	$5,988,745,944	$1,197,749,189	0.92%
Total	**25,640**	**$5,496,914,508**	**$2,748,457,254**	**$8,245,371,762**	**$1,649,074,352**	**1.27%**

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

According to Table 4-73 and Table 4-74, unincorporated Sacramento County has 3,862 improved parcels and roughly $2.25 billion of structure and contents value in the 1% annual chance floodplain. The unincorporated County has 21,778 parcels and roughly $6 billion in structure and contents values in the 0.2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described, there is a 1% chance in any given year of a flood event causing roughly $451,325,164 in damage in the unincorporated areas of Sacramento County. Applying the same factor, there is a 0.2% chance of a flood event causing $1.2 billion in damage to the unincorporated County. A loss ratio of 1.27% indicates that while the unincorporated County has assets at risk in the floodplain, flood losses would be limited compared to the total built environment and the community would likely be able to recover adequately.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the County Planning Area in comparison to total area within the unincorporated County and city limits of each jurisdiction.

Methodology

GIS was used to calculate acres flooded by FEMA flood zones and property use categories. The Sacramento County parcel layer and effective DFIRM were intersected, and each segment divided by the intersection of flood zone and parcels was calculated for acres. This process was conducted for 1% flood chance areas, with each segment being defined by zone type (A, AE, AO) and acres, and the process repeated for X

Protected by Levee zones and 0.2% flood chance areas. The resulting data tables with flooded acreages were then imported into a database and linked back to the original parcels, including total acres and land/improvement values, by parcel number. Once this was completed, each parcel contained acreage values for flooded acre by zone type within the parcel. In some cases, a single parcel had multiple flooded acres values (e.g. parcels overlapping a 1%-0.2% flood chance boundary). In the tables below each flood zone is represented and then split out by property use, their total flooded acres, total improved acres, and percent of improved acres that are flooded.

Limitations

One limitation created by this type of analysis is that improvements are uniformly found throughout the parcel, while in reality, only portions of the parcel are improved, and improvements may or may not fall within the flood zone portion of a parcel; thus, areas of improvements flooded calculated through this method may be higher or lower than those actually seen in a similar real world event.

The following tables represent a detailed and summary analysis of total acres for each FEMA DFIRM flood zone. Table 4-75 gives summary information for the Planning Area. Table 4-76 gives detailed information by property use for the unincorporated County. This information is available for each jurisdiction in their respective annexes.

Table 4-75 Sacramento County Planning Area – Flooded Acres by Jurisdiction

Jurisdiction	Flood Zone*	Total Flooded Acres	Improved Flooded Acres
Citrus Heights	1% Annual Chance	105.75	44.61
	0.2% Annual Chance	66.81	57.09
Elk Grove**	1% Annual Chance	N/A	N/A
	0.2% Annual Chance	N/A	N/A
Folsom	1% Annual Chance	110.21	2.24
	0.2% Annual Chance	177.15	92.67
Galt	1% Annual Chance	111.92	3.86
	0.2% Annual Chance	5.11	0
Isleton	1% Annual Chance	215.58	57.46
	0.2% Annual Chance	0	0
Rancho Cordova	1% Annual Chance	794.88	44.68
	0.2% Annual Chance	307.17	190.19
City of Sacramento	1% Annual Chance	12,958.27	5,468.67
	0.2% Annual Chance	6,385.63	4,477.68
Unincorporated	1% Annual Chance	179,672.53	86,988.83
	0.2% Annual Chance	8,730.38	6,569.14
Total	1% Annual Chance	**193,999.13**	**92,610.36**
	0.2% Annual Chance	**15,672.25**	**11,386.78**

Source: Sacramento County DFIRM June 16, 2015 Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.
**The City of Elk Grove performed analysis based on the 2011 Plan. In that plan, no flooded acres analysis was performed.

*Table 4-76 Unincorporated Sacramento County – Flooded Acres by Property Use and Detailed Flood Zone**

Flood Zone*	Property Use	Total Flooded Acres	Improved Flooded Acres
A	Agricultural	32,617.68	19,467.81
	Care / Health	0.00	0.00
	Church / Welfare	0.00	0.00
	Industrial	977.22	83.82
	Miscellaneous	43.26	0.00
	No Data	0.00	0.00
	Office	0.00	0.00
	Public / Utilities	5,065.09	11.76
	Recreational	78.27	46.01
	Residential	1,319.46	1,104.78
	Retail / Commercial	0.61	0.61
	Vacant	1,778.53	125.28
	Total	**41,880.12**	**20,840.07**
AE	Agricultural	84,342.76	57,963.53
	Care / Health	9.27	7.61
	Church / Welfare	78.60	62.63
	Industrial	523.13	205.93
	Miscellaneous	510.43	25.39
	No Data	1.21	0.00
	Office	32.13	30.40
	Public / Utilities	27,099.43	0.00
	Recreational	488.53	365.63
	Residential	3,929.19	3,765.93
	Retail / Commercial	59.41	55.19
	Vacant	4,287.01	431.39
	Total	**121,361.10**	**62,913.63**
AH	Agricultural	0.00	0.00
	Care / Health	0.00	0.00
	Church / Welfare	2.15	2.15
	Industrial	0.00	0.00
	Miscellaneous	0.00	0.00

Flood Zone*	Property Use	Total Flooded Acres	Improved Flooded Acres
	No Data	0.00	0.00
	Office	0.15	0.15
	Public / Utilities	74.83	0.00
	Recreational	0.00	0.00
	Residential	23.28	23.28
	Retail / Commercial	7.42	4.99
	Vacant	7.40	-
	Total	**115.23**	**30.57**
AO	Agricultural	0.00	0.00
	Care / Health	0.00	0.00
	Church / Welfare	12.94	12.94
	Industrial	0.00	0.00
	Miscellaneous	0.00	0.00
	No Data	0.00	0.00
	Office	0.00	0.00
	Public / Utilities	7.48	0.00
	Recreational	0.00	0.00
	Residential	253.52	253.52
	Retail / Commercial	0.00	0.00
	Vacant	64.03	4.19
	Total	**337.97**	**270.65**
A99	Agricultural	6,248.57	1,614.31
	Care / Health	15.12	12.38
	Church / Welfare	4.62	4.62
	Industrial	573.43	554.85
	Miscellaneous	278.57	0.00
	No Data	6.56	0.00
	Office	121.29	91.22
	Public / Utilities	4,845.43	33.24
	Recreational	109.30	61.92
	Residential	457.22	397.81
	Retail / Commercial	24.70	24.70
	Vacant	3,293.30	138.86
	Total	**15,978.10**	**2,933.91**
Total 1%		**179,672.53**	**86,988.83**

Flood Zone*	Property Use	Total Flooded Acres	Improved Flooded Acres
Shaded X (500-year)**	Agricultural	38.56	16.68
	Care / Health	23.57	23.57
	Church / Welfare	152.83	140.27
	Industrial	722.14	647.87
	Miscellaneous	89.04	0.04
	No Data	0.00	0.00
	Office	120.56	84.61
	Public / Utilities	746.85	0.07
	Recreational	40.41	39.38
	Residential	5,210.90	4,990.42
	Retail / Commercial	561.64	547.79
	Vacant	1,023.88	78.44
	Total Shaded X	**8,730.38**	**6,569.14**
X Protected by Levee	Agricultural	315.52	315.52
	Care / Health	27.02	20.70
	Church / Welfare	80.24	63.45
	Industrial	456.42	454.05
	Miscellaneous	12.94	0.23
	No Data	0.64	0.00
	Office	200.94	181.30
	Public / Utilities	499.28	0.15
	Recreational	62.75	15.50
	Residential	2,168.87	2,097.75
	Retail / Commercial	275.26	267.84
	Vacant	192.37	8.35
	Total Levee	**4,292.25**	**3,424.84**
X	Agricultural	113,047.02	44,485.28
	Care / Health	574.02	552.77
	Church / Welfare	1,086.98	907.28
	Industrial	11,984.48	7,659.80
	Miscellaneous	811.66	4.37
	No Data	34.74	10.53
	Office	812.46	768.06
	Public / Utilities	17,998.80	56.63
	Recreational	831.80	745.02
	Residential	60,567.95	58,848.44

Flood Zone*	Property Use	Total Flooded Acres	Improved Flooded Acres
	Retail / Commercial	1,832.80	1,755.13
	Vacant	18,137.40	1,763.99
	Total Zone X	**227,720.11**	**117,557.30**

Source: Sacramento County DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

* The City of Elk Grove performed analysis based on the 2011 Plan. In that plan, no flooded acres analysis was performed. As such, this flooded acres table represents all flooded acres based on the 2015 DFIRM flood zones.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Insurance Coverage, Claims Paid, and Repetitive Losses

Unincorporated Sacramento County joined the NFIP on March 15, 1979, and the CRS on October 1, 1992. The current effective date is May 1, 2013. According to the CRS listing of eligible communities dated May 1, 2014, the County is currently a Class 2, which provides a 40 percent discount on flood insurance for those located within the special flood hazard area (SFHA) and a 10 percent discount for those located in non-SFHA areas.

2016 NFIP Analysis

NFIP insurance data indicates that as of February 19, 2016, there were 10,468 policies in force in the unincorporated County, resulting in $2,939,536,100 of insurance in force. Of these, 9,698 are for residential properties; 770 are nonresidential. 3,171 of these are in A zones; 7,297 policies are for parcels in the B, C, & X zones.

There have been 1,193 closed paid losses totaling $22,391,339; 1,128 of these were for residential properties and 64 were nonresidential, while 1 was unknown. Of these 1,193 paid losses, 819 were parcels in A zones and 366 parcels were in B, C, & X zones. Information was not provided on the other 8 claims. Of the 1,193 claims, 970 claims were associated with pre-FIRM structures and 213 with post-FIRM structures; 10 claims unknown. There have been 95 substantial damage claims since 1979.

Based on this analysis of insurance coverage, unincorporated Sacramento County has significant assets at risk to the 100-year and greater floods. However, of the 3,862 improved parcels within the 100-year floodplain, 3,171 (or 82.1 percent) of those parcels maintain flood insurance. Flood insurance coverage for the unincorporated County and the incorporated jurisdictions can be seen in Table 4-77.

Table 4-77 Sacramento County Planning Area – Percentages of Policy Holders to Parcels in the 1% Annual Chance Floodplain

Jurisdiction	Improved Parcels in 1% Annual Chance Floodplain*	Insurance Policies in the A (1% Annual Chance) Zone	Percentage of 1% Annual Chance Floodplain Parcels Currently Insured
Citrus Heights	156	67	42.9%
Elk Grove	265	8	3.1%
Folsom	8	13	100%
Galt	1	6	100%

Jurisdiction	Improved Parcels in 1% Annual Chance Floodplain*	Insurance Policies in the A (1% Annual Chance) Zone	Percentage of 1% Annual Chance Floodplain Parcels Currently Insured
Isleton	325	122	37.5%
Rancho Cordova	21	6	28.6%
City of Sacramento	24,861	2,153	8.7%
Unincorporated County	3,862	3,171	82.1%
Total	**29,499**	**5,546**	**18.8%**

Source: FEMA DFIRM June 16, 2015; Sacramento County 2016 Parcel Data

*With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

2015 Program for Public Information Flood Insurance Analysis

In addition to the 2016 data, a more detailed analysis of flood insurance by flood zone was performed for the 2015 Sacramento County Program for Public Information (PPI). That analysis is included here.

As of 12/31/2014, Sacramento County had 9,571 active flood insurance policies in effect. Flood insurance is required as a condition of Federal aid or mortgage or loan that is federally insured for a building located in a special flood hazard area. Flood insurance may not be required for properties that do not have a federally backed loan, but it is still advised. Level of coverage is measured in two ways:

- The number of buildings with insurance coverage compared to the number of buildings exposed to a flood hazard (see Table 4-78)
- The average amount of coverage by FIRM Zone and occupancy type compared to the amount of expected flood damage from a base flood (see Table 4-79, Table 4-80, and Table 4-81).

Table 4-78 Sacramento County – Percentage of Buildings Insured (as of 9/30/14)

Flood Zone	Policies	Properties	Percent Coverage
Zone AE	2,201	9,197	24%
Zone A	203	1,395	15%
Zone AO	348	823	42%
Zone AH	17	716	2%
Zone AR*	337	0	0%
Zone A99*	424	0	
Zone X	0	159,663	4%
Standard	420	–	–
Preferred	5,992	–	–
Total	**9,942**	**171,794**	**6%**

Source: 2015 Program for Public Information

*There are currently no properties in Zone AR or A99 in Sacramento County.

Table 4-79 Sacramento County – Policy Break-down (as of 9/30/14)

Structure Type	Number Policies in Force	Premium	Insurance in Force
Single Family	7,059	$3,899,552	$2,077,759,400
2-4 Family	413	$202,190	$92,290,000
All Other Residential	1,363	$566,396	$220,798,600
Non-Residential	736	$1,075,390	$248,079,800
Total	**9,571**	**$5,743,528**	**$2,638,927,800**

Source: 2015 Program for Public Information

Table 4-80 Sacramento County – Pre-FIRM Policies in Force (as of 9/30/14)

Flood Zone	Pre-FIRM	Premium	Insurance in Force
Zone AE	1,579	$1,174,252	$240,551,000
Zone A	123	$134,078	$23,207,400
Zone AO	319	$307,966	$60,462,600
Zone AH	12	$11,405	$2,531,600
Zone AR*	179	$144,366	$31,323,000
Zone A99*	314	$325,272	$66,997,100
Zone X			
Standard	146	$182,502	$36,442,700
Preferred	3,812	$1,668,465	$1,217,267,000
Total	**6,484**	**$3,948,306**	**$1,678,782,400**

Source: 2015 Program for Public Information

*There are currently no properties in Zone AR or A99 in Sacramento County.

Table 4-81 Sacramento County – Post-FIRM Policies in Force (as of 9/30/14)

Flood Zone	Post-FIRM	Premium	Insurance in Force
Zone AE	619	$222,943	$138,974,700
Zone A	80	$47,159	$19,236,600
Zone AO	29	$24,551	$8,008,300
Zone AH	5	$4,777	$1,910,500
Zone AR*	158	$54,322	$34,219,800
Zone A99*	110	$149,525	$28,530,600
Zone X			
Standard	274	$332,115	$75,199,500
Preferred	2,180	$1,206,920	$740,765,000
Total	**3,455**	**$2,042,312**	**$1,046,845,000**

Source: 2015 Program for Public Information

*There are currently no properties in Zone AR or A99 in Sacramento County.

Repetitive Loss Analysis

Unincorporated Sacramento County's vulnerability to flooding can be seen in the number of Repetitive Loss properties. The NFIP considers a property a Repetitive Loss Property if two or more flood insurance claims of more than $1,000 have been paid within any 10-year period since 1978. According to FEMA's records and the analysis contained in the Sacramento County Department of Water Resources' July 2015 Repetitive Loss Area Analysis Report, there are 101 Repetitive Loss Properties within Sacramento County. Several more properties within Sacramento County may have reached the damage threshold for Repetitive Loss Properties, but not all properties are covered by flood insurance and flood insurance claims are not submitted for all flood damage sustained. There are 11 severe repetitive loss properties (a residential property has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000).

A Repetitive Loss Area (RLA) consists of Repetitive Loss Properties and the surrounding properties that experience the same or similar flooding conditions, whether or not the buildings on those surrounding properties have been damaged by flooding. Figure 4-83 shows the 28 RLAs in Sacramento County based on an analysis of the location of the RL properties. Information by area is shown on Table 4-82 that includes the RL properties, historical loss properties (ie., those properties with one insurance claim), and information on those RL properties that have been mitigated. Much greater detail can be found in the July 2015 Repetitive Loss Area Analysis Report, as shown in Appendix G.

Figure 4-83 Unincorporated Sacramento County – Repetitive Loss Areas

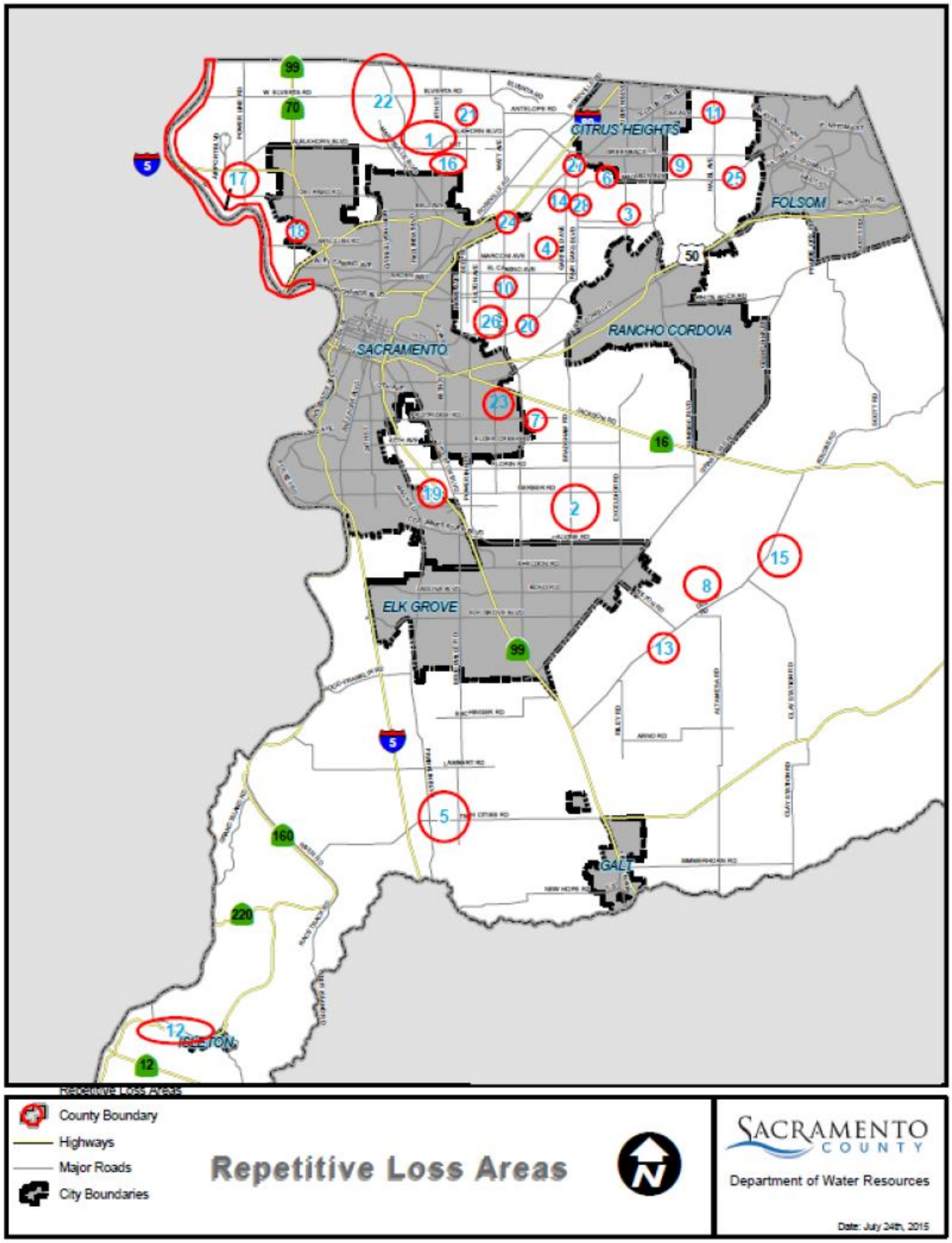


Table 4-82 Repetitive Loss Area Totals and Mitigated Properties

Name	Repetitive Loss Properties	Historical Loss Properties	Repetitive Loss Area Properties	Total Repetitive Loss Properties	Mitigated Properties
Area 1 – Dry Creek Watershed					
Cherry Lane	10	10	8	**28**	12
O Street	2	9	20	**31**	2
Dry Creek Road	2	1	30	**33**	3
10th Street; 16th Street; Eye Street; Front Street	0	0	16	**16**	0
Fallon Woods Way	0	2	35	**37**	0
Curved Bridge Road	0	3	6	**9**	2
Elkhorn Boulvard	9	8	7	**24**	14
Jamie Court	0	0	11	**11**	0
K Street	0	1	24	**25**	0
Vickrey Court; Vickie Theresa La Ne; Linda Lane; Lilac Lane; 14th Street	0	0	17	**17**	1
6th Street; 5th Street	11	2	15	**28**	2
6th Street; 5th Street	0	0	10	**10**	0
Oak Lane	0	2	14	**16**	0
Fallon Place Court; JC Court	0	0	17	**17**	0
Alvilde Court; Castle Creek Way; Q Street	0	0	21	**21**	0
Radalyac Court; Woodwright Way	0	0	17	**17**	4
Total Area 1	**34**	**38**	**268**	**340**	**40**
Repetive Loss Area 2 – Laguna Creek (Interbasin Transfer) and Gerber Creek					
Bar Du Lane	0	2	14	**16**	0
Bradshaw Road	0	4	29	**33**	2
Carmencita Avenue	1	1	27	**29**	0
Rogers Road; Gerber Road; Vineyard Road; Wildhawk West Drive	0	1	24	**25**	0
Total	**1**	**8**	**94**	**103**	**2**
Repetitive Loss Area 3- Andrew Alan Lane					
Andrew Alan Lane; Winding Way	2	3	3	**8**	5

Name	Repetitive Loss Properties	Historical Loss Properties	Repetitive Loss Area Properties	Total Repetitive Loss Properties	Mitigated Properties
Repetitive Loss Area 4 – North Ave (Chicken Ranch Slough)					
North Avenue	3	4	10	**17**	1
McCowan Way; Murchison Way; Oakfield Drive	3	4	10	**17**	1
Total	**6**	**8**	**20**	**34**	**2**
Repetitive Loss Area 5 – Twin Cities Road					
Bruceville Road; Franklin Boulevard; Twin Cities Road	1	0	9	**10**	0
Repetitive Loss Area 6 –Brooktree Creek					
Elsinore Way; Leavitt Way	1	0	10	**11**	1
Southbrook Way; Northbrook Way	1	0	6	**7**	0
Total	**2**	**0**	**16**	**18**	**1**
Repetitive Loss Area 7 – Morrison Creek					
Fruitridge Road	1	0	7	**7**	0
Repetitive Loss Area 8 – Cosumnes River					
Green Road; Jeffcott Road	2	5	26	**33**	0
Repetitive Loss Area 9 – South Branch Of Arcade Creek					
Hoffman Lane	1	6	4	**11**	1
Long Acres Court; Manana Way	0	4	7	**11**	0
Total	**1**	**10**	**11**	**22**	**1**
Repetitive Loss Area 10 – Strong Ranch Slough					
Kincaid Way	2	1	6	**9**	4
Kubel Circle	1	2	3	**6**	0
Maple Glen Road	1	3	23	**27**	0
Ladino Road; Meadow Lane; Riding Club Lane; Rockwood Drive	0	2	16	**18**	0
Winding Creek Road	4	4	11	**19**	0
Total	**8**	**12**	**59**	**79**	**4**
Repetitive Loss Area 11 – Linda Creek					
Creek Oaks Lane; Eden Oaks Avenue	0	2	10	**12**	0

Name	Repetitive Loss Properties	Historical Loss Properties	Repetitive Loss Area Properties	Total Repetitive Loss Properties	Mitigated Properties
Hazel Avenue	1	3	6	**10**	0
Leever Lane; Nipawin Way; Oak Avenue	0	3	19	**22**	0
Total	**1**	**8**	**35**	**44**	**0**
Repetitive Loss Area 12 – Grand Island Road & Vieira's Resort					
Long Island Road; Grand Island Road; Sycamore Drive; Beach Drive; Anchor Drive	8	12	23	**43**	5
Repetitive Loss Area 13 – Badger Creek					
Collings Road; Mann Road	1	0	19	**20**	0
Haggie Road; Dillard Road; Davis Road	0	1	12	**13**	0
Repetitive Loss Area 14 - Arcade Creek					
Manzanita Avenue	0	1	9	**10**	0
Sycamore Avenue	0	1	8	**9**	0
Peppermill Court	0	0	22	**22**	0
Pasadena Avenue; Winding Way	0	1	5	**6**	0
Total	**0**	**3**	**44**	**47**	**0**
Repetitive Loss Area 15 - Dillard Rd/Berry Rd					
Apple Road; Berry Road	2	0	10	**12**	0
Cherry Road; Currant Road; Dillard Road	0	1	11	**12**	0
Early Times Road; Live Oak Road	1	0	10	**11**	0
Orange Road	0	1	5	**6**	0
Total	**3**	**2**	**36**	**41**	**0**
Repetitive Loss Area 16 - Robla Creek					
C Street	2	5	9	**16**	0
16th Street; 20th Street	0	2	12	**14**	0
E Street	2	5	14	**21**	1
Total	**4**	**12**	**35**	**51**	**1**
Repetitive Loss Area 17 -Garden Highway					
Garden Highway*	24	53	222	**300**	3
Repetitive Loss Area 18 – Leona Circle					
Leona Circle	1	0	13	**14**	0

Name	Repetitive Loss Properties	Historical Loss Properties	Repetitive Loss Area Properties	Total Repetitive Loss Properties	Mitigated Properties
Repetitive Loss Area 19 – Tangerine Avenue					
Persimmon Avenue; Tangerine Avenue	1	0	2	**3**	0
Repetitive Loss Area 20 – Treehouse Lane					
Columbia Drive; Cortlandt Drive; Fair Oaks Boulevard; Treehouse Lane	1	7	4	**12**	0
Repetitive Loss Area 21 – Rio Linda Dry Creek					
24th Street; U Street	3	9	7	**19**	8
Repetitive Loss Area 22 – North Natomas East Main Drain Canal					
Burr Av; E Levee Rd; El Modena Av	0	0	15	**15**	0
Marysville Boulevard	1	10	4	**15**	0
Rio Linda Boulevard; Schandoney Avenue; Sorento Road; Straugh Road	9	3	4	**16**	0
M Street; West M Street	0	3	17	**20**	0
Q Street; West Q Street	0	2	10	**12**	0
2nd Street; West 2nd Street; 4th Street; West 4th Street; West 6th Street	1	4	16	**21**	0
Total	**11**	**22**	**66**	**99**	**0**
Repetitive Loss Area 23 – Morrison Creek					
Bradshaw Road	1	0	19	**20**	0
Mayhew Road	0	0	4	**4**	0
Total	**1**	**0**	**23**	**24**	**0**
Repetitive Loss Area 24 – Arcade Creek at Park Road					
Arcade Creek at Park Rd.	3	2	0	**5**	4
Repetitive Loss Area 25 – Madison Avenue at Rollingwood					
Madison Avenue	8	17	44	**69**	0
Repetitive Loss Area 26 – Strong Ranch Slough					
Bell Street; Northrop Avenue	0	5	12	**17**	0
Roselake Avenue; Roselee Way	0	0	12	**12**	0
Villanova Circle	0	8	12	**20**	0

Name	Repetitive Loss Properties	Historical Loss Properties	Repetitive Loss Area Properties	Total Repetitive Loss Properties	Mitigated Properties
Woodside Lane	52	11	87	**150**	0
Total	**52**	**24**	**123**	**199**	**0**
Repetitive Loss Area 27 – Brooktree Creek					
Auburn Boulevard; Devecchi Avenue	0	1	6	**7**	0
Rosebud Lane	1	2	6	**9**	1
Total	**1**	**3**	**12**	**16**	**1**
Repetitive Loss Area 28 – Verda Cruz Creek					
College Oak Drive; Crestview Drive	1	3	14	**18**	0
Moraga Drive	1	0	3	**4**	0
Total	**2**	**3**	**17**	**22**	**0**

Source: Repetitive Loss Area Analysis
*Includes 1 Severe Repetitive Loss structure

Population at Risk

A separate analysis was performed to determine population in flood zones. Using GIS, the DFIRM Flood dataset was overlayed on the improved residential parcel data. Those parcel centroids that intersect a flood zone were counted and multiplied by the Census Bureau factor for average household size; results were tabulated by jurisdiction and flood zone (see Table 4-83). According to this analysis, there is a residential population of 72,719 in the 1% annual chance flood event, and 140,353 in the 0.2% annual chance flood event for the Sacramento County Planning Area.

Table 4-83 Sacramento County Planning Area – Population at Risk to Flooding by Jurisdiction

	1% Annual Chance		0.2% Annual Chance*	
Jurisdiction	Improved Residential Parcels**	Population***	Improved Residential Parcels**	Population***
Citrus Heights	146	369	262	663
Elk Grove****	37	118	3,949	12,558
Folsom	7	18	76	198
Galt	0	0	0	0
Isleton	244	593	0	0
Rancho Cordova	21	58	963	2,648
Sacramento	24,416	63,970	13,622	35,690
Unincorporated	2,551	6,913	21,098	57,176
Total	**27,636**	**72,039**	**39,970**	**139,645**

Source: Sacramento County DFIRM June 16, 2015; US Census Bureau; Sacramento County 2016 Parcel/2015 Assessor Data
**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.
**With respect to improve parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone
***Census Bureau 2010 average household sizes are: Citrus Heights – 2.53; Elk Grove – 3.18; Folsom – 2.61; Galt – 3.24; Isleton – 2.43; Rancho Cordova – 2.75; City of Sacramento – 2.62; Unincorporated County – 2.71
**** The City of Elk Grove performed analysis based on the 2011 Plan. The City of Elk Grove's population analysis from that plan is included here and in its annex to this Plan Update.

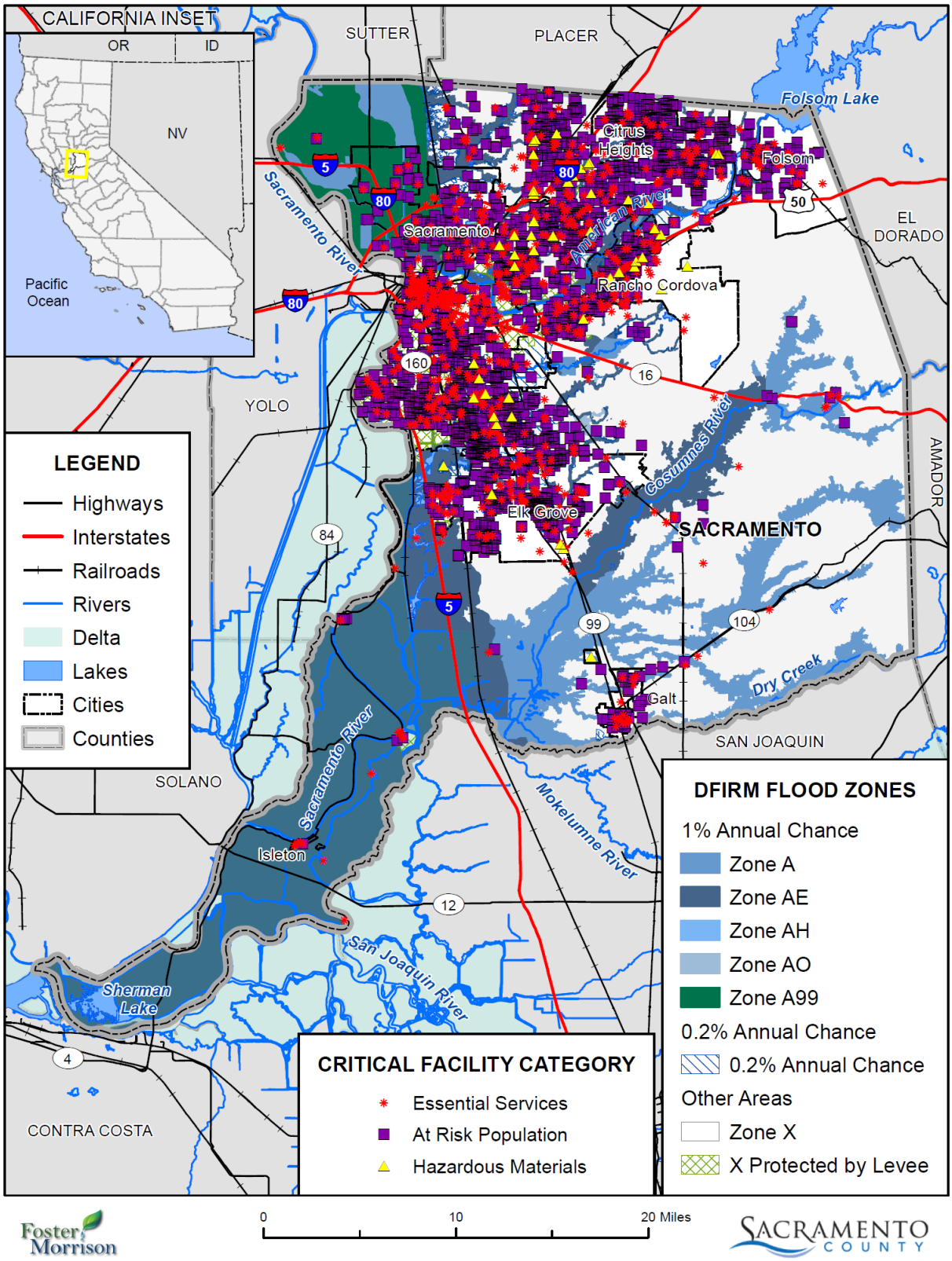
Cultural and Natural Resources at Risk

The Sacramento County Planning Area has significant cultural and natural resources located throughout the County as previously described. Risk analysis of these resources was not possible due to data limitations. However, as previously described, natural areas, such as wetlands and riparian areas within the floodplain, often benefit from periodic flooding as a naturally recurring phenomenon. These natural areas often reduce flood impacts by allowing absorption and infiltration of floodwaters. Preserving and protecting these areas and associated functions are a vital component of sound floodplain management practices for the Sacramento County Planning Area.

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions to determine critical facilities in the 1% and 0.2 annual chance floodplains. Using GIS, the Preliminary DFIRM flood zones were overlayed on the critical facility location data. Figure 4-84 shows critical facilities, as well as the DFIRM flood zones. Table 4-84 details critical facilities by facility type and count for the Planning Area, while Table 4-85 details the critical facilities for the unincorporated County. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure 4-84 Sacramento County Planning Area – Critical Facilities in DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

*Table 4-84 Sacramento County Planning Area – Critical Facilities in DFIRM Flood Zones**

Critical Facility Category	Facility Type	Facility Count
Zone A		
Essential Services Facilities	Airport	1
	Detention Basin	13
	Emergency Evacuation Shelter	1
	Total	**15**
At Risk Population Facilities	Detention Center	1
	Public Continuation High School	1
	School-Age Day Care Center	1
	Total	**3**
Zone A Total		**18**
A99		
Essential Services Facilities	Airport	1
	Arena	1
	Emergency Evacuation Shelter	10
	Fire Station	4
	Medical Health Facility	3
	Total	**19**
At Risk Population Facilities	Adult Residential	7
	Alternative Education School	1
	Charter School	3
	Day Care Center	19
	Group Home	1
	Hotel	3
	Private Elementary School	2
	Public Continuation High School	1
	Public Elementary School	10
	Public High School	2
	Public Middle School	3
	Residential Care/Elderly	6
	School-Age Day Care Center	8
	Total	**66**
A99 Total		**85**
Zone AE		
Essential Services Facilities	Airport	3
	Detention Basin	9

Critical Facility Category	Facility Type	Facility Count
	Emergency Evacuation Shelter	11
	Fire Station	3
	Government Facilities	2
	Medical Health Facility	5
	Police	2
	Stadium	1
	Total	**36**
At Risk Population Facilities	Adult Day Care	1
	Adult Residential	3
	Community Day School	1
	Day Care Center	3
	Detention Center	1
	Group Home	2
	Hotel	1
	Private K-12 School	2
	Public Continuation High School	1
	Public Elementary School	3
	Residential Care/Elderly	1
	Total	**19**
Hazardous Materials Facilities	Sewer Treatment Plant	1
	Total	**1**
AE Total		**56**
AH		
Essential Services Facilities	Detention Basin	1
	Emergency Evacuation Shelter	1
	Total	**2**
At Risk Population Facilities	Adult Residential	2
	Residential Care/Elderly	1
	School-Age Day Care Center	1
	Total	**4**
AH Total		**6**
Total 1% Annual Chance		**165**
0.2% Annual Chance		
Essential Services Facilities	Bus Terminal	2
	Detention Basin	6
	Drainage	1

Critical Facility Category	Facility Type	Facility Count
	Emergency Evacuation Shelter	18
	Fire Station	7
	General Acute Care Hospital	2
	Government Facilities	5
	Light Rail Stop	2
	Medical Health Facility	22
	Police	3
	Total	**68**
At Risk Population Facilities	Adult Day Care	2
	Adult Education School	1
	Adult Residential	70
	Alternative Education School	1
	Assisted Living Centers	8
	Charter School	2
	College/University	1
	Community Day School	1
	Day Care Center	51
	Group Home	11
	Hotel	1
	Infant Center	6
	Private Elementary School	7
	Private High School	1
	Private K-12 School	5
	Public Continuation High School	5
	Public Elementary School	25
	Public High School	4
	Public Middle School	4
	Residential Care/Elderly	53
	School	4
	School-Age Day Care Center	11
	Total	**274**
Hazardous Materials Facilities	Oil Collection Center	6
	Total	**6**
0.2% Annual Chance Total*		**348**
Zone X		
Essential Services Facilities	Airport	4
	Bus Terminal	2

Critical Facility Category	Facility Type	Facility Count
	Corporation Yard	1
	Detention Basin	16
	Dispatch Center	2
	Drainage	4
	Emergency Evacuation Shelter	133
	Emergency Rooms	1
	EOC	2
	Fire Station	61
	Gas Storage	1
	General Acute Care Hospital	5
	Government Facilities	43
	Hospitals	1
	Light Rail Stop	24
	Medical Health Facility	91
	Police	15
	Sand Bag	3
	State and Fed Facilities	1
	State Facility	1
	Traffic Operations Center	1
	Train Station	1
	Urgent Care Facilities	2
	Vehicle and Equipment Storage	1
	Water Treatment Plant	2
	Total	**418**
At Risk Population Facilities Total	Adult Day Care	12
	Adult Education School	7
	Adult Residential	165
	Alternative Education School	5
	Assisted Living Centers	47
	Charter School	15
	Children's Home	2
	College/University	4
	Community Day School	5
	Day Care Center	236
	Detention Center	1
	Group Home	64
	Hotel	29

Critical Facility Category	Facility Type	Facility Count
	Independent Study School	1
	Infant Center	16
	JAIL	1
	Prison	1
	Private Elementary School	45
	Private High School	23
	Private K-12 School	26
	Public Continuation High School	14
	Public Elementary School	136
	Public High School	24
	Public Middle School	27
	Residential Care/Elderly	308
	Residential Facility Chronically	1
	School	33
	School-Age Day Care Center	55
	Senior Center	1
	Social Rehabilitation Facility	4
	Special Education School	10
	Total	**1,318**
Hazardous Materials Facilities	Oil Collection Center	37
	OTHER	1
	Propane Storage	1
	Sewer Treatment Plant	1
	Total	**40**
X Total		**1,776**
X Protected by Levee		
Essential Services Facilities	Airport	1
	Bus Terminal	4
	Convention Center	1
	Drainage	1
	Emergency Evacuation Shelter	59
	Fire Station	19
	General Acute Care Hospital	2
	Government Facilities	18
	Light Rail Stop	26
	Medical Health Facility	79
	Police	2

Critical Facility Category	Facility Type	Facility Count
	Sand Bag	2
	Stadium	2
	Vehicle and Equipment Storage	1
	Water Treatment Plant	1
	Total	**218**
At Risk Population Facilities	Adult Day Care	11
	Adult Education School	4
	Adult Residential	61
	Assisted Living Centers	3
	Charter School	5
	College/University	2
	Community Day School	2
	Day Care Center	107
	Group Home	18
	Hotel	16
	Independent Study School	1
	Infant Center	11
	Private Elementary School	11
	Private High School	6
	Private K-12 School	4
	Public Elementary School	56
	Public High School	5
	Public Middle School	9
	Residential Care/Elderly	45
	School	1
	School-Age Day Care Center	21
	Total	**399**
Hazardous Materials Facilities Total	Oil Collection Center	2
	Total	**2**
X Protected by Levee Total		**619**
Grand Total		**2,908**

Source: Sacramento County DFIRM, Sacramento County GIS

* The City of Elk Grove performed analysis based on the 2011 Plan. The City of Elk Grove's annex shows the critical facilities in the floodplain. Due to difficulties in matching the datasets from 2011 and 2016, this table shows analysis of the critical facilities based on the 2015 DFIRM for all jurisdictions, including Elk Grove.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Table 4-85 Unincorporated Sacramento County – Critical Facilities in DFIRM Flood Zones

Critical Facility Category	Facility Type	Facility Count
A		
Essential Services Facilities	Airport	1
	Emergency Evacuation Shelter	1
	Total	**2**
At Risk Population Facilities	Detention Center	1
	Public Continuation High School	1
	School-Age Day Care Center	1
	Total	**3**
A Total		**5**
A99		
Essential Services Facilities	Airport	1
	Fire Station	2
	Medical Health Facility	3
	Total	**6**
At Risk Population Facilities	Hotel	1
	Total	**1**
A99 Total		**7**
AE		
Essential Services Facilities	Airport	3
	Detention Basin	4
	Emergency Evacuation Shelter	7
	Fire Station	3
	Medical Health Facility	3
	Police	1
	Stadium	1
	Total	**22**
At Risk Population Facilities	Adult Day Care	1
	Adult Residential	2
	Community Day School	1
	Day Care Center	2
	Detention Center	1
	Group Home	2
	Hotel	1
	Private K-12 School	2
	Public Continuation High School	1

Critical Facility Category	Facility Type	Facility Count
	Public Elementary School	2
	Residential Care/Elderly	1
	Total	**16**
Hazardous Materials Facilities	Sewer Treatment Plant	1
	Total	**1**
AE Total		**39**
Total 1% Annual Chance		**51**
0.2% ANNUAL CHANCE		
Essential Services Facilities Total	Bus Terminal	1
	Emergency Evacuation Shelter	9
	Fire Station	4
	Government Facilities	2
	Light Rail Stop	1
	Medical Health Facility	11
	Police	2
	Total	**30**
At Risk Population Facilities	Adult Day Care	1
	Adult Education School	1
	Adult Residential	34
	Community Day School	1
	Day Care Center	26
	Group Home	8
	Infant Center	4
	Private Elementary School	2
	Private High School	1
	Private K-12 School	2
	Public Continuation High School	4
	Public Elementary School	11
	Public High School	1
	Public Middle School	1
	Residential Care/Elderly	31
	School-Age Day Care Center	5
	Total	**133**
Hazardous Materials Facilities	Oil Collection Center	5
	Total	**5**
0.2% Annual Chance Total*		**168**

Critical Facility Category	Facility Type	Facility Count
Zone X		
Essential Services Facilities Total	Airport	4
	Emergency Evacuation Shelter	70
	Fire Station	38
	General Acute Care Hospital	1
	Government Facilities	17
	Light Rail Stop	2
	Medical Health Facility	45
	Police	8
	Traffic Operations Center	1
	Vehicle and Equipment Storage	1
	Total	**187**
At Risk Population Facilities	Adult Day Care	6
	Adult Education School	4
	Adult Residential	86
	Alternative Education School	5
	Charter School	9
	College/University	1
	Community Day School	3
	Day Care Center	112
	Detention Center	1
	Group Home	41
	Hotel	5
	Infant Center	8
	Private Elementary School	22
	Private High School	12
	Private K-12 School	16
	Public Continuation High School	7
	Public Elementary School	70
	Public High School	12
	Public Middle School	16
	Residential Care/Elderly	164
	Residential Facility Chronically	1
	School-Age Day Care Center	24
	Social Rehabilitation Facility	2
	Special Education School	6
	Total	**633**

Critical Facility Category	Facility Type	Facility Count
Hazardous Materials Facilities	Oil Collection Center	26
	OTHER	1
	Total	**27**
X Total		**847**
X Protected by Levee		
Essential Services Facilities	Emergency Evacuation Shelter	11
	Fire Station	3
	Light Rail Stop	3
	Medical Health Facility	8
	Police	1
	Vehicle and Equipment Storage	1
	Total	**27**
At Risk Population Facilities	Adult Day Care	2
	Adult Residential	12
	Charter School	1
	Day Care Center	14
	Group Home	5
	Hotel	1
	Infant Center	2
	Private Elementary School	1
	Private High School	2
	Private K-12 School	1
	Public Elementary School	10
	Public High School	1
	Public Middle School	1
	Residential Care/Elderly	6
	School-Age Day Care Center	3
	Total	**62**
Hazardous Materials Facilities	Oil Collection Center	1
	Total	**1**
X Protected by Levee Total		**90**
Grand Total		**1,156**

Source: Sacramento County DFIRM, Sacramento County GIS

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Overall Community Impact

Floods and their impacts vary by location and severity of any given event and will likely only affect certain areas of the County during specific times. Based on the risk assessment, it is evident that floods will continue to have potentially devastating economic impacts to certain areas of the County. However, many floods in the County are minor, localized events that cause nominal damagare rather than a disaster. Impacts that are not quantified, but can be anticipated in large future events, include:

- Commercial and residential structural and property damage;
- Costs incurred due to post-flood clean up and repair of buildings and infrastructure;
- Damage to roads/bridges resulting in loss of mobility;
- Decreased revenue due to loss of income, sales, tourism, and property taxes;
- Deterioration of homes and neighborhoods as floods recur;
- Disruption of and damage to public infrastructure and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Impact on the overall mental health of the community;
- Injury and loss of life, including first responders rescuing those who did not evacuate or are stranded;
- Loss of historical or unique artifacts;
- Loss of jobs due to businesses closing or cutting back on operating hours;
- Loss of programs or services that are cut to pay for flood recovery;
- Mental health and family impacts, including increased occurrence of suicides and divorce
- Negative impact on commercial and residential property values;
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed; and
- Significant economic impact (jobs, sales, tax revenue) to the community.

Future Development and Future Flood Conditions

This section provides an analysis of the flood hazard and proposed future development within the County based on FEMA DFIRMs and also discusses considerations in evaluating future flooding conditions.

Future Development: General Considerations

Communities that participate in the NFIP adopt regulations and codes that govern development in special flood hazard areas, and enforce those requirements through their local floodplain management ordinances through the issuance of permits. Sacramento County's floodplain management ordinance provides standards for development, subdivision of land, construction of buildings, and improvements and repairs to buildings that meet or exceed the minimum requirements of the NFIP.

The International Residential Code (IRC) and International Building Code (IBC), by reference to ASCE 24, include requirements that govern the design and construction of buildings and structures in flood hazard areas. FEMA has determined that the flood provisions of the I-Codes are consistent with the requirements of the NFIP (the I-Code requirements shown either meet or exceed NFIP requirements). ASCE 24, a design standard developed by the American Society of Civil Engineers, expands on the minimum NFIP requirements with more specificity, additional requirements, and some limitations.

With the adoption of the 2015 International Code, communities will be moving towards a more stringent approach to regulatory floodplain management. The adoption and enforcement of disaster-resistant building codes is a core community action to promote effective mitigation. When communities ensure that new buildings and infrastructure are designed and constructed in accordance with national building codes and construction standards, they significantly increase local resilience now and in the future. With continued advancements in building codes, local ordinances should be reviewed and updated to meet and exceed standards as practicable to protect new development from future flood events and to further promote disaster resiliency.

Master planning will also be necessary to assure that open channel flood flow conveyances serving the smaller internal streams and drainage areas are adequately prepared to accommodate the flows. Preservation and maintenance of natural and riparian areas should also be an ongoing priority to realize the flood control benefits of the natural and beneficial functions of these areas. Also to be considered in reducing flooding in areas of existing and future development is to promote implementation of stormwater program elements and erosion and sediment controls, including the clearing of vegetation from natural and man-made drains that are critical to flood protection. Both native and invasive species can clog drains, and reduce flows of floodwaters, which slow that natural drainage process and can exacerbate flooding.

One of the most effective ways to reduce vulnerability to potential flood damage is through careful land use planning that fully considers applicable flood management information and practices. California's 2007 flood legislation (Senate Bill 5) directly linked system-wide flood management planning to local land use planning, requiring local jurisdictions to demonstrate an urban level of flood protection before approving new development in urban and urbanizing areas. "Urban level of flood protection" means the level of protection necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year (California Government Code Section 65007). DWR has been developing criteria to guide local jurisdiction compliance with the new requirements. In addition to developing criteria to help local jurisdictions in their land use planning, DWR is preparing criteria for use in the design of levees protecting urban and urbanizing areas. DWR is also working with local partners to develop guidance related to nonurban flood protection levels.

Once these standards become effective, cities and counties within the Sacramento-San Joaquin Valley cannot enter into development agreements or issue a permit to construct a new structure in areas located within a flood hazard zone unless the following is established:

- Find that existing facilities protect urban and urbanizing areas to a 1-in 200 chance of flooding in any given year or the FEMA standard of flood protection in non-urbanized areas, or
- Find that the local flood management agency has made adequate progress on the construction of the flood protection system to provide the required level of protection, or
- Impose conditions on the development agreement that will provide the required level of protection.

Sacramento Planning Area SB 5 Compliance Status

In June of 2016, SAFCA released their Engineering Report certifying "Adequate Progress Towards an Urban Level of Flood Protection". This certification is made with respect to the following levee systems:

- Natomas Levee System comprised of Natomas Cross Canal south levee; Sacramento River east levee, Natomas Cross Canal to Powerline Road; Sacramento River east levee, Powerline Road to American River; American River north levee; Natomas East Main Drainage Canal west levee; and Pleasant Grove Creek Canal west levee.
- Dry Creek Levee System comprised of the Dry Creek north levee. Robla-Arcade Levee System comprised of Robla Creek south levee; Natomas East Main Drainage Canal east levee from Robla (Dry) Creek to Arcade Creek; and Arcade Creek north levee.
- American River North Levee System comprised of Arcade Creek south levee; Natomas East Main Drainage Canal east levee from Arcade Creek to American River; and American River north levee from NEMDC east levee to Arden Way (at William B. Pond Recreation Area).
- American River South and Sacramento River East Levee System comprised of American River south levee; from Sacramento River to Mayhew Drain; Sacramento River east levee from American River to Beach Lake north levee; and Beach Lake north levee from Sacramento River to UPRR.
- South Sacramento Streams Levee System comprised of the Morrison Creek right and left bank levees and floodwalls, Florin Creek right and left bank levees and floodwalls, Elder Creek right and left bank levees and floodwalls, and Unionhouse right bank levee and floodwall.

SAFCA has prepared a separate report, titled SAFCA Urban Level of Flood Protection Plan and Adequate Progress Baseline Report (SAFCA, 2016), that demonstrates adequate progress and the identified scope, schedule, and cost of the construction of a flood protection system which will result in flood protection equal to or greater than the urban level of flood protection in urban or urbanizing areas. For urban and urbanizing areas protected by project levees, the urban level of flood protection shall be achieved by 2025.

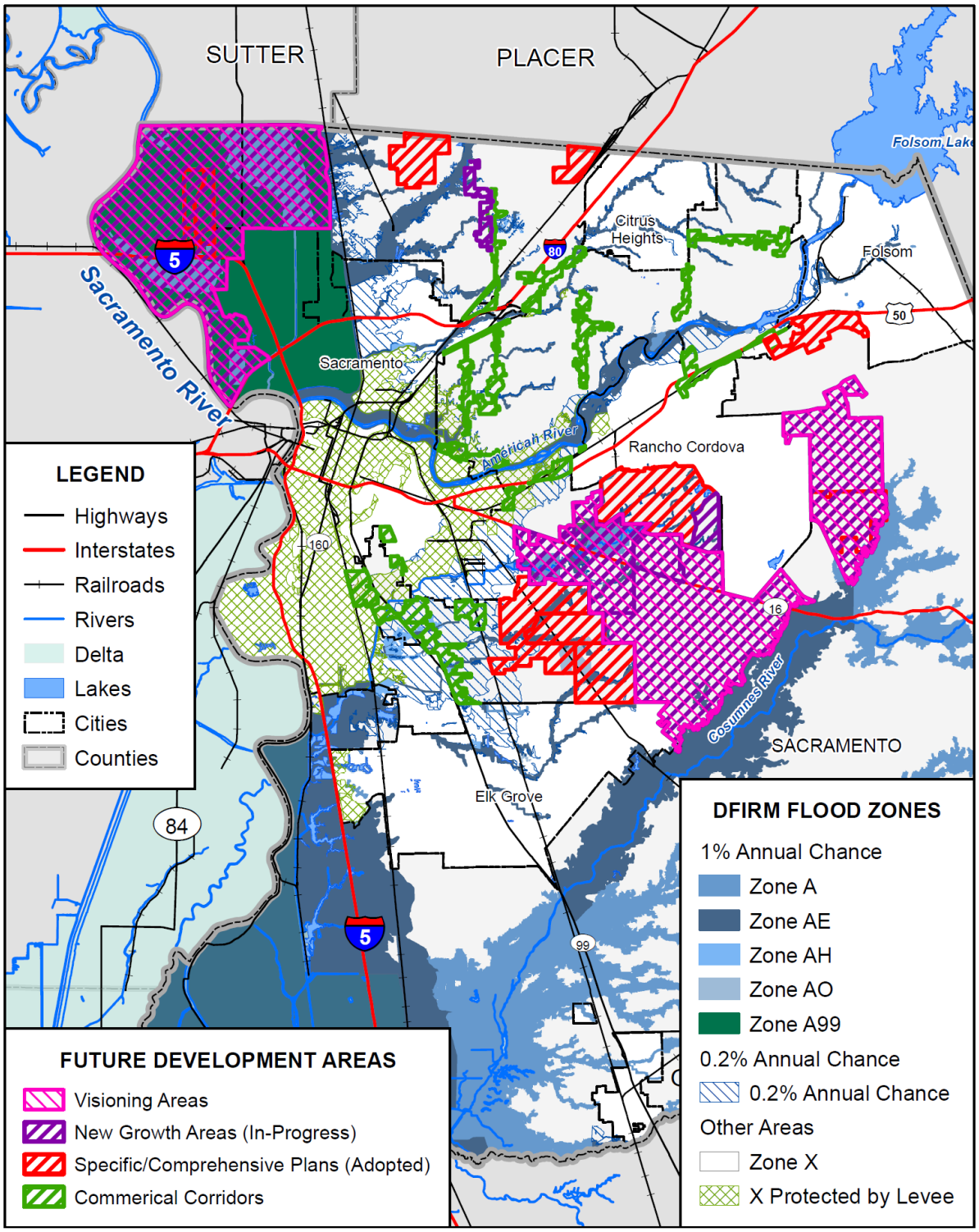
SAFCA's June 2016 Engineering Report, "Adequate Progress Towards an Urban Level of Flood Protection" was developed to provide substantial evidence that, once the planned improvements have been completed, the structural flood control facilities protecting the urban areas of the City and County from flooding from the Sacramento and American Rivers and their tributaries will be able to withstand flooding from a 1-in-200-year flood event in accordance with the State of California's Urban Levee Design Criteria (ULDC), issued in May 2012. To this end, for each of the six levee systems discussed, there is a description of the status for compliance with each criterion for each levee within the levee system.

Future Development: DFIRM GIS Analysis

Future development areas for unincorporated Sacramento County is broken out into four primary categories: Vision areas, new growth areas, specific/comprehensive plan areas, and commercial corridors. GIS data is maintained by Sacramento County, and was made available for this plan. An analysis was performed to quantify parcels within these development areas that are also in flood hazard areas. Results can provide information on how and where to grow in the future.

GIS was used to determine the number of parcels in the 1% and 0.2% annual chance flood events within the four categories of future development areas. GIS was used to create a centroid, or point representing the center of the parcel polygon. Those parcels centroids that fall inside the future development areas and that were within the 1% annual chance flood event or the 0.2% annual chance flood events were selected and tabulated in Figure 4-85 and shown in Table 4-86.

Figure 4-85 Unincorporated Sacramento County – Future Development in DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table 4-86 Unincorporated Sacramento County– Future Development in FEMA DFIRM Zones

Future Development Areas	Parcels	Acres	DFIRM Flood Zone
Visioning Area			
Jackson	1,099	21,670	A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X
Natomas	907	24,504	A, A99, AE, X
Grantline East	48	8,198	A, X
New Growth Areas			
Mather South Master Plan	12	1,299	AE, 0.2% Annual Chance, X
Natomas North	907	24,504	A, A99, AE, X
Jackson Township	61	1,909	AE, 0.2% Annual Chance, X
New Bridge	27	1,339	AE, 0.2% Annual Chance, X
West Jackson Highway	455	6,181	A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X
West of Watt	383	609	AE, 0.2% Annual Chance, X
Specific/Comprehensive Plan Areas			
Cordova Hills Master Plan	26	2,436	A, X
East Antelope Specific Plan	1,425	601	X
Easton Project	19	1,409	0.2% Annual Chance, X
Elverta Specific Plan	158	1,581	AE, X
Florin-Vineyard Gap Community Plan	827	3,875	A, AE, AO, 0.2% Annual Chance, X
Jackson Township Master Plan	61	1,909	AE, 0.2% Annual Chance, X
Mather Field	1,421	5,493	A, AE, 0.2% Annual Chance, X
Mather South Master Plan	12	1,299	AE, 0.2% Annual Chance, X
Metro Airpark	78	1,810	A, A99
New Bridge Master Plan	27	1,339	AE, 0.2% Annual Chance, X
North Vineyard Station Specific Plan	1,320	1,553	AE, AO, 0.2% Annual Chance, X
Vineyard Springs Comprehensive Plan	2,732	2,344	AE, AO, 0.2% Annual Chance, X
West Jackson Highway Master Plan	455	6,181	A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X
West of Watt	383	609	AE, 0.2% Annual Chance, X
Commercial Corridor Areas			
Corridor 1	1,277	554	AE, 0.2% Annual Chance, X
Corridor 2	533	226	X
Corridor 3	1,033	625	AE, 0.2% Annual Chance, X
Corridor 4	626	532	AE, 0.2% Annual Chance, X
Corridor 5	516	621	AE, AH, 0.2% Annual Chance, X
Corridor 6	579	311	AE, 0.2% Annual Chance, X
Corridor 7	722	460	AE, 0.2% Annual Chance, X
Corridor 8	126	136	X

Future Development Areas	Parcels	Acres	DFIRM Flood Zone
Visioning Area			
Corridor 9	946	290	AE, 0.2% Annual Chance, X-Protected by Levee, X
Corridor 10	593	101	X
Corridor 11	266	76	X-Protected by Levee, X
Corridor 12	2,537	1,929	A, AE, AH, 0.2% Annual Chance, X-Protected by Levee, X
Corridor 13	325	402	AE, 0.2% Annual Chance, X
Corridor 14	30	155	X
Corridor 15	224	465	0.2% Annual Chance, X
Corridor 16	31	11	X
Corridor 17	203	254	A, 0.2% Annual Chance, X-Protected by Levee, X
Corridor 18	3	1	X-Protected by Levee
Corridor 19	48	130	0.2% Annual Chance, X-Protected by Levee

Source: Sacramento County GIS, Sacramento County DFIRM June 16, 2015

Future Flood Conditions

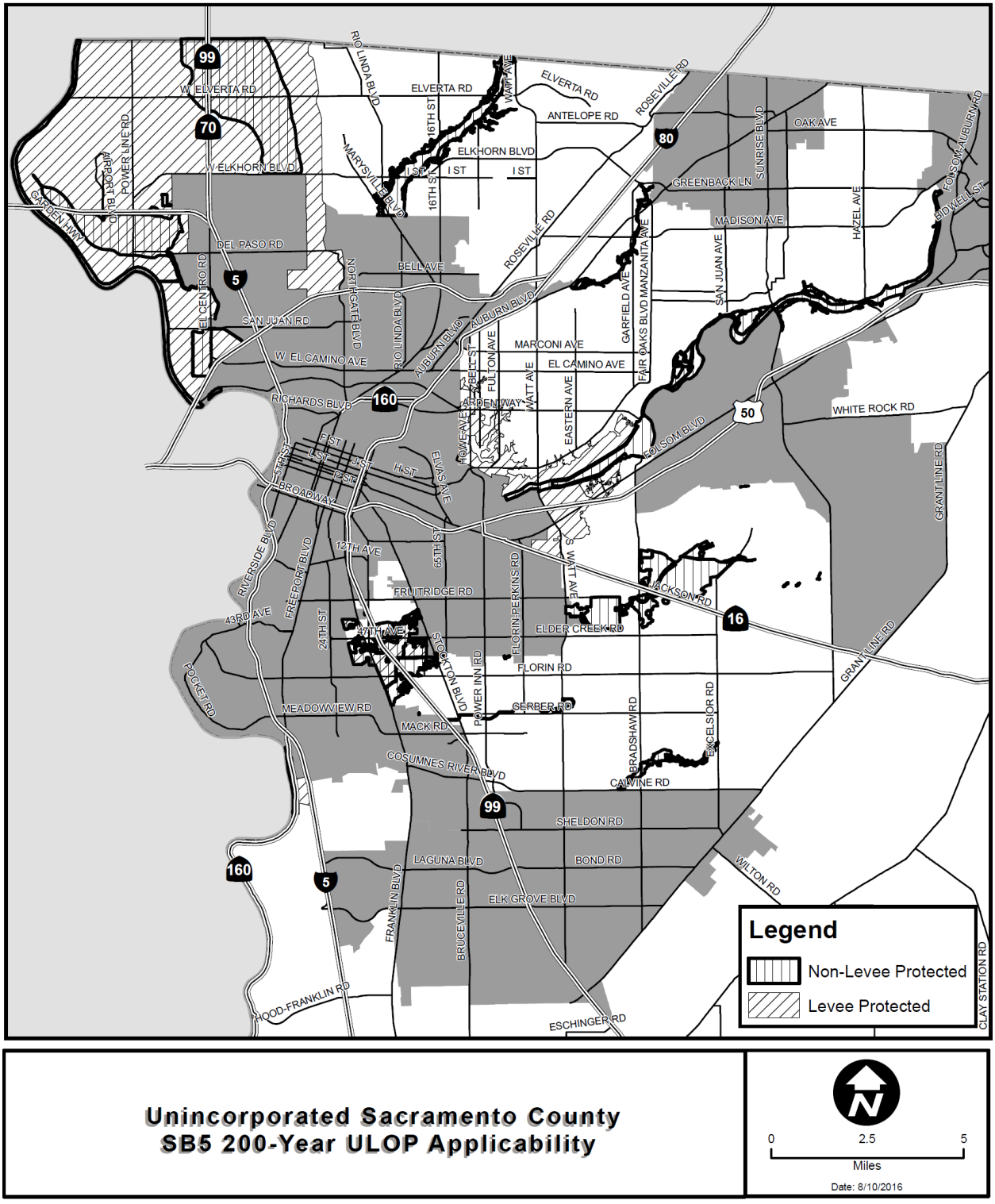
The flood risk assessment included a detailed analysis of historic and existing conditions through documentation of past occurrences and various mapping efforts conducted by multiple agencies, as well as an evaluation of areas likely to flood in the future/future flooding conditions. Future flooding conditions were considered by the County for this assessment using a variety of tools:

- The new FEMA DFIRMs (6/16/2015) and updated FIS provide information on the updated 1% and 0.2% annual chance floods and X-protected by levee areas based on the latest studies and considering recent growth and development in the County. This new mapping is a representation of areas subject to major floods in the future and is used for regulatory and future planning and development purposes.
- Local Flood Mapping prepared by Sacramento County Department of Water Resources. These maps have local floodplains identified throughout the County that are based on high water data, local hydrologic and hydraulic studies, and other reports of flooding.
- The County also maintains a separate database and mapping effort of all RL and historical loss properties in the County. This RL/historical loss analysis is also used to identify areas likely to flood in the future and to assist with the development of mitigation measures to mitigate future flood damage to these areas. This information and analysis is included in the County's and City of Sacramento's updated 2015 RLAA Reports, attached as an Appendix to this plan.
- Also to be considered when evaluating future flood conditions in the Sacramento County Planning Area, the California DWR developed Best Available Maps (BAM)/Flood Awareness Maps. These maps were developed to provide communities with an additional tool in understanding potential flood hazards currently not mapped as a regulated floodplain. These preliminary maps include the 100-, 200- and 500-year floodplains to provide information on the true risk of flooding to allow communities to make informed floodplain management and property use decisions. These advisory maps are intended to help communities begin implementing activities to meet SB 5 requirements calling for a minimum of 200-year protection for new development in urban and urbanizing area.

Regulatory Considerations for Future Flood Conditions

As previously described, Sacramento County and participating jurisdictions have been evaluating and determining the impact of both existing and future flood conditions, including development of a local program to address the 200-year state requirement for the ULOP. The County is in the process of finalizing updates to the General Plan and Zoning Code addressing new flood protection requirements that establish a 200-year flood standard of protection in urban areas (e.g., ULOP). This is the primary policy change that will affect construction in urban or urbanizing areas that are in a SFHA or a Moderate Flood Zone. Areas not considered to be urbanizing will remain subject to the FEMA 0.1% standard of flood protection. Figure 4-86 shows the 200-year ULOP applicability areas within the unincorporated County. 200-year studies have been completed or are underway for areas that are non-levee protected. Proposed amendments address: agency coordination, setbacks along levees, elevation and construction standards, flood map data, flood emergency response, floodway management, building design standards, and the process for making legal determinations and project approvals for development in flood hazard zones.

Figure 4-86 Unincorporated Sacramento County – Urban Level of Flood Protection



Mapping of these areas will be part of implementation of the program moving forward

Future Flood Conditions: The Effects of Climate Change

The effects of climate change on future flood conditions should also be considered. While the risk and associated short and long term impacts of climate change are uncertain, experts in this field tend to agree that among the most significant impacts include those resulting from increased heat and precipitation events that cause increased frequency and magnitude of flooding. Changes associated with climate change and flooding could be significant given the effects of snowmelt runoff combined with significant rain events. Increases in damaging flood events may cause greater property damage, public health and safety concerns displacement, and loss of life. In addition, an increase in the magnitude and severity of flood events can lead to potential contamination of potable water and contamination of food crops given the agricultural industry in the County. Displacement of residents can include both temporary and long-term displacement.

Sacramento County will continue to study the risk and vulnerability associated with future flood conditions, both in terms of future growth areas and other considerations such as climate change, as they evaluate and implement their flood mitigation and adaptation strategy for the Sacramento County Planning Area.

Future Flood Conditions: ARkStorm Scenario

Also to be considered in evaluating potential "worst case" future flood conditions, is the ARkStorm Scenario. Although much attention in California's focuses on the "Big One" as a high magnitude earthquake, there is the risk of another significant event in California – a massive, statewide winter storm. The last such storms occurred in the 19th century, outside the memory of current emergency managers, officials, and communities. However, massive storms are a recurring feature of the state, the source of rare but inevitable disasters. The USGS Multi Hazards Demonstration Project's (MHDP) developed a product called ARkStorm, which addressed massive U.S. West Coast storms analogous to those that devastated California in 1861-1862. Over the last decade, scientists have determined that the largest storms in California are the product of phenomena called Atmospheric Rivers (discussed above in Section 4.2.14 in the discussion of Pineapple Express), and so the MHDP storm scenario is called the ARkStorm, for Atmospheric River 1000 (a measure of the storm's size).

Scientific studies of offshore deposits in northern and southern California indicate that storms of this magnitude and larger have occurred about as often as large earthquakes on the southern San Andreas Fault. Such storms are projected to become more frequent and intense as a result of climate change. This scientific effort resulted in a plausible flood hazard scenario to be used as a planning and preparation tool by hazard mitigation and emergency response agencies.

For the ARkStorm Scenario, experts designed a large, scientifically realistic meteorological event followed by an examination of the secondary hazards (e.g., landslides and flooding), physical damages to the intense winter storms of 1861-62 that left California's Central Valley impassible. Storms far larger than the ARkStorm, dubbed megastorms, have also hit California at least six times in the last two millennia.

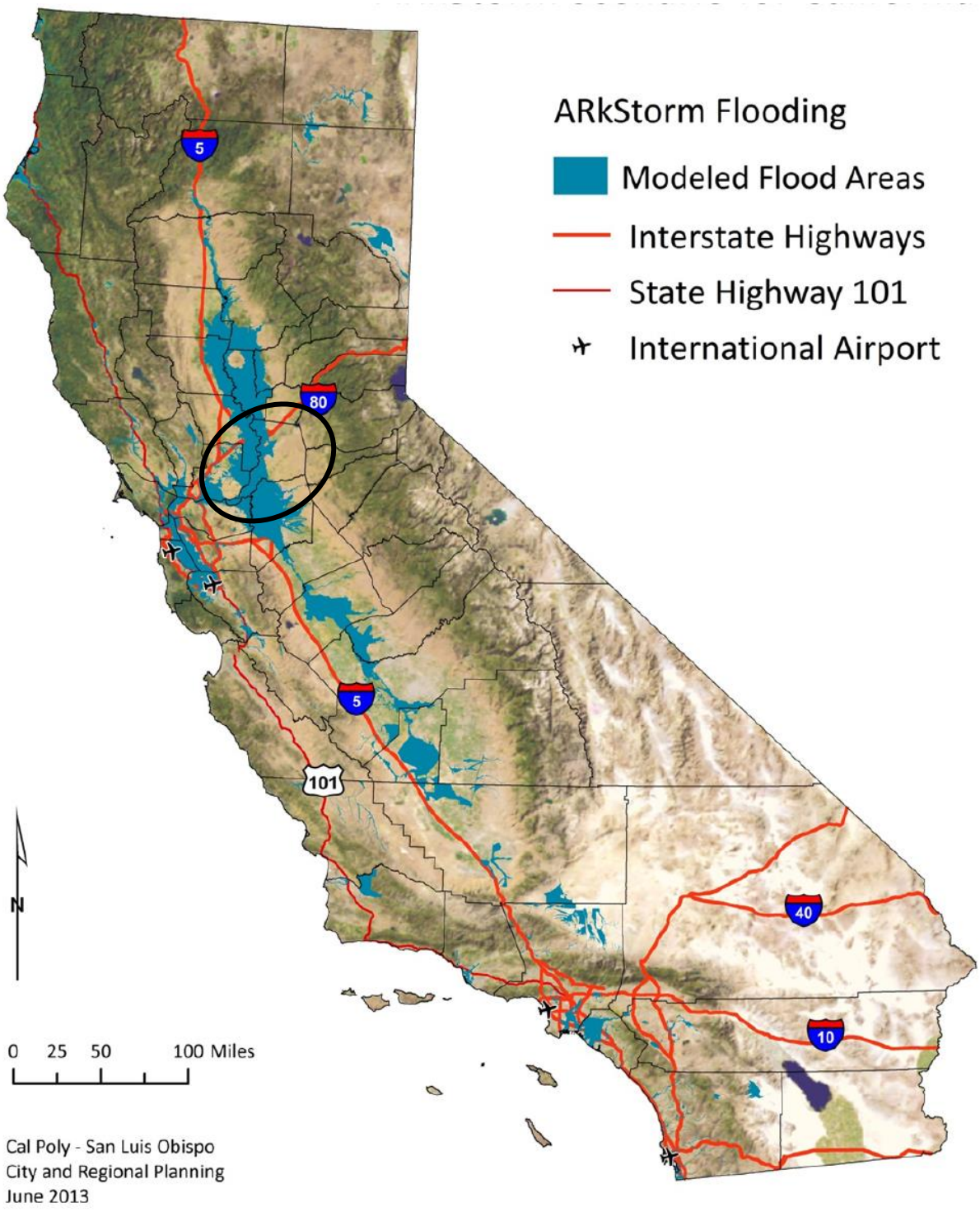
The ARkStorm produces precipitation in many places exceeding levels experienced on average every 500 to 1,000 years. Extensive flooding in many cases overwhelms the state's flood protection system, which is at best designed to resist 100- to 200-year runoffs (many flood protection systems in the state were designed for smaller runoff events). The Central Valley experiences widespread flooding. Serious flooding also

occurs in Orange County, Los Angeles County, San Diego, the San Francisco Bay Area, and other coastal communities. In some places, winds reach hurricane speeds, as high as 125 miles per hour. Hundreds of landslides occur, damaging roads, highways, and homes. Property damage exceeds $300 billion, most of it from flooding. Agricultural losses and other costs to repair lifelines, dewater flooded islands, and repair damage from landslides brings the total direct property loss to nearly $400 billion, of which only $20 to $30 billion would be recoverable through public and commercial insurance. Power, water, sewer, and other lifelines experience damage that takes weeks or months to restore. Flooding evacuation could involve over one million residents in the inland region and Delta counties.

A storm of ARkStorm's magnitude has important implications: 1) it raises serious questions about the ability of existing national, state, and local disaster policy to handle an event of this magnitude; 2) it emphasizes the choice between paying now to mitigate, or paying a lot more later to recover; 3) innovative financing solutions are likely to be needed to avoid fiscal crisis and adequately fund response and recovery costs; 4) responders and government managers at all levels could be encouraged to conduct self-assessments and devise table-top exercises to exercise their ability to address a similar event; 5) the scenario can be a reference point for application of FEMA and Cal OES guidance connecting federal, state, and local natural hazards mapping and mitigation planning under the NFIP and Disaster Mitigation Act of 2000; and 6) common messages to educate the public about the risk of such an extreme event could be developed and consistently communicated to facilitate policy formulation and transformation.

Figure 4-87 depicts an ARkStorm modeled scenario showing the potential for flooding in the Central Valley as the result of a large storm. In Sacramento County, the modeled scenario suggests the westernmost portion of the County would face inundation.

Figure 4-87 Projected ARkStorm Flooding in California



Source: USGS ArkStorm

4.3.11. Flood: Localized Stormwater Flooding Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Historically, the Planning Area has been at risk to flooding primarily during the spring months when river systems in the County swell with heavy rainfall. Localized flooding also occurs throughout the Planning Area at various times throughout the year with several areas of primary concern unique to each City and the unincorporated County. Mapping of these areas is an ongoing effort by the County and Cities. However, affected localized flood areas and associated values identified by the County are summarized in Table 4-87.

Methodology

Areas in Sacramento County vulnerable to localized flooding were identified by the County and analysis was performed for the 2011 Plan Update. That analysis was updated here, using 2016 mean values of sturctures in the County. Parcel and road segments vulnerable to these areas were tabulated by watershed, and are shown in Table 4-35 in Section 4.2.15. Road segments were initially selected if they were within 50 feet of an affected parcel. For the purposes of this analysis, parcels and road segments that overlapped watershed boundaries were counted for each of the watersheds. Parcels and road segments that intersect the 1% or.2% annual flood events (see DFIRM flood analysis, Section 4.3.10) were eliminated from these counts. It is important to note that localized flooding may also occur within those DFIRM zones, making this analysis a conservative approach.

There are 10,034 parcels affected by localized flooding (and outside of the DFIRM flood zones) in Sacramento County. Morrison Creek and Laguna Creek Watersheds have the highest counts of parcels affected, each with over 1,000. These are large watersheds that extend in a northeast-southwest orientation across the middle of the county and that cover unincorporated county and areas in Sacramento, Elk Grove and Rancho Cordova.

According to the County Assessor data, the mean (average) structure value of improved residential parcels county-wide is $295,000 (it was $158,665 in 2010). Assuming that the parcels listed in Table 4-35 are improved residential parcels, there is a total structure value of $2.9 billion at risk to localized flooding. Assuming contents value is 50% of residential structure value, there is a total value of $4.4 billion at risk. Applying the 20% loss due to flooding, the loss estimate for the Planning Area is $888 million. Total values at risk are shown in Table 4-87. Total population at risk to localized flooding is 27,192 (based on Census 2010 household factor of 2.71).

Table 4-87 Sacramento County Planning Area – Vulnerability to Localized Flooding

Parcel Count	Improved Value/Parcel*	Structure Value	Contents Value	Total Value	Loss Estimate
10,034	$295,000	$2,960,030,000	$1,480,015,000	$4,440,045,000	$888,009,000

*mean value of an improved residential structure

Future Development

Much of the growth in Sacramento County is occurring through expansion of the urban areas, causing a significant increase in peak flow and stormwater runoff. Such growth can consume previously undeveloped acres, and the impacts may overwhelm existing drainage and flood control facilities.

The potential for flooding may increase as stormwater is channeled due to land development. Such changes can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. Floodplain modeling and master planning should be based on build out property use to ensure that all new development remains safe from future flooding. While local floodplain management, stormwater management, and water quality regulations and policies address these changes on a site-by-site basis, their cumulative effects can have a negative impact on the floodplain.

The risk of stormwater/localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater through compliance with stormwater management regulations or choosing not to develop in areas that often are subject to localized flooding will reduce future risks of losses due to stormwater/localized flooding.

4.3.12. Levee Failure Vulnerability Assessment

Likelihood of Future Occurrence—Occasional
Vulnerability—Medium

Levee failure flooding can occur as the result of partial or complete collapse of an impoundment, and often results from prolonged rainfall and flooding. The primary danger associated with dam or levee failure is the high velocity flooding of those properties downstream of the breach. Section 4.2.17 Levee Failure describes the levee inventory in the Sacramento County Planning Area.

A levee failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to levee failures is generally confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions.

Approximately 150 years ago, the levees of the Sacramento-San Joaquin Delta were raised to prevent flooding on what remains some of the most fertile farmland in the nation. While the peat soils were excellent for agriculture, they were not the best choice to create strong foundations for levee barriers meant to contain a constant flow of river water. Nevertheless, it was these native soils that were primarily used to create the levee system.

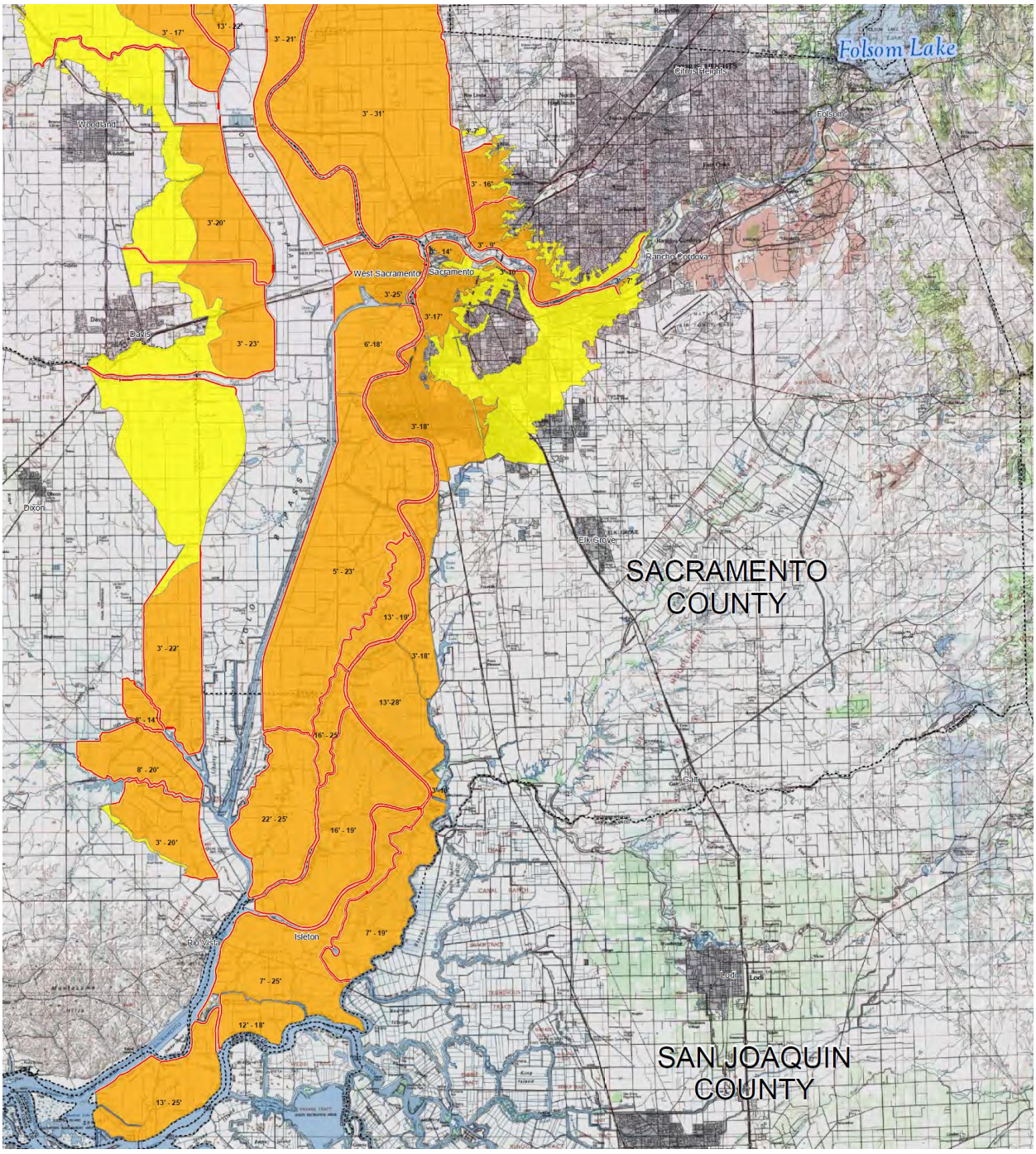
Levee failure flooding would vary in the County depending on which structure fails and the nature and extent of the failure and associated flooding. This flooding presents a threat to life and property, including buildings, their contents, and their use. Large flood events can affect lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, agricultural industry, and the local and regional economies.

Levee Flood Protection Zones

Levee Flood Protection Zones estimate the maximum area that may be inundated if a project levee fails when water surface elevation is at the top of a project levee. Zones depicted on Figure 4-88 do not necessarily depict areas likely to be protected from flow events for which project levees were designed. Figure 4-88 illustrates the depths of flooding should a levee that protects that area fail.

Lands within the Levee Flood Protection Zones and other leveed areas may be subject to flooding due to various factors, including the failure or overtopping of project or non-project levees, flows that exceed the design capacity of project or non-project levees, and flows from water sources not specifically protected against by project levees. Lands not mapped within a Levee Flood Protection Zone and within other areas protected by a levee are not invulnerable to flood risk, and some may also experience flooding from these or other related events.

Figure 4-88 Expected Flood Depths from Levee Failure



Levee Flood Protection Zones

- Estimated Depth Greater Than 3' (Numbers shown indicate approximate inundation depths)
- Depth Unknown
- Butte Basin: Not an LFPZ - area is designed to flood. Area shown is based on historical limits of flooding.
- State Federal Project Levee
- County Boundary

Source: DWR, USGS

Values at Risk

Unincorporated Sacramento County and its incorporated jurisdictions have mapped flood hazard areas. This includes areas protected by levees. GIS was used to determine the possible impacts of flooding in areas protected by levee within the County, and how the risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and values at risk to levee failure. However, this analysis was performed based on the most current 2015 DFIRMs which still reflect some levees as providing 100-year level of protection. According to the County, all levees have since been decertified as not providing a 100-year level of protection, so this analysis is based solely on the information presented in the DFIRMs. Further it is important to note that many levee improvement projects are ongoing throughout the Planning Area, some of which will be providing certification of area levees to both a 100-year and 200-year levels depending on applicable requirements. Thus, this analysis reflects a moment in time and while it does provide information on areas developed behind levees, the X Protected by Levee flood zone will continue to change as these projects are completed and new certifications obtained.

The methodology detailed below was followed in determining assets at risk to a levee failure. Analysis on assets at risk is provided for two different areas in this Base Plan:

- Sacramento County Planning Area
- Unincorporated Sacramento County

The Sacramento County Planning Area includes both the unincorporated County and each jurisdiction, essentially the entire geographical area of Sacramento County. Summary tables for the Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the participating jurisdictions are included in their respective annexes to this plan.

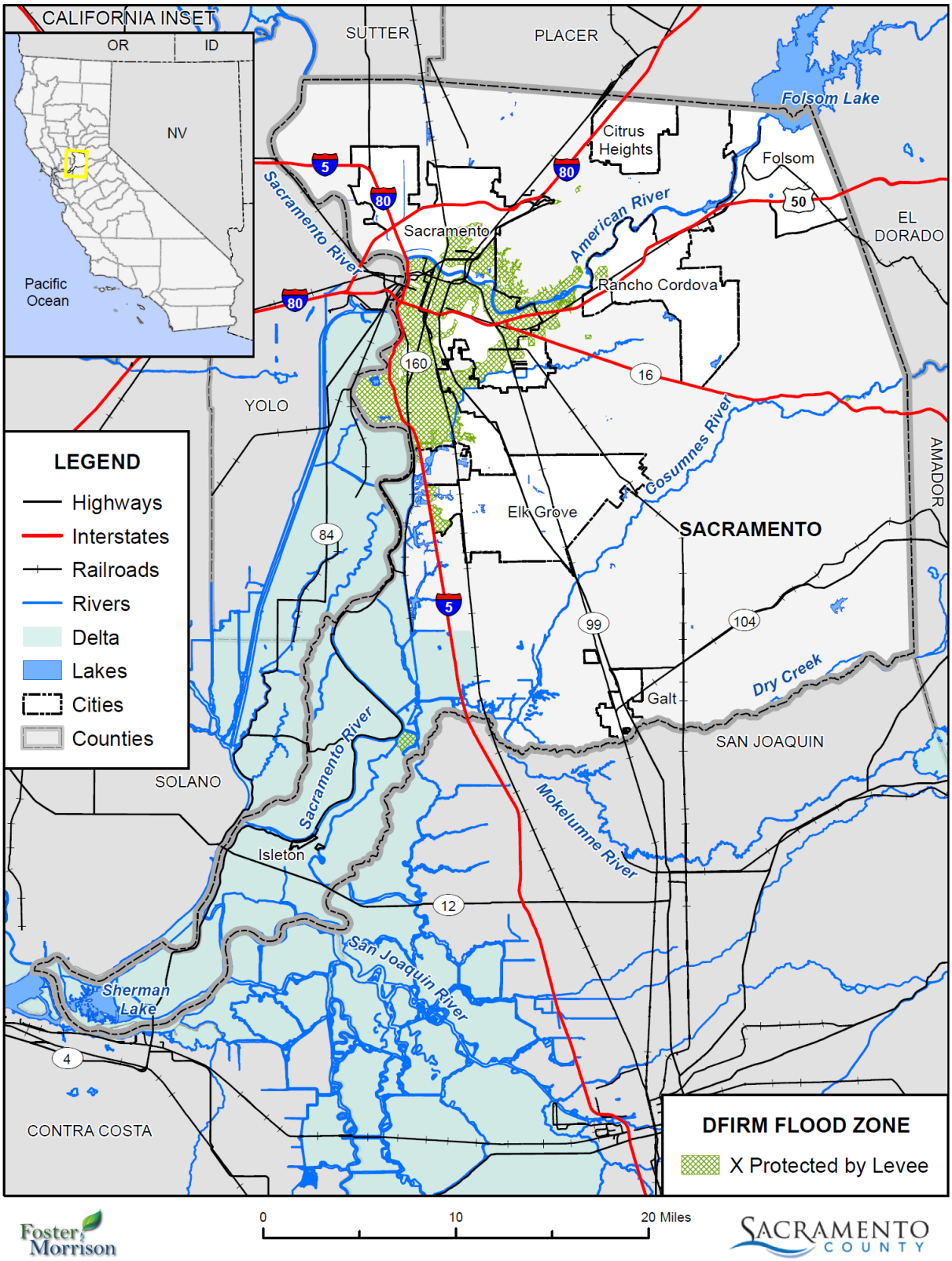
X Protected by Levee Analysis

Methodology

Sacramento's parcel and associated secured roll assessor 2015 data was used as the basis for the countywide inventory of developed parcels, land value, and structure value. Sacramento County's current FEMA DFIRM, obtained from the FEMA National Flood Hazard Layer and dated April 16, 2016 was utilized to perform this analysis of areas protected by levees. GIS was used to create a centroid, or point representing the center of the parcel polygon. DFIRM data was then overlaid on the parcel centroids. For the purposes of this analysis, the X-protected by levee flood zone that intersected a parcel centroid was assigned that zone for the entire parcel. The model assumes that every parcel with a structure value greater than zero is improved in some way. It is important to note that there could be more than one structure on an improved parcel (i.e. condo complex occupies one parcel but might have several structures).

Figure 4-89 contains flood analysis results for area protected by a levee (i.e. designation of X Protected by Levee) for the entire Sacramento County Planning Area.

Figure 4-89 Sacramento County Planning Area – X Protected by Levee Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Sacramento County Planning Area

Based on FEMA guidance for levee failure, contents value is estimated using the methodology shown in Table 4-56. Table 4-92 contains levee failure analysis results for the entire Sacramento County Planning Area. This includes unincorporated Sacramento County and the incorporated jurisdictions. This table shows the number of parcels and assets at risk in levee protected areas. Table 4-92 shows the value of improved parcels by jurisdiction. Results of this analysis are presented for the Sacramento County Planning Area.

Table 4-88 Sacramento County Planning Area – Count and Structure Value of Improved Parcels in X Protected by Levee Zone

Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Citrus Heights	0	0	$0	$0	$0
Elk Grove	2,359	2,261	$261,870,363	$778,210,531	$1,040,080,894
Folsom	0	0	$0	$0	$0
Galt	0	0	$0	$0	$0
Isleton	0	0	$0	$0	$0
Rancho Cordova	826	796	$41,727,801	$113,935,128	$155,662,929
City of Sacramento	69,158	64,495	$6,259,968,574	$14,814,016,310	$21,073,984,884
Unincorporated Sacramento County	10,654	10,188	$1,077,093,916	$2,472,625,848	$3,549,719,764
Total	**82,997**	**77,740**	**$7,640,660,654**	**$18,178,787,817**	**$25,819,448,471**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016

Table 4-93 shows potential losses from levee failure with loss estimates and loss ratios for the Sacramento County Planning Area. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the unincorporated County) and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3 foot flood depth (30% damage), 6 foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table 4-89 Sacramento County Planning Area – X Protected by Levee Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
X Protected by Levee	77,740	$18,178,787,817	$12,091,140,402	$30,269,928,219	$9,080,978,465.70 $18,161,956,931.40 $30,269,928,219.00	7.0% 14.0% 23.3%

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table 4-92 and Table 4-93, the Sacramento County Planning Area has 77,740 improved parcels and roughly $30.3 billion of structure and contents value in the X Protected by Levee areas. The 3 foot loss ratio of 7.0%, the 6 foot loss ratio of 14.0%, and the total loss ratio of 23.3% indicates that the County has large amounts of assets at risk to possible levee failures.

Structures protected by levees that fail are often total losses (see Figure 4-41 in Section 4.2.17). The analysis above assumes all levees in the Sacramento County Planning Area break at one time, which is unlikely. The extent and depth of actual flooding and associated damage will vary depending on the location, nature, depth, and extent of any levee break.

Unincorporated Sacramento County

Table 4-94 contains levee failure analysis results for unincorporated Sacramento County. These tables show the number of parcels and assets at risk in X Protected by Levee areas. Table 4-94 shows the value of improved parcels by land use. Results of this analysis are presented for unincorporated Sacramento County.

Table 4-90 Unincorporated Sacramento County – Count and Structure Value of Improved Parcels by Land Use in X Protected by Levee Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	1	1	$256,152	$138,321	$394,473
Care / Health	16	13	$7,758,169	$27,721,005	$35,479,174
Church / Welfare	28	23	$10,782,719	$29,340,621	$40,123,340
Industrial	86	84	$27,845,077	$68,708,090	$96,553,167
Miscellaneous	35	1	$105,638	$31,352	$136,990
Office	155	133	$87,237,295	$283,380,334	$370,617,629
Public / Utilities	149	4	$353,474	$323,426	$676,900
Recreational	2	2	$3,159,193	$8,192,213	$11,351,406
Residential	9,743	9,657	$772,836,538	$1,756,520,864	$2,529,357,402
Retail / Commercial	279	263	$140,803,738	$295,289,034	$436,092,772
Vacant	159	7	$25,955,923	$2,980,588	$28,936,511
No Data	1	-	$0	$0	$0
Total	**10,654**	**10,188**	**$1,077,093,916**	**$2,472,625,848**	**$3,549,719,764**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016

Table 4-95 shows potential losses from levee failure with loss estimate and loss ratios for the unincorporated County. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the unincorporated County) and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3 foot flood depth (30% damage), 6 foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is

usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table 4-91 Unincorporated Sacramento County – X Protected by Levee Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
X Protected by Levee	10,188	$2,472,625,848	$1,625,738,873	$4,098,364,721	$1,229,509,416.30 $2,459,018,832.60 $4,098,364,721.00	2.6% 5.2% 8.7%

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016
*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table 4-94 and Table 4-95, unincorporated Sacramento County has 10,188 improved parcels and roughly $4.1 billion of structure and contents value in X Protected by Levee areas. The 3 foot loss ratio of 2.6%, the 6 foot loss ratio of 5.2%, and the total loss ratio of 8.7% indicates that the unincorporated County has moderate amounts of assets at risk to levee failure.

Structures protected by levees that fail are often total losses (see Figure 4-41 in Section 4.2.17). The analysis above assumes all levees in unincorporated Sacramento County break at one time, which is unlikely. The extent and depth of actual flooding and associated damage will vary depending on the location, nature, depth, and extent of any levee break.

Other values at risk from levee failure include agricultural crop loss. High value crops are grown in the Delta and other agricultural areas would be at risk to levee failure. Specific dollar values of crops protected by levees was not available for this plan.

Population at Risk

A separate analysis was performed to determine population in the X Protected by Levee areas. Using GIS, the X Protected by Levee DFIRM Zone was overlaid on the improved residential parcel data. Those parcel centroids that intersect the levee protected area were counted and multiplied by the Census Bureau household factor for each jurisdiction; and results were tabulated in Table 4-92. According to this analysis, there is a population of 193,533 in the X Protected by Levee Zone for the Sacramento County Planning Area.

Table 4-92 Sacramento County Planning Area – X Protected by Levee – Improved Residential Parcels and Population

Jurisdiction	Improved Residential Parcels	Population*
Citrus Heights	0	0
Elk Grove	2,193	5,548
Folsom	0	0
Galt	0	0
Isleton	0	0

Jurisdiction	Improved Residential Parcels	Population*
Rancho Cordova	792	2,178
Sacramento	61,023	159,880
Unincorporated	9,567	25,927
Total	**73,575**	**193,533**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, June 2016; US Census Bureau

*Census Bureau 2010 average household sizes are: Citrus Heights – 2.53; Elk Grove – 3.18; Folsom – 2.61; Galt – 3.24; Isleton – 2.43; Rancho Cordova – 2.75; City of Sacramento – 2.62; Unincorporated County – 2.71

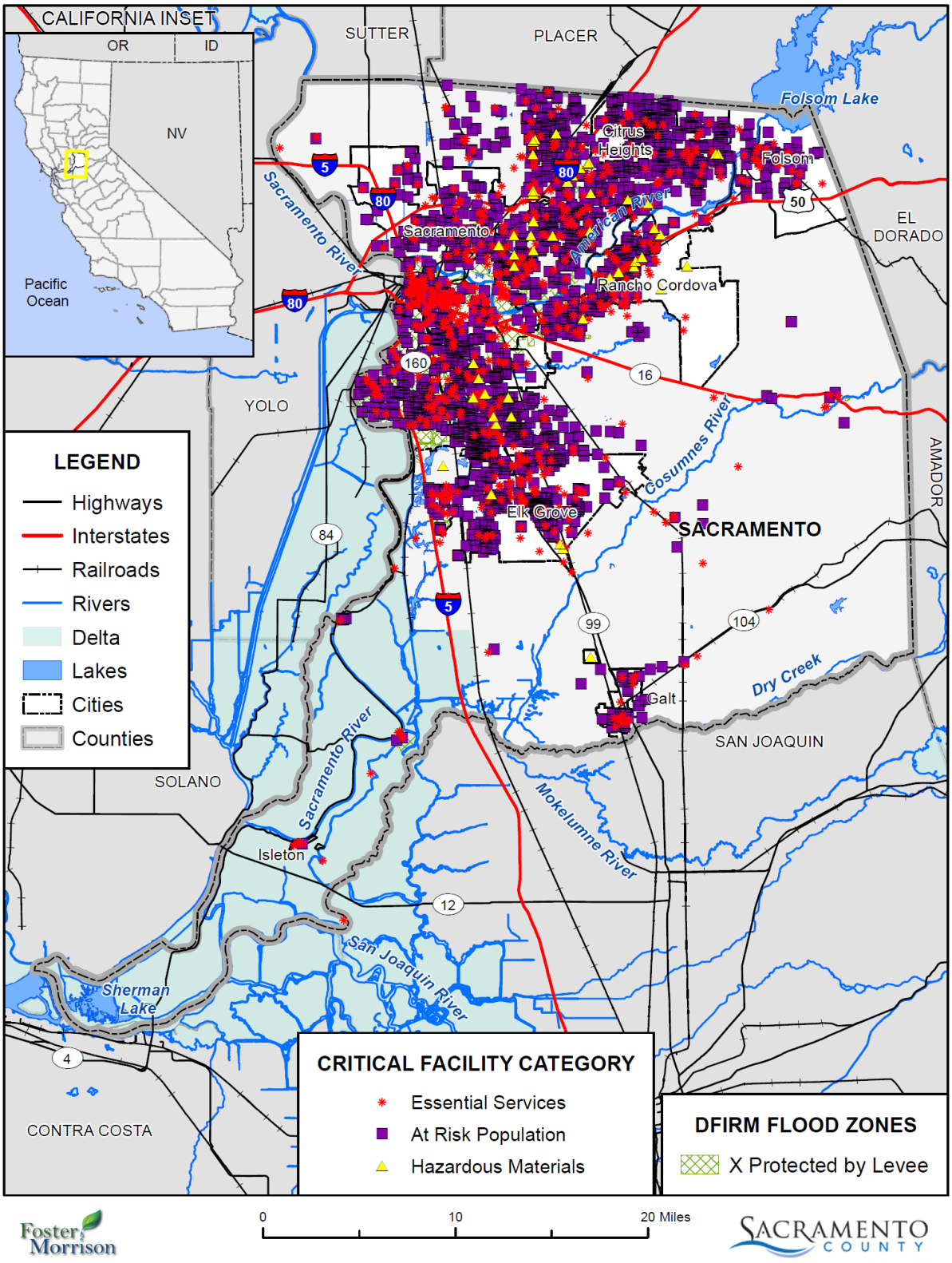
Cultural and Natural Resources at Risk

The Sacramento County Planning Area has significant cultural and natural resources located throughout the County as previously described. Vulnerability analysis of these resources was not possible due to data limitations, as the cultural and natural resource data is not available in a GIS layer.

Critical Facilities at Risk

A separate analysis was performed on the critical facility inventory in Sacramento County. GIS was used to determine whether the facility locations intersect the X Protected by Levee hazard areas. These are shown in Figure 4-90. Table 4-93 details critical facilities by facility type and count for the Planning Area, while Table 4-94 details the critical facilities for the unincorporated County. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure 4-90 Sacramento County Planning Area – Critical Facilities in X Protected by Levee Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table 4-93 Sacramento County Planning Area – Critical Facilities in DFIRM X Protected by Levee Flood Zones

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Airport	1
	Bus Terminal	4
	Convention Center	1
	Drainage	1
	Emergency Evacuation Shelter	59
	Fire Station	19
	General Acute Care Hospital	2
	Government Facilities	18
	Light Rail Stop	26
	Medical Health Facility	79
	Police	2
	Sand Bag	2
	Stadium	2
	Vehicle and Equipment Storage	1
	Water Treatment Plant	1
	Total	**218**
At Risk Population Facilities	Adult Day Care	11
	Adult Education School	4
	Adult Residential	61
	Assisted Living Centers	3
	Charter School	5
	College/University	2
	Community Day School	2
	Day Care Center	107
	Group Home	18
	Hotel	16
	Independent Study School	1
	Infant Center	11
	Private Elementary School	11
	Private High School	6
	Private K-12 School	4
	Public Elementary School	56
	Public High School	5
	Public Middle School	9
	Residential Care/Elderly	45

Critical Facility Category	Facility Type	Facility Count
	School	1
	School-Age Day Care Center	21
	Total	**399**
Hazardous Materials Facilities Total	Oil Collection Center	2
	Total	**2**
X Protected by Levee Total		**619**

Source: Sacramento County DFIRM, Sacramento County GIS

Table 4-94 Unincorporated Sacramento County – Critical Facilities in DFIRM X Protected by Levee Flood Zones

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Emergency Evacuation Shelter	11
	Fire Station	3
	Light Rail Stop	3
	Medical Health Facility	8
	Police	1
	Vehicle and Equipment Storage	1
	Total	**27**
At Risk Population Facilities	Adult Day Care	2
	Adult Residential	12
	Charter School	1
	Day Care Center	14
	Group Home	5
	Hotel	1
	Infant Center	2
	Private Elementary School	1
	Private High School	2
	Private K-12 School	1
	Public Elementary School	10
	Public High School	1
	Public Middle School	1
	Residential Care/Elderly	6
	School-Age Day Care Center	3
	Total	**62**
Hazardous Materials Facilities	Oil Collection Center	1
	Total	**1**
X Protected by Levee Total		**90**

Source: Sacramento County DFIRM, Sacramento County GIS

Overall Community Impact

Levee failures and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the County during specific times. Based on the risk assessment, it is evident that levee failures will continue to have potentially devastating economic impacts to certain areas of the County. Impacts that are not quantified, but can be anticipated in large future events, include:

- Commercial and residential structural and property damage;
- Costs incurred due to post-flood clean up and repair of buildings and infrastructure;
- Damage to roads/bridges resulting in loss of mobility;
- Decreased revenue due to loss of income, sales, tourism, and property taxes;
- Deterioration of homes and neighborhoods as floods recur;
- Disruption of and damage to public infrastructure and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Impact on the overall mental health of the community;
- Injury and loss of life, including first responders rescuing those who did not evacuate or are stranded;
- Loss of historical or unique artifacts;
- Loss of jobs due to businesses closing or cutting back on operating hours;
- Loss of programs or services that are cut to pay for flood recovery;
- Mental health and family impacts, including increased occurrence of suicides and divorce
- Negative impact on commercial and residential property values;
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed; and
- Significant economic impact (jobs, sales, tax revenue) to the community.

Future Development

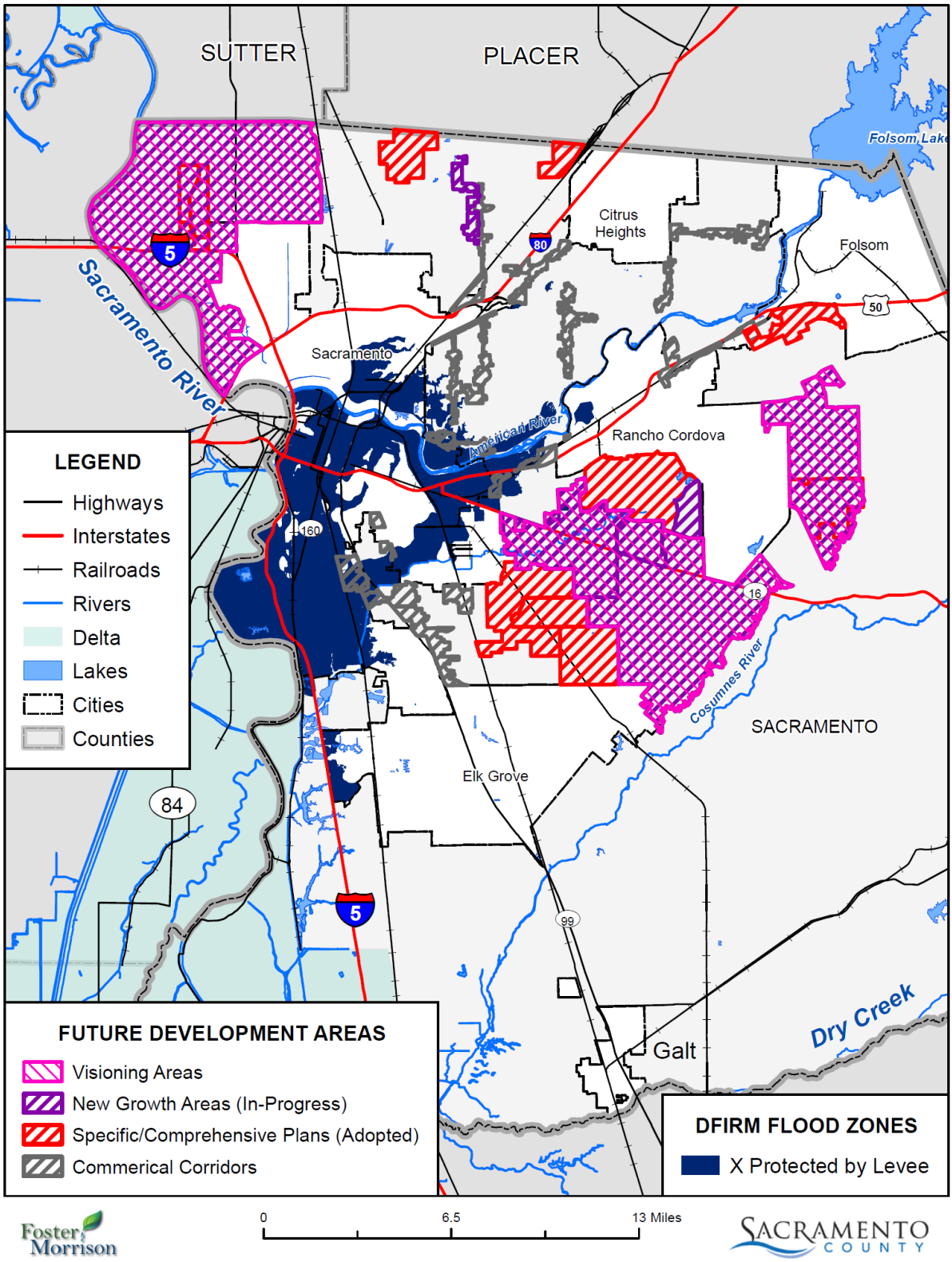
The HMPC detailed that SB 5 and levee improvements ULOP that will provide 200-year level of protection for urbanizing areas, as well as levee improvement projects to provide 100-year level in non urban areas. Both of these levee improvements will allow development in leveed areas to continue without being within a SFHA. For those areas where 100 and 200 cannot be met to accredit/certify these levees, then development standards associated with their FEMA floodzones would apply; most likely the SFHA.

Future Development GIS Analysis

Visioning areas, new growth areas, specific plan areas, commercial corridors data is maintained by Sacramento County, and was made available for this plan. A simple analysis was performed to quantify parcels within these development areas that are also in flood hazard areas. Results can serve as confirmation for future development.

GIS was used to determine the number of parcels in the X Protected by Levee flood zones within visioning areas, specific plan areas, new growth areas, and commercial corridor areas. GIS was used to create a centroid, or point representing the center of the parcel polygon. Those parcels centroids that fall inside the future development areas and that were within the X Protected by Levee flood zone were selected and tabulated in Figure 4-91 and shown in Table 4-95.

Figure 4-91 Sacramento County Planning Area – Future Development in X Protected by Levee DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table 4-95 Sacramento County Planning Area – Future Development in X Protected by Levee DFIRM Flood Zones

Area	Parcels	Acres	DFIRM Flood Zone
Visioning Area			
Jackson	1,099	21,670	A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X
Plan Areas			
West Jackson Highway Master Plan	455	6,181	A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X
Corridor Areas			
Corridor 9	946	290	AE, 0.2% Annual Chance, X-Protected by Levee, X
Corridor 11	266	76	X-Protected by Levee, X
Corridor 12	2,537	1,929	A, AE, AH, 0.2% Annual Chance, X-Protected by Levee, X
Corridor 17	203	254	A, 0.2% Annual Chance, X-Protected by Levee, X
Corridor 19	48	130	0.2% Annual Chance, X-Protected by Levee
New Growth Areas			
West Jackson Highway	455	6,181	A, AE, AO, 0.2% Annual Chance, X-Protected by Levee, X

Source: Sacramento County GIS, Sacramento County DFIRM June 16, 2015

4.3.13. River/Stream/Creek Bank Erosion Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Sacramento is traversed by many waterways, both large and small (see Figure 4-41 and Table 4-33). These locations are all subject to bank erosion. Certain developed areas that abut creeks and rivers in the County are at risk to continued bank erosion. The HMPC noted that areas of the American River near the Fair Oaks area were at risk to continued erosion, and possible landslide, of American River banks. Levees are at risk to erosion as well, due to the channelization due to narrow river channels, high water levels, and wave action from boating. The annual costs of repairs to the banks of rivers and levees can vary, but the average cost of erosion repairs done under the Sacramento Bank Protection program by the Corps of Engineers/Central Valley Flood Protection Board has averaged between $2 million to $3 million a year over the last several years within SAFCA's jurisdiction.

The County Department of Water Resources – Drainage Department tracks areas of erosion troubles and mitigates, to the extent possible, the root causes of erosion. These are shown on Table 4-108 in Section 4.4.1. Costs to the County for these mitigation efforts were not available for this Plan Update.

Future Development

Planned developments should take erosion risk areas into account during the construction of new homes and commercial properties. Enforcement of leveed setback areas may also prevent erosion due to encroachment activities. The County will continue to enforce the zoning, subdivision, and development ordinances that are discussed in Section 4.4.1.

4.3.14. Severe Weather: Extreme Temperatures – Heat Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

Extreme heat happens in Sacramento County each year. Limited data on temperature extreme impacts per County was available during the development of this hazard's profile. Extreme heat normally does not impact structures as there may be a limited number of days where the temperatures stay high which gives the structure periodic relief between hot and cool temperature cycles. Areas prone to excessively high temperatures are identified normally on a nation-wide assessment scale, which doesn't allow detailed results on specific structures.

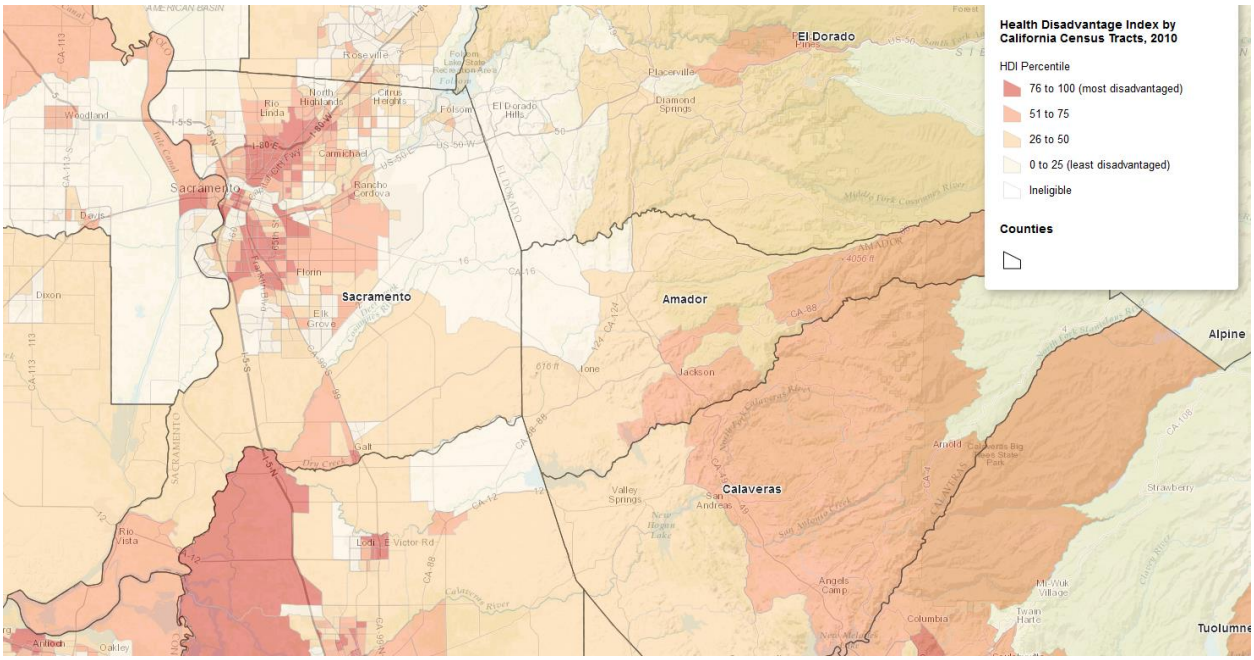
Recent research indicates that the impact of extreme temperatures, particularly on populations, has been historically under-represented. The risks of extreme temperatures are often profiled as part of larger hazards, such as severe winter storms or drought (see Section 4.3.7). However, as temperature variances may occur outside of larger hazards or outside of the expected seasons but still incur large costs, it is important to examine them as stand-alone hazards. Extreme heat may overload demands for electricity to run air conditioners in homes and businesses during prolonged periods of exposure and presents health concerns to individuals outside in the temperatures. Extreme heat may also be a secondary effect of droughts, or may cause drought-like conditions in a temporary setting. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability for that time period even if the rest of the season is relatively moist.

Vulnerable populations to extreme heat include:

- Homeless
- Infants and children under age five
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

The Public Health Alliance has developed a composite index to identify cumulative health disadvantage in California. Factors such as those bulleted above were combined to show what areas are at greater risk to hazards like extreme heat. This is shown on Figure 4-92.

Figure 4-92 Health Disadvantage Index by California Census Tract



Source: Public Health Alliance of Southern California

In addition to vulnerable populations, pets and livestock are at risk to extreme heat.

Future Development

As the County shifts in demographics, more residents will become senior citizens. The residents of nursing homes and elder care facilities are especially vulnerable to extreme temperature events. It is encouraged that such facilities have emergency plans or backup power to address power failure during times of extreme heat. Low income residents and homeless populations are also vulnerable. Cooling centers for these populations are opened when necessary.

4.3.15. Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning) Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—Medium

According to historical hazard data, severe weather is an annual occurrence in Sacramento County. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrences in the County. Wind and lightning often accompany these storms and have caused damage in the past. However, actual damage associated with the primary effects of severe weather has been limited. It is the secondary hazards caused by weather, such as floods, fire, and agricultural losses that have had the greatest impact on the County. The risk and vulnerability associated with these secondary hazards are discussed in other sections (Section 4.2.14 Flood: 100/200/500-year, Section 4.2.15 Flood: Localized, Section 4.2.16 Levee Failure).

Future Development

New critical facilities should be built to withstand heavy rains, hail damage, and lightning. While minimal damages have occurred to critical facilities in the past due to heavy rains, lightning, and hail, there remains future risk. With development occurring in the region, future losses to both existing and new development may occur.

4.3.16. Wildfire Vulnerability Assessment

Likelihood of Future Occurrence—Highly Likely
Vulnerability—High

Risk and vulnerability to the Sacramento County Planning Area from wildfire is of significant concern, with some areas of the Planning Area being at greater risk than others as described further in this section. High fuel loads in the Planning Area, combined with a large built environment and population, create the potential for both natural and human-caused fires that can result in loss of life and property. These factors, combined with natural weather conditions common to the area, including periods of drought, high temperatures, low relative humidity, and periodic winds, can result in frequent and potentially catastrophic fires. During the May to October fire season, the dry vegetation and hot and sometimes windy weather, combined with continued growth in the WUI areas, results in an increase in the number of ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. As development continues throughout the Planning Area, especially in these interface areas, the risk and vulnerability to wildfires will likely increase.

Wildfires can cause short-term and long-term disruption to the County. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the County by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires may result in casualties and can destroy buildings and infrastructure.

Although the physical damages and casualties arising from wildland-urban interface fires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. In some cases, the economic impact of this loss of services may be comparable to the economic impact of physical damages or, in some cases, even greater. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Fires can also cause major damage to power plants and power lines needed to distribute electricity to operate facilities as well as impact the agricultural industry.

Sacramento County Communities at Risk to Wildfire

The National Fire Plan is a cooperative, long-term effort between various government agency partners with the intent of actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. For purposes of the National Fire Plan, CAL FIRE generated a list of California communities at risk for wildfire. The intent of this assessment was to evaluate the risk to a given area from fire escaping off federal lands. Three main factors were used to determine the wildfire

threat in the wildland-urban interface areas of California: fuel hazards, probability of fire, and areas of suitable housing density that could create wildland urban interface fire protection strategy situations. The preliminary criteria and methodology for evaluating wildfire risk to communities is published in the Federal Register, January 4, 2001. The National Fire Plan identifies 13 "Communities at Risk" in Sacramento County. These are shown in Table 4-96.

Table 4-96 Sacramento County Communities at Risk to Wildfire

Communities at Risk		
Fair Oaks	Mather Air Force Base	Rio Lindo
Folsom	North Highlands	Rosemont
Galt	Orangevale	Sacramento
Isleton	Rancho Cordova	
La Riviera	Rancho Murieta	

Source: CAL FIRE

Beetle Kill and Tree Mortality

Drought can weaken trees, making them less resistant to bark beetles. These beetles attack trees weakened trees and can kill them. These trees then become fuel for wildfires. This is discussed in greater detail in Section 4.3.7.

On October 30, 2015, Governor Brown proclaimed a State of Emergency and included provisions to expedite the removal and disposal of dead and dying hazardous trees. As a result, costs related to identification, removal, and disposal of dead and dying trees caused from drought conditions may be eligible for California Disaster Assistance Act (CDAA) reimbursement.

Wildfire and Air Quality

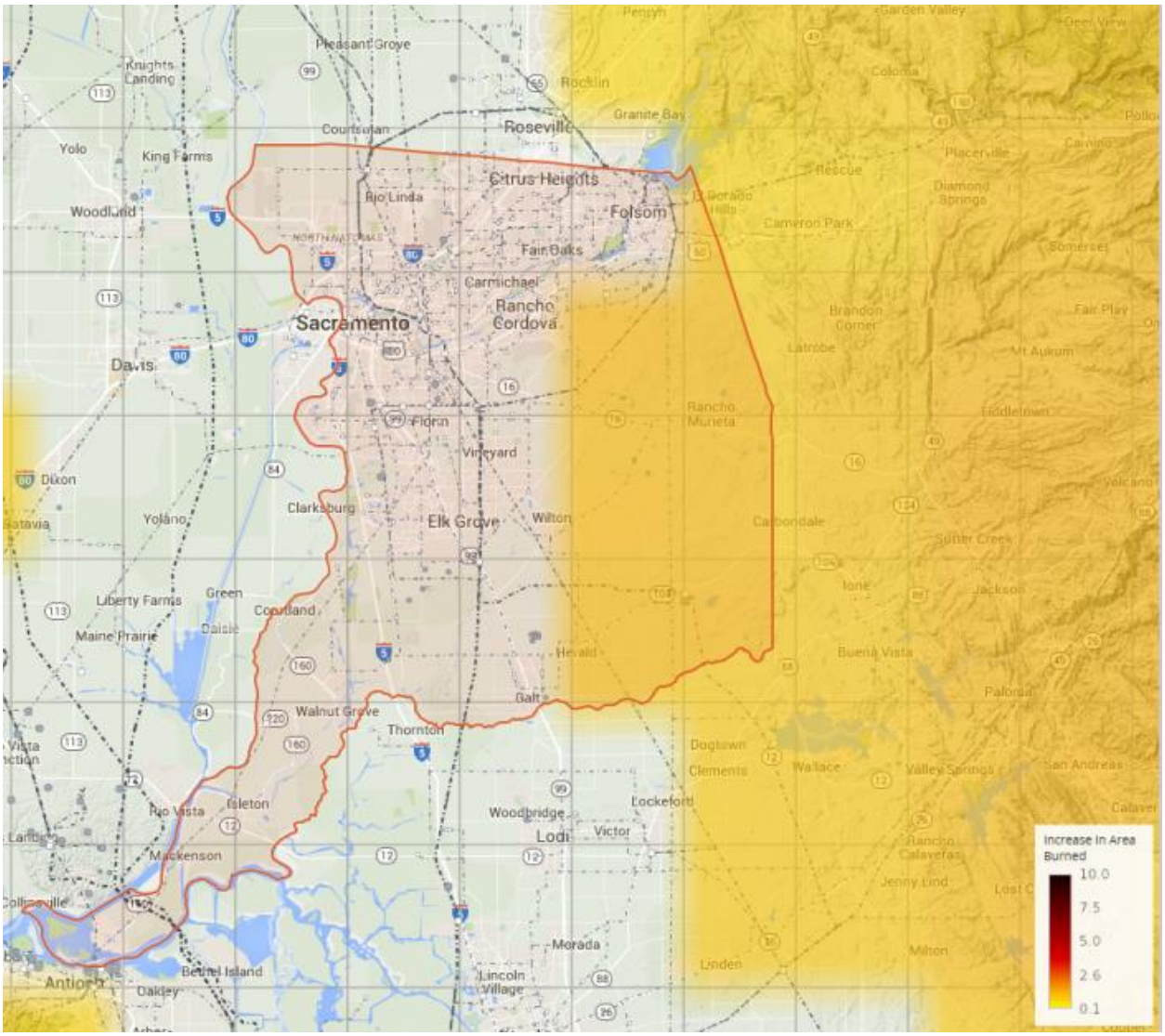
During many summer months in past years, Sacramento County residents have had to breathe wildfire smoke both from fires occurring within the County, but also from wildfires occurring throughout the region. Wildfire smoke is particularly dangerous because it contains a key air pollutant known as PM 2.5, or fine particulate matter less than 2.5 microns in diameter. These particulates are small enough to travel deep into the lungs causing short-term health impacts while aggravating long-term, existing respiratory and heart issues. For example, a report in *Climate Central* indicated that wildfire smoke can exacerbate chronic heart and lung disease, trigger asthma attacks and heart attacks, and increase visits to emergency rooms and hospitalizations. (l)

During the summers of 2013 through 2015, several wildfire incidents occurred in Northern California that increased PM2.5 concentration within Sacramento County. When Sacramento air quality is affected by wildfire smoke, whether from fires within the County or from throughout Northern California, the Sacramento County Air Pollution Control Officer will work with the County health department to issue health advisories to residents. These advisories are sent to the media, including newspapers, TV, radio, the community, and posted on county websites and the regional Spare the Air website.

While Sacramento-specific projections on future wildfire risk are limited, overall wildfire risk in California is expected to increase as a result of reduced precipitation, rising temperatures, deteriorating forest health due to drought, heat, and tree disease and pests; and logging dead trees. According to a study by Climate Central, wildfires burning within 50-100 miles of a city generally caused air quality to be 5-15 times worse than normal. On average, in the U.S. West there are now twice as many fires burning each year as there were in the 1970s. A recent Yale University study published in *Climatic Change* predicts a significant increase in the number of days that people in the western U.S. will be exposed to wildfire smoke by 2050. The number of people exposed to "smoke waves," or consecutive days with poor air quality due to wildfires, will also increase from 57 million today to 82 million by 2050, the majority of whom will be in northern California, western Oregon, and the Great Plains.

Cal-Adapt is an online tool put together by the California Energy Commission that downscales global climate models to the California level with projections for sea-level rise, drought, temperature increase, heat, and wildfire, from 2020 out to 2085. Figure 4-93 shows the 2020 wildfire projection for Sacramento County. The lines represent transmission lines and the dots and squares power lines and transmission lines. Air quality in these areas of the County would be lower due to wildfire if the scenario projected is accurate.

Figure 4-93 2020 Wildfire Projections for Sacramento County



Source; Cal-Adapt

Assets at Risk

Unincorporated Sacramento County and the incorporated jurisdictions have mapped CAL FIRE fire threat areas. GIS was used to determine the possible impacts of wildfire within the County and how the wildfire risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and values by fire threat. Analysis on assets at risk to wildfire in the County is provided for two different areas in this Base Plan:

- Sacramento County Planning Area
- Unincorporated Sacramento County

The Sacramento County Planning Area includes both the unincorporated County and all of the incorporated jurisdictions, essentially the entire geographical area of Sacramento County. Summary tables for the

Planning Area are presented below. For the unincorporated County, both summary and detail tables are shown and discussed below. Detail tables for the participating jurisdictions are included in their respective annexes to this plan.

Methodology

Cal Fire develops and maintains datasets related to wildland fire threat and risk. The Fire Threat dataset, created in 2004, was used for analysis on unincorporated Sacramento County and for the county's seven incorporated areas including Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and Sacramento. This fire threat layer was used for loss estimation purposes based on its comprehensive coverage of the Planning Area. Sacramento County's parcel and associated assessor data was used as the basis for the countywide inventory of developed parcels, or structures.

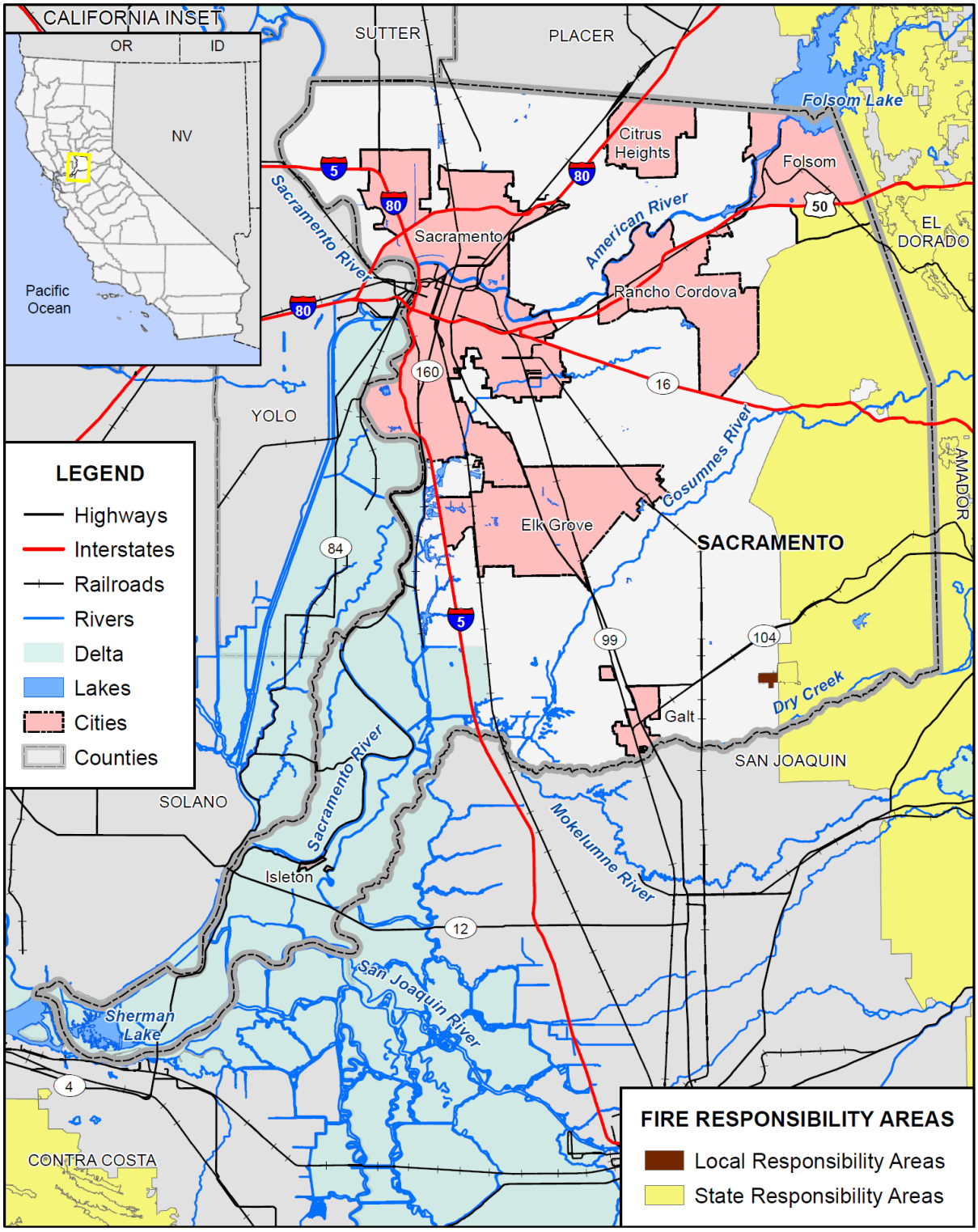
The Fire Threat dataset is a combination of fire frequency, or the likelihood of a given area to burn, and potential fire behavior. Fire rotation is calculated using fifty years of fire history, as well as climate, vegetation, and land ownership information. Fuel rank is calculated based on expected fire behavior for unique combinations of topography and vegetative fuels under given weather conditions (wind speed, humidity, temperature, and fuel moistures). Fuel rank and fire rotation are then combined to create the 5 threat classes in the Fire Threat dataset, ranging from Little or No Threat to Extreme Threat. The fire threat maps are based on designated responsibility areas: Federal Responsibility Area (FRA), State Responsibility Area (SRA) and Local Responsibility Area (LRA)

GIS was used to create a centroid, or point representing the center of the Sacramento County parcel polygon. Fire Threat was then be overlayed on the parcel centroids. For the purposes of this analysis, the wildfire threat zone (Little or No Threat | Moderate | High | Very High | Extreme) that intersected a parcel centroid was assigned as the threat zone for the entire parcel.

Responsibility Areas

CAL FIRE has a legal responsibility to provide fire protection on all SRA lands, which are defined based on land ownership, population density and property use. CAL FIRE is now also responsible for determining parcels subject to the SRA Fire Prevention Fee under AB X1 29. This dataset (SRA15_2) represents SRA status as of 7/1/2015 and was used for the final determination of which parcels were potentially eligible for the fee. CAL FIRE's State Responsibility Area layer was used in this analysis to show Sacramento County's values, inventory and population by FRA, SRA, and LRA. The FRA in the County contains no improved properties. The largest number of improved properties is in the LRA. Locations of each responsibility area are shown in Figure 4-94.

Figure 4-94 Sacramento County FRA, SRA, LRA Wildfire Responsibility Areas



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire FRAP Statewide LRA/SRA 11/2007; Map Date: 05/2016.

The FRA contains no improved parcels. The SRA contains 1,987 parcels, with about $811 million in total value, and the LRA has 442,068 parcels with nearly $129 billion in total value. It should be noted that fire does not just affect structural values, fire can also affect land values. As such the Assessor's land values and all parcels were accounted for in this analysis to represent total county assets at risk. However, it is highly unlikely the whole County will ever be on fire at once. The County parcel inventory and associated values by responsibility area are provided in Table 4-97.

Table 4-97 Sacramento County Planning Area – Assets in Local, State, and Federal Responsibility Areas by Property Use

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
Federal Responsibility Area					
Agricultural	4	$0	0	$0	$0
Care / Health	0	$0	0	$0	$0
Church / Welfare	0	$0	0	$0	$0
Industrial	0	$0	0	$0	$0
Miscellaneous	0	$0	0	$0	$0
Office	0	$0	0	$0	$0
Public / Utilities	29	$0	0	$0	$0
Recreational	0	$0	0	$0	$0
Residential	1	$0	0	$0	$0
Retail / Commercial	0	$0	0	$0	$0
Vacant	0	$0	0	$0	$0
No Data	0	$0	0	$0	$0
Total	**34**	**$0**	**0**	**$0**	**$0**
State Responsibility Area					
Agricultural	450	$176,979,238	108	$84,873,195	$261,852,433
Care / Health	0	$0	0		$0
Church / Welfare	1	$286,472	1	$3,404,127	$3,690,599
Industrial	27	$23,699,591	6	$1,498,794	$25,198,385
Miscellaneous	39	$81,529	2	$5,379	$86,908
Office	2	$440,424	1	$677,579	$1,118,003
Public / Utilities	112	$0	0	$0	$0
Recreational	7	$3,867,428	3	$4,793,289	$8,660,717
Residential	1,090	$126,111,415	954	$224,865,488	$350,976,903
Retail / Commercial	3	$4,191,169	3	$4,493,161	$8,684,330
Vacant	255	$149,723,488	15	$918,274	$150,641,762
No Data	1	$0	0	$0	$0

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
Total	**1,987**	**$485,380,754**	**1,093**	**$325,529,286**	**$810,910,040**
Local Responsibility Area					
Agricultural	2,157	$590,713,601	1,265	$398,101,195	$988,814,796
Care / Health	657	$285,193,234	578	$1,868,570,719	$2,153,763,953
Church / Welfare	1,151	$277,976,428	999	$1,285,532,595	$1,563,509,023
Industrial	4,296	$1,430,169,222	3,731	$3,695,929,958	$5,126,099,180
Miscellaneous	5,027	$10,078,985	21	$435,962	$10,514,947
Office	3,295	$1,811,845,814	2,981	$6,903,518,450	$8,715,364,264
Public / Utilities	8,007	$18,100,245	27	$17,165,874	$35,266,119
Recreational	332	$137,582,547	244	$297,824,035	$435,406,582
Residential	394,051	$28,618,208,743	388,309	$69,988,291,012	$98,606,499,755
Retail / Commercial	6,357	$3,185,018,016	5,728	$6,037,477,479	$9,222,495,495
Vacant	16,714	$1,968,565,618	622	$58,396,689	$2,026,962,307
No Data	24	$2,123,330	10	$2,342,809	$4,466,139
Total	**442,068**	**$38,335,575,783**	**404,515**	**$90,553,586,777**	**$128,889,162,560**

Source: CAL FIRE, Sacramento County 2016 Parcel/2015 Assessor's Data
*Land and structure values

Fire Threat Analysis

Cal Fire develops and maintains datasets related to wildland fire threat and risk. The Fire Threat dataset, created in 2004, was used for analysis on unincorporated Sacramento County and for the county's seven incorporated areas including Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and Sacramento. This fire threat layer was used for loss estimation purposes based on its comprehensive coverage of the Planning Area. Sacramento County's parcel and associated assessor data was used as the basis for the countywide inventory of developed parcels, or structures.

The Fire Threat dataset is a combination of fire frequency, or the likelihood of a given area to burn, and potential fire behavior. Fire rotation is calculated using fifty years of fire history, as well as climate, vegetation, and land ownership information. Fuel rank is calculated based on expected fire behavior for unique combinations of topography and vegetative fuels under given weather conditions (wind speed, humidity, temperature, and fuel moistures). Fuel rank and fire rotation are then combined to create the 5 threat classes in the Fire Threat dataset, ranging from Little or No Threat to Extreme Threat. There is no area of Extreme Threat in Sacramento County.

GIS was used to create a centroid, or point representing the center of the Sacramento County parcel polygon. Fire Threat was then overlaid on the parcel centroids. For the purposes of this analysis, the wildfire threat zone (Little or No Threat | Moderate | High | Very High | Extreme) that intersected a parcel centroid was assigned as the threat zone for the entire parcel.

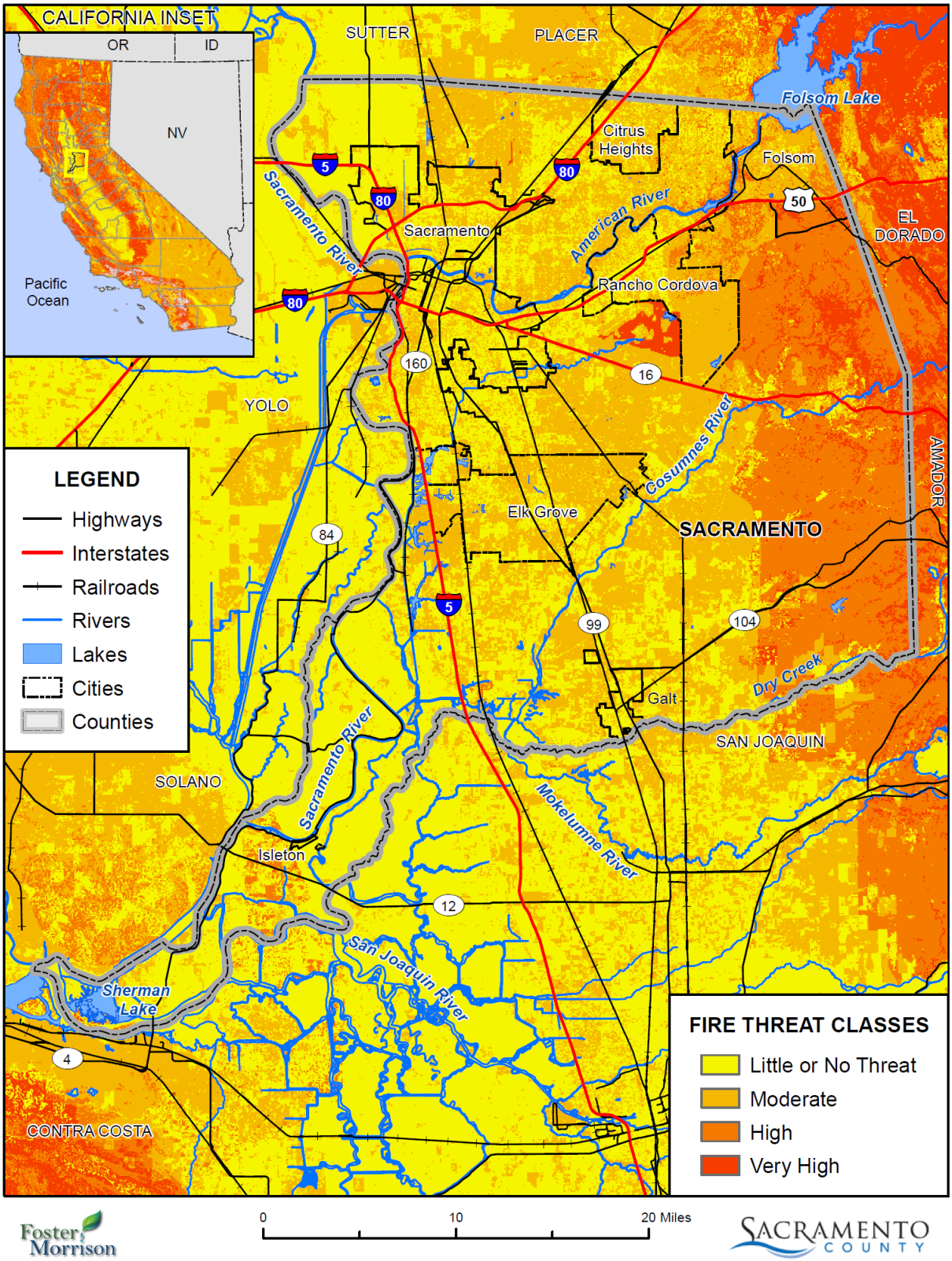
Assets at Risk

Results are presented by total Planning Area, unincorporated county, and for the participating jurisdictions (in their respective annexes to the plan), and detailed tables show improved parcel counts and their land and structure values by property use (residential, industrial, etc.) within each fire threat zone.

Sacramento County Planning Area

Analysis results for the entire Sacramento County Planning Area are summarized in Table 4-98, which summarizes total parcel counts, improved parcel counts, and their improved and land values by jurisdiction. Fire threat is shown in Figure 4-95.

Figure 4-95 Sacramento County Planning Area Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table 4-98 Sacramento County Planning Area – Count and Value of Parcels by Jurisdiction and Fire Threat Zone

Jurisdiction	Little or No Threat		Moderate		High		Very High	
	Imp. Parcel Count	Improved Structure Value	Imp. Parcel Count	Improved Structure Value	Imp. Parcel Count	Improved Structure Value	Imp. Parcel Count	Improved Structure Value
Citrus Heights	9,027	$1,528,881,062	14,296	$2,480,158,745	19	$3,556,445	163	$35,932,376
Elk Grove	19,397	$4,501,259,568	27,947	$7,562,799,423	58	$19,703,611	0	$0
Folsom	3,041	$767,685,499	15,557	$5,940,882,470	1,648	$861,468,891	351	$113,606,213
Galt	4,869	$777,657,262	1,903	$429,612,755	3	$177,790	0	$0
Isleton	248	$22,266,676	86	$6,286,028	0	$0	0	$0
Rancho Cordova	9,593	$2,715,054,337	8,485	$1,945,831,870	13	$12,557,201	1	$5,297,123
City of Sacramento	87,831	$20,158,400,464	43,213	$8,958,468,787	38	$10,287,720	3	$1,475,434
Unincorporated County	76,521	$15,046,236,091	79,118	$16,390,513,662	1,612	$451,368,485	567	$131,690,075
Planning Area Total	**210,527**	**$45,517,440,959**	**190,605**	**$43,714,553,740**	**3,391**	**$1,359,120,143**	**1,085**	**$288,001,221**

Source: CAL FIRE, Sacramento County 2016 Parcel/2015 Assessor's Data
*Land and structure values

Unincorporated Sacramento County

Table 4-99 breaks out the details of fire threat class and property use type for the unincorporated County.

Table 4-99 Unincorporated Sacramento County – Count and Value of Parcels by Property Use and Fire Threat Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Little or No Threat					
Agricultural	1,380	$375,260,590	861	$264,918,899	$640,179,489
Care / Health	164	$51,833,586	153	$347,569,562	$399,403,148
Church / Welfare	274	$66,085,343	242	$306,205,804	$372,291,147
Industrial	894	$349,488,969	768	$834,488,119	$1,183,977,088
Miscellaneous	649	$2,437,203	7	$43,176	$2,480,379
NO DATA	5	$1,379,765	3	$762,048	$2,141,813
Office	841	$315,184,580	777	$915,391,891	$1,230,576,471
Public / Utilities	1,442	$6,630,808	14	$13,264,491	$19,895,299
Recreational	126	$52,675,850	98	$84,850,716	$137,526,566
Residential	72,660	$4,459,923,163	71,768	$10,755,174,845	$15,215,098,008

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Retail / Commercial	1,830	$866,774,980	1,704	$1,512,330,761	$2,379,105,741
Vacant	1,762	$263,501,839	126	$11,235,779	$274,737,618
Total	**82,027**	**$6,811,176,676**	**76,521**	**$15,046,236,091**	**$21,857,412,767**
Moderate					
Agricultural	747	$204,491,937	421	$180,465,853	$384,957,790
Care / Health	151	$70,995,676	140	$211,641,630	$282,637,306
Church / Welfare	176	$56,282,638	151	$242,735,799	$299,018,437
Industrial	512	$166,219,126	386	$464,696,414	$630,915,540
Miscellaneous	942	$1,458,357	3	$59,279	$1,517,636
NO DATA	6	$166,349	1	$45,082	$211,431
Office	268	$96,635,887	238	$287,852,802	$384,488,689
Public / Utilities	1,493	$3,744,898	5	$1,404,284	$5,149,182
Recreational	43	$10,991,764	31	$19,507,031	$30,498,795
Residential	78,275	$6,651,475,883	77,225	$14,540,264,093	$21,191,739,976
Retail / Commercial	353	$205,970,921	321	$427,344,776	$633,315,697
Vacant	3,532	$383,691,610	196	$14,496,619	$398,188,229
Total	**86,498**	**$7,852,125,046**	**79,118**	**$16,390,513,662**	**$24,242,638,708**
High					
Agricultural	339	$87,366,810	63	$32,559,555	$119,926,365
Care / Health	3	$487,080	2	$776,664	$1,263,744
Church / Welfare	3	$4,927,189	2	$23,181,514	$28,108,703
Industrial	21	$20,609,680	4	$1,047,452	$21,657,132
Miscellaneous	40	$116,663	3	$8,454	$125,117
NO DATA	1	$0	-	$0	$0
Office	3	$264,252	2	$518,911	$783,163
Public / Utilities	126	$56,917	-	$0	$56,917
Recreational	1	$13,278	-	$0	$13,278
Residential	1,575	$183,267,476	1,522	$391,815,820	$575,083,296
Retail / Commercial	1	$6,096	1	$531,121	$537,217
Vacant	259	$74,890,918	13	$928,994	$75,819,912
Total	**2,372**	**$372,006,359**	**1,612**	**$451,368,485**	**$823,374,844**
Very High					
Agricultural	64	$12,801,099	8	$2,977,224	$15,778,323
Care / Health	2	$422,451	2	$667,633	$1,090,084

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Church / Welfare	1	$289,627	1	$201,939	$491,566
Industrial	4	$1,416,312	-	$0	$1,416,312
Miscellaneous	17	$3,737	-	$0	$3,737
Office	2	$667,989	2	$490,028	$1,158,017
Public / Utilities	59	$0	-	$0	
Residential	560	$54,055,418	545	$124,816,685	$178,872,103
Retail / Commercial	5	$2,010,893	5	$2,264,309	$4,275,202
Vacant	39	$11,097,665	4	$272,257	$11,369,922
Total	**753**	**$82,765,191**	**567**	**$131,690,075**	**$214,455,266**
Grand Total	**171,650**	**$15,118,073,272**	**157,818**	**$32,019,808,313**	**$47,137,881,585**

Source: CAL FIRE, Sacramento County 2016 Parcel/2015 Assessor's Data

Population at Risk

A separate analysis was performed to determine population in fire threat zones. Using GIS, the CAL FIRE fire theat dataset was overlayed on the improved residential parcel data. Those parcel centroids that intersect a fire threat zone were counted and multiplied by the Census Bureau Sacramento County average household size (2.71 for the County); results were tabulated by jurisdiction and fire threat zone (see Table 4-100). Information on specific jurisdictions can be found in their respective annexes to this plan. According to this analysis, there is a population of 515,563 in the moderate or higher fire severity zone category.

Table 4-100 Sacramento County Planning Area – Population at Risk by Fire Threat Zone

Fire Threat Zone	Improved Residential Parcels	Population*
Very High	1,051	2,848
High	3,237	8,772
Moderate	185,957	503,943
Little or No Threat	199,018	539,339

Source: CAL FIRE, US Census Bureau, Sacramento County 2016 Assessor/2015 Parcel Data

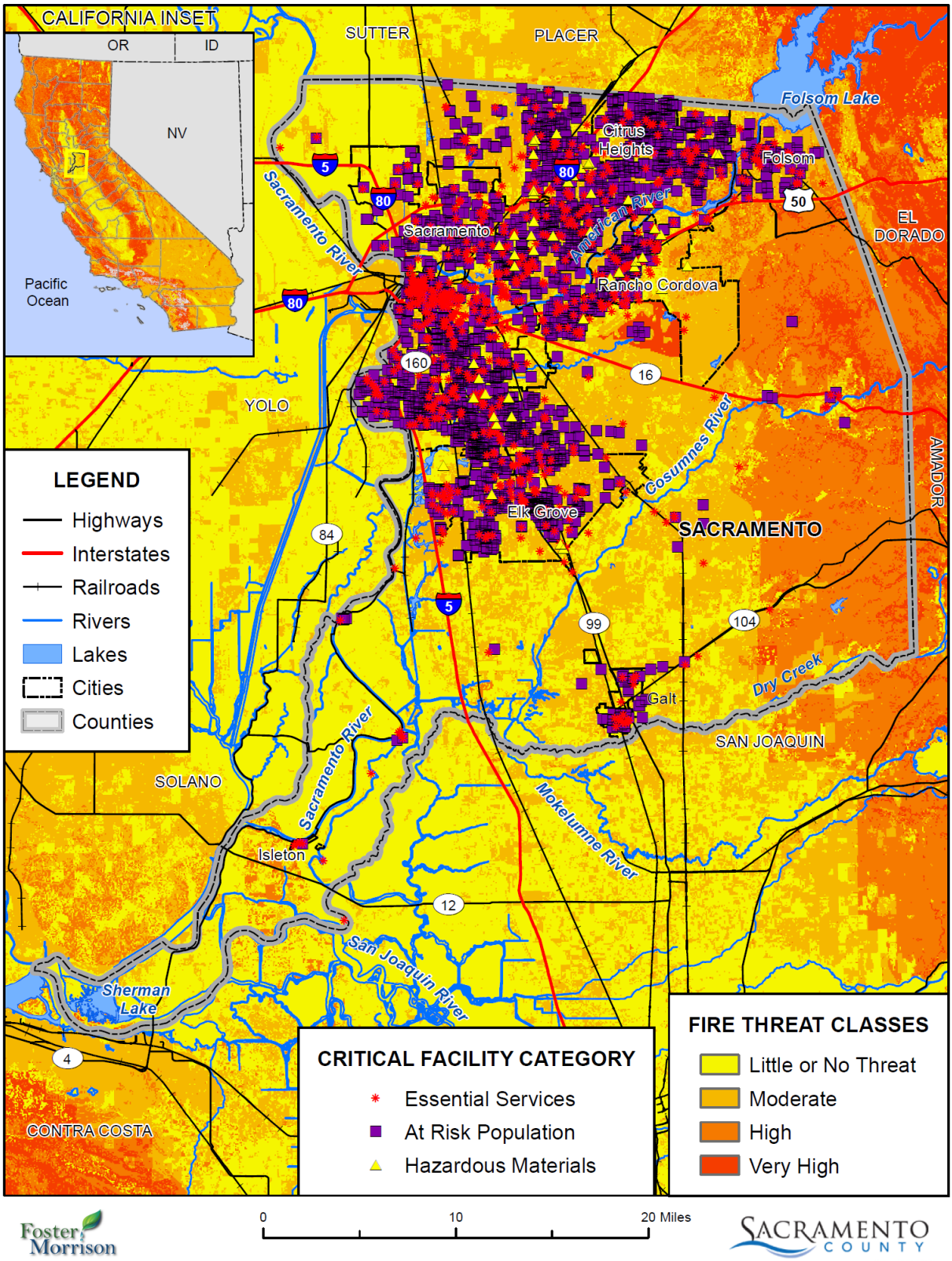
Cultural and Natural Resources at Risk

Sacramento County has substantial cultural and natural resources located throughout the County as previously described. In addition, there are other natural resources at risk when wildland-urban interface fires occur. One is the watershed and ecosystem losses that occur from wildland fires. This includes impacts to water supplies and water quality as well as air quality. Another is the aesthetic value of the area. Major fires that result in visible damage detract from that value. Other assets at risk include wildland recreation areas, wildlife and habitat areas, and rangeland resources. The loss to these natural resources can be significant.

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect a wildfire hazard areas provided by CAL FIRE, and if so, which zone it intersects. This is shown on Figure 4-96. Table 4-101 shows the breakdown of critical facilities by fire threat zone for the Planning Area, while Table 4-102 shows the breakdown of critical facilities by fire threat zone for the unincorporated County. Details of critical facility definition, type, name, address, and jurisdiction by fire threat zone are listed in Appendix E.

Figure 4-96 Sacramento County Planning Area – Critical Facilities in Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table 4-101 Sacramento County Planning Area – Critical Facilities in Fire Threat Zones

Critical Facility Category	Facility Type	Facility Count
Little or No Threat		
Essential Services Facilities	Airport	5
	Arena	1
	Bus Terminal	6
	Convention Center	1
	Detention Basin	22
	Dispatch Center	
	Drainage	3
	Emergency Evacuation Shelter	113
	Emergency Rooms	1
	EOC	1
	Fire Station	56
	Gas Storage	1
	General Acute Care Hospital	7
	Government Facilities	49
	Hospitals	1
	Light Rail Stop	49
	Medical Health Facility	152
	Police	16
	Sand Bag	2
	Stadium	2
	Traffic Operations Center	1
	Train Station	1
	Vehicle and Equipment Storage	2
	Water Treatment Plant	2
	Total	**495**
At Risk Population Facilities	Adult Day Care	25
	Adult Education School	7
	Adult Residential	199
	Alternative Education School	5
	Assisted Living Centers	27
	Charter School	15
	Children's Home	2
	College/University	4
	Community Day School	5
	Day Care Center	228

Critical Facility Category	Facility Type	Facility Count
	Detention Center	2
	Group Home	49
	Hotel	40
	Independent Study School	1
	Infant Center	17
	JAIL	1
	Private Elementary School	36
	Private High School	19
	Private K-12 School	19
	Public Continuation High School	12
	Public Elementary School	110
	Public High School	15
	Public Middle School	20
	Residential Care/Elderly	209
	Residential Facility Chronically	1
	School	17
	School-Age Day Care Center	45
	Senior Center	1
	Social Rehabilitation Facility	2
	Special Education School	7
	Total	**1,140**
Hazardous Materials Facilities	Oil Collection Center	41
	OTHER	1
	Propane Storage	1
	Sewer Treatment Plant	2
	Total	**45**
Little or No Threat Total		**1,680**
Moderate		
Essential Services Facilities	Airport	4
	Bus Terminal	2
	Corporation Yard	1
	Detention Basin	23
	Dispatch Center	1
	Drainage	3
	Emergency Evacuation Shelter	118
	EOC	1
	Fire Station	37

Critical Facility Category	Facility Type	Facility Count
	General Acute Care Hospital	1
	Government Facilities	18
	Light Rail Stop	3
	Medical Health Facility	45
	Police	6
	Sand Bag	3
	Stadium	1
	State and Fed Facilities	1
	State Facility	1
	Urgent Care Facilities	2
	Water Treatment Plant	1
	Total	**272**
At Risk Population Facilities	Adult Day Care	1
	Adult Education School	5
	Adult Residential	109
	Alternative Education School	2
	Assisted Living Centers	31
	Charter School	10
	College/University	3
	Community Day School	4
	Day Care Center	185
	Detention Center	1
	Group Home	46
	Hotel	10
	Independent Study School	1
	Infant Center	16
	Prison	1
	Private Elementary School	29
	Private High School	11
	Private K-12 School	17
	Public Continuation High School	10
	Public Elementary School	119
	Public High School	19
	Public Middle School	23
	Residential Care/Elderly	202
	School	21
	School-Age Day Care Center	52

Critical Facility Category	Facility Type	Facility Count
	Social Rehabilitation Facility	2
	Special Education School	3
	Total	**933**
Hazardous Materials Facilities	Oil Collection Center	4
	Total	**4**
Moderate Total		**1,209**
High		
Essential Services Facilities	Airport	1
	Emergency Evacuation Shelter	1
	Fire Station	1
	General Acute Care Hospital	1
	Government Facilities	1
	Medical Health Facility	1
	Total	**6**
At Risk Population Facilities	Day Care Center	3
	Group Home	1
	Public Elementary School	1
	Public High School	1
	Residential Care/Elderly	1
	Total	**7**
High Total		**13**
Very High		
Essential Services Facilities	Emergency Evacuation Shelter	1
	Medical Health Facility	2
	Total	**3**
At Risk Population Facilities	Private K-12 School	1
	Residential Care/Elderly	2
	Total	**3**
Very High Total		**6**
Grand Total		**2,908**

Source: CAL FIRE, Sacramento County GIS

Table 4-102 Unincorporated Sacramento County – Critical Facilities in Fire Threat Zones

Critical Facility Category	Facility Type	Facility Count
Little or No Threat		
Essential Services Facilities	Airport	4
	Bus Terminal	1
	Detention Basin	2
	Emergency Evacuation Shelter	47
	Fire Station	29
	General Acute Care Hospital	1
	Government Facilities	13
	Light Rail Stop	5
	Medical Health Facility	54
	Police	9
	Traffic Operations Center	1
	Vehicle and Equipment Storage	2
	Total	**168**
At Risk Population Facilities	Adult Day Care	10
	Adult Education School	3
	Adult Residential	81
	Alternative Education School	4
	Charter School	4
	College/University	1
	Community Day School	4
	Day Care Center	88
	Detention Center	2
	Group Home	26
	Hotel	7
	Infant Center	7
	Private Elementary School	19
	Private High School	11
	Private K-12 School	10
	Public Continuation High School	7
	Public Elementary School	43
	Public High School	4
	Public Middle School	6
	Residential Care/Elderly	94
	Residential Facility Chronically	1
	School-Age Day Care Center	18

Critical Facility Category	Facility Type	Facility Count
	Social Rehabilitation Facility	1
	Special Education School	4
	Total	**455**
Hazardous Materials Facilities	Oil Collection Center	29
	OTHER	1
	Sewer Treatment Plant	1
	Total	**31**
Little or No Threat Total		**654**
Moderate		
Essential Services Facilities	Airport	4
	Detention Basin	2
	Emergency Evacuation Shelter	50
	Fire Station	20
	Government Facilities	5
	Light Rail Stop	1
	Medical Health Facility	14
	Police	3
	Stadium	1
	Total	**100**
At Risk Population Facilities	Adult Education School	2
	Adult Residential	53
	Alternative Education School	1
	Charter School	6
	Community Day School	1
	Day Care Center	63
	Detention Center	1
	Group Home	29
	Hotel	1
	Infant Center	7
	Private Elementary School	6
	Private High School	4
	Private K-12 School	10
	Public Continuation High School	6
	Public Elementary School	49
	Public High School	10
	Public Middle School	12
	Residential Care/Elderly	106

Critical Facility Category	Facility Type	Facility Count
	School-Age Day Care Center	15
	Social Rehabilitation Facility	1
	Special Education School	2
	Total	**385**
Hazardous Materials Facilities	Oil Collection Center	3
	Total	**3**
Moderate Total		**488**
High		
Essential Services Facilities	Airport	1
	Emergency Evacuation Shelter	1
	Fire Station	1
	Government Facilities	1
	Total	**4**
At Risk Population Facilities	Day Care Center	3
	Group Home	1
	Public Elementary School	1
	Residential Care/Elderly	1
	Total	**6**
High Total		**10**
Very High		
Essential Services Facilities	Medical Health Facility	2
	Total	**2**
At Risk Population Facilities	Private K-12 School	1
	Residential Care/Elderly	1
	Total	**2**
Very High Total		**4**
Grand Total		**1,156**

Source: CAL FIRE, Sacramento County GIS

Overall Community Impact

The overall impact to the community from a severe wildfire includes:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Decreased water quality in area watersheds;
- Increase in post-fire hazards such as flooding, sedimentation, and mudslides;
- Damage to natural resource habitats and other resources, such as timber and rangeland;

- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents;
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures;
- Negative impact on commercial and residential property values;
- Loss of churches, which could severely impact the social fabric of the community;
- Loss of schools, which could severely impact the entire school system and disrupt families and teachers, as temporary facilities and relocations would likely be needed; and
- Impact on the overall mental health of the community.

Future Development

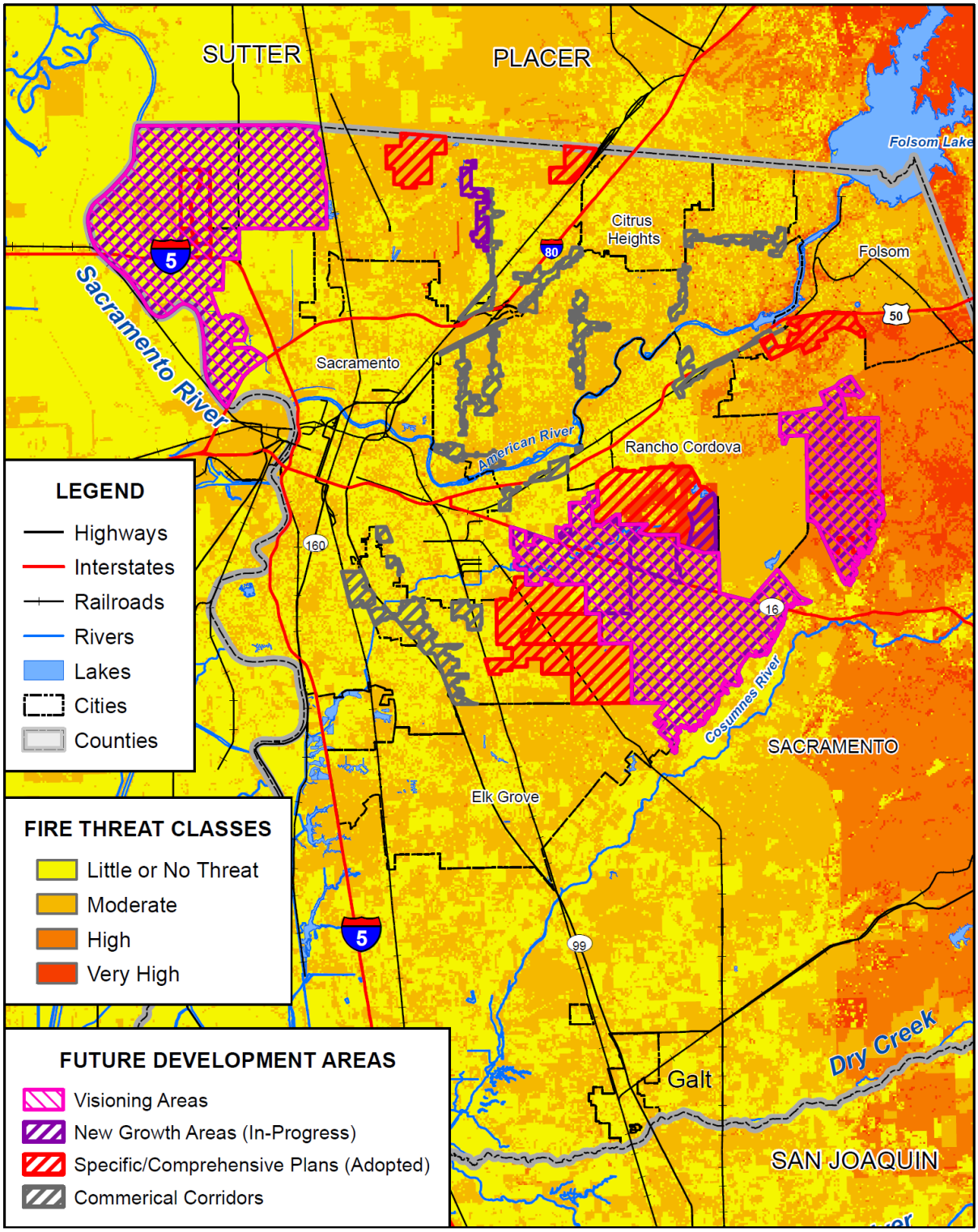
Population growth and development in Sacramento County is on the rise. Additional growth and development within the WUI areas of the County would place additional assets at risk to wildfire.

Future Development GIS Analysis

Future development areas that include visioning areas, new growth areas, specific/comprehensive plan areas, and commercial corridors data is maintained by Sacramento County, and was made available for this plan. An analysis was performed to quantify parcels within these development areas that are also in identified fire threat areas. Results can provide the County with information on where and how to grow in the future.

GIS was used to determine the number of parcels in the CAL FIRE threat zones within identified future development areas. GIS was used to create a centroid, or point representing the center of the parcel polygon. Those parcels centroids that fall inside the future development areas and that were within the fire threat zones were selected and shown on Figure 4-97 and tabulated in Table 4-103.

Figure 4-97 Unincorporated Sacramento County – Future Development in Fire Threat Zones



Foster Morrison

SACRAMENTO COUNTY

Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table 4-103 Sacramento County Planning Area – Future Development in Fire Threat Zones

Area	Parcels	Acres	Fire Threat Zones
Visioning Area			
Jackson	1,099	21,670	Little or No Hazard, Moderate, High, Very High
Natomas	907	24,504	Little or No Hazard, Moderate, High
Grantline East	48	8,198	Little or No Hazard, Moderate, High, Very High
New Growth Areas			
Mather South Master Plan	12	1,299	Little or No Hazard, Moderate, Very High
Natomas North	907	24,504	Little or No Hazard, Moderate, High
Jackson Township	61	1,909	Little or No Hazard, Moderate, High, Very High
West Jackson Highway	455	6,181	Little or No Hazard, Moderate, Very High
New Bridge	27	1,339	Little or No Hazard, Moderate, High, Very High
West of Watt	383	609	Little or No Hazard, Moderate, High
Specific/Comprehensive Plan Areas			
Cordova Hills Master Plan	26	2,436	Moderate, High, Very High
East Antelope Specific Plan	1,425	601	Little or No Hazard, Moderate, High
Easton Project	19	1,409	Little or No Hazard, Moderate, High, Very High
Elverta Specific Plan	158	1,581	Little or No Hazard, Moderate, High
Florin-Vineyard Gap Community Plan	827	3,875	Little or No Hazard, Moderate, High
Jackson Township Master Plan	61	1,909	Little or No Hazard, Moderate, High, Very High
Mather Field	1,421	5,493	Little or No Hazard, Moderate, High, Very High
Mather South Master Plan	12	1,299	Little or No Hazard, Moderate, Very High
Metro Airpark	78	1,810	Little or No Hazard, Moderate
New Bridge Master Plan	27	1,339	Little or No Hazard, Moderate, Very High
North Vineyard Station Specific Plan	1,320	1,553	Little or No Hazard, Moderate
Vineyard Springs Comprehensive Plan	2,732	2,344	Little or No Hazard, Moderate, High
West Jackson Highway Master Plan	455	6,181	Little or No Hazard, Moderate, High, Very High
West of Watt	383	609	Little or No Hazard, Moderate, High
Commercial Corridor Areas			
Corridor 1	1,277	554	Little or No Hazard, Moderate, High, Very High
Corridor 2	533	226	Little or No Hazard, Moderate
Corridor 3	1,033	625	Little or No Hazard, Moderate
Corridor 4	626	532	Little or No Hazard, Moderate
Corridor 5	516	621	Little or No Hazard, Moderate
Corridor 6	579	311	Little or No Hazard, Moderate
Corridor 7	722	460	Little or No Hazard, Moderate
Corridor 8	126	136	Little or No Hazard, Moderate

Area	Parcels	Acres	Fire Threat Zones
Corridor 9	946	290	Little or No Hazard, Moderate
Corridor 10	593	101	Little or No Hazard, Moderate
Corridor 11	266	76	Little or No Hazard, Moderate
Corridor 12	2,537	1,929	Little or No Hazard, Moderate
Corridor 13	325	402	Little or No Hazard, Moderate, High
Corridor 14	30	155	Little or No Hazard, Moderate, High, Very High
Corridor 15	224	465	Little or No Hazard, Moderate, High
Corridor 16	31	11	Little or No Hazard, Moderate
Corridor 17	203	254	Little or No Hazard, Moderate
Corridor 18	3	1	Little or No Hazard, Moderate
Corridor 19	48	130	Little or No Hazard, Moderate

Source: Sacramento County GIS, CAL FIRE

4.4 Capability Assessment

Thus far, the planning process has identified the natural hazards posing a threat to the Planning Area and participating jurisdictions described, in general, the vulnerability of the County to these risks. The next step is to assess what loss prevention mechanisms are already in place. This part of the planning process is the mitigation capability assessment. Combining the risk assessment with the mitigation capability assessment results in the County's net vulnerability to disasters, and more accurately focuses the goals, objectives, and proposed actions of this plan.

The HMPC used a two-step approach to conduct this assessment for the County. First, an inventory of common mitigation activities was reviewed. The purpose of this effort was to identify policies and programs that were either in place, needed improvement, or could be undertaken if deemed appropriate. Second, the HMPC conducted an inventory and review of existing policies, regulations, plans, and programs to determine if they contributed to reducing hazard-related losses or if they inadvertently contributed to increasing such losses.

This section presents the County's mitigation capabilities and discusses select state and federal mitigation capabilities that are applicable to the County.

Similar to the HMPC's effort to describe hazards, risks, and vulnerability of the County, this mitigation capability assessment describes the County's existing capabilities, programs, and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This assessment is divided into four sections: regulatory mitigation capabilities are discussed in Section 4.4.1; administrative and technical mitigation capabilities are discussed in Section 4.4.2; fiscal mitigation capabilities are discussed in Section 4.4.3; and mitigation education, outreach, and partnerships are discussed in Section 4.4.4. A discussion of other mitigation efforts follows in Section 4.4.5.

4.4.1. Sacramento County's Regulatory Mitigation Capabilities

Table 4-104 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities, and indicates those that are in place in the County. Excerpts from applicable policies, regulations, and plans and program descriptions follow to provide more detail on existing mitigation capabilities.

Table 4-104 Sacramento County Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y 2011	
Capital Improvements Plan	Y	The County has a Five-Year Capital Improvement Plan (CIP) that is prepared by the County Executive Office. The projects contained within the CIP are dependent upon the individual departments. Water Resources has a storm drain system capital improvement plan
Economic Development Plan	Y	The Planning and Environmental Review Division maintains the General Plan which has an Economic Development Element, but many of the items identified within the Element are the responsibility of the Office of Economic Development & Marketing. The Element does not address hazards.
Local Emergency Operations Plan	Y 2012	County Emergency Operations
Continuity of Operations Plan		
Transportation Plan	Y	The Planning and Environmental Review Division maintains the General Plan which has Circulation Element (including a Transportation Plan), but many of the items identified within the Element are the responsibility of SACDOT. The Element does not address hazards, but does include a policy to reduce the heat island effect.
Stormwater Management Plan/Program	Y	Hydrology Standards 1996 Stormwater Guidance Manual
Engineering Studies for Streams	Y	
Community Wildfire Protection Plan	Y 2014	Sacramento Metropolitan Fire District Community Wildfire Protection Plan
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y 2011	The Climate Action Plan Strategy and Framework Document was adopted with the General Plan update in 2011. Chapter 2 discusses the County's vulnerability to climate change and identified potential impacts to human, natural and built systems. It also proposed actions to address climate change. Preparation of a Communitywide Climate Action Plan has begun and is expected to be completed in Fall 2017.
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: 2013 CBC
Building Code Effectiveness Grading Schedule (BCEGS) Score	Y	Score: 3/3

Fire department ISO rating:	Y	Rating: 2/9 Class 2 applies to all risks that are both: I) within 5 road miles of a recognized fire station AND II) within 1000 feet of a recognized fire hydrant. Class 9 would apply to those risks that are: I) within 5 road miles of a recognized fire station, but without a fire hydrant within 1000 feet.
Site plan review requirements	Y	The County operates a public counter for review of all development applications. DWR drainage division staff evaluates new development proposals for compliance with County standards, drainage ordinances, and floodplain development policies and provide flood zone information.
Property Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Generally, the zoning ordinance separates hazardous land uses from sensitive land uses and addresses risks e.g. flood, erosion and traffic. The zoning ordinance contains a Flood (F) Combining Zoning District and Tributary Standards, and Natural Streams (NS) Combining Zoning District to reduce the impacts of flood hazards. Additionally, the ordinance contains a Parkway Corridor (PC) Combining Zoning District to ensure that bluff development does not create erosion or geologic instability.
Subdivision ordinance	Y	County Code Title 22 Land Development is the County's subdivision ordinance. The ordinance does not address hazards.
Floodplain ordinance	Y	Minor revisions in 2010 and 2014, major in 2007 reviewed by FEMA Region 9. Additional revisions are forthcoming to comply with Senate Bill (SB) 5 regarding floodplain management.
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Improvement Standards
Flood insurance rate maps	Y	County maintains a library of past and current FIRMS.
Elevation Certificates	Y	Comprehensive record of elevation certificates
Acquisition of land for open space and public recreation uses	Y	Land acquisition is on-gong for purposes of flood control, species conservation, open space preservation and recreation.
Erosion or sediment control program	Y	County Improvement Standards, 2010
Other	Y Y	Evacuation Plan, The South Sacramento Habitat Conservation Plan is a regional approach to addressing issues related to urban development, habitat conservation and agricultural protection. The Plan is still in process and is estimated to be approved in Summer 2017.
How can these capabilities be expanded and improved to reduce risk?		

As indicated in the tables above, Sacramento County has several plans and programs that guide the County's mitigation of development of hazard-prone areas. Starting with the Sacramento County General Plan,

which is the most comprehensive of the County's plans when it comes to mitigation, some of these are described in more detail below.

Sacramento County Plans/Studies

Sacramento County General Plan

The Sacramento County General Plan is a comprehensive, long-term framework for the protection of the County's agricultural, natural, and cultural resources and for development in the County. Designed to meet state general plan requirements, it outlines policies, standards, and programs and sets out plan proposals to guide day-to-day decisions concerning Sacramento County's future. It is a legal document that serves as the County's blueprint for land use and development. It is broken into the following sections:

- Agriculture Element
- Air Quality Element
- Circulation Element
- Conservation Element
- Economic Development
- Energy Element
- Hazardous Materials Element
- Human Services Element
- Land Use Element
- Noise Element
- Open Space Element
- Public Facilities Element
- Safety Element

Goals and policies related to mitigation of natural hazards can be found in the discussion below.

Agriculture Element

The Sacramento County (County) General Plan provides for growth and development in the unincorporated area through the year 2030. Portions of the Plan contain policies for urban development including urban communities and the infrastructure necessary to serve them. Other sections of the Plan describe strategies to recognize and preserve areas of open space and natural resources. As a whole, the Plan reflects a balance between the amount and location of land uses in urban areas and those to remain in a rural or natural setting.

GOAL:	**Protect important farmlands from conversion and encroachment and conserve agricultural resources.**
Objective:	Reduce or eliminate groundwater cones of depression in farming areas by encouraging water conservation.
Objective:	Reduced soil erosion.
Objective:	No increase in the level or intensity of flooding of intensively farmed land.
Objective:	Reduced crop and livestock productivity losses resulting from noxious weed infestations and wildfires.
Objective:	Reduced cost and difficulty of obtaining permits for construction of accessory farm buildings in floodway fringe areas.

Conservation Element

The County recognizes the need for effective conservation practices which allow for the maintenance and preservation of its natural environment and efficient use of its resources. The State mandates that the County's General Plan include a Conservation Element which will enable the County to analyze its resources and determine policies for their use and conservation. State law requires that the element address the management and protection of specific resources:

- The Water Resources section addresses the County's objectives with respect to the use of ground, surface, and recycled water for residential, commercial, industrial, agricultural, and recreational purposes. The section assesses how and from where the County intends to secure its future water supply and provides guidelines for the County's policies on water quality, ground and surface water use, and water conservation.
- The Mineral Resources section delineates the County's policies on the protection of mineral resources for economic extraction while providing guidelines on how, when, and where mineral resources can be extracted to avert adverse impacts on the environment.
- The Materials Recycling section specifies the County's plan of reducing the amount of solid waste that is produced. It includes policies and programs which will encourage participation in the recycling of materials and supports a sustainable market for recycled materials.
- The Soil Resources section discusses the management and protection of county soils for purposes of maintaining its resource value and agricultural potential. The section deliberates on the County's future plans in dealing with the loss of agriculturally productive soils and discusses policies and programs which will encourage the utilization of effective soil conservation practices.
- The Vegetation and Wildlife section consist of four main subsections, each of which discusses the preservation and management of biotic resources. The Habitat Protection and Management subsection includes many overarching policies that address habitat mitigation; habitat preserves and management; and habitat protection and project review. The Special Status Species and their Respective Habitats subsection includes policies and measures to protect and manage habitats for the protection of special status species. Aquatic Resources, the third subsection, covers the protection of vernal pools, rivers and streams and fisheries. Lastly, the Terrestrial Resources subsection addresses the protection and preservation of native vegetation, landmark and heritage trees and the urban forest while also promoting new trees in the urban landscape.
- The Cultural Resources section discusses County objectives with respect to the protection and preservation of important cultural resources and plans for increasing public awareness and appreciation of them.

Soil Resources

GOAL:	Preserve and protect long-term health and resource value of agricultural soils.
Objective:	Agriculturally productive Delta soils protected from the effects of oxidation, shrinkage, and erosion.
Objective:	Mining of top soil to have minimal effect on soil productivity.

Water Resources

GOAL:	Preserve and manage natural habitats and their ecological functions throughout Sacramento County.
Objective:	Mitigate and restore for natural habitat and special status species loss.
Objective:	Establish and manage a preserve system with large core and landscape level preserves connected by wildlife corridors throughout Sacramento County to protect ecological functions and species populations.
Objective:	Review development plans and projects to ensure a balance between essential growth needs and the protection and preservation of natural habitats and special status species.

GOAL:	Preserve, enhance and restore special status species habitat in Sacramento County to aid in the recovery of these species.
Objective:	Protect and maintain habitat for special status species.
Objective:	Manage and maintain special status species and their respective habitat in a manner that resolves conflicts with adjacent privately owned-land and agricultural operations.

GOAL:	Preserve, protect, and manage the health and integrity of aquatic resources in Sacramento County.
Objective:	Preserve and enhance self-sustaining vernal pool habitats.
Objective:	Establish vernal pool preserves that enhance and protect the ecological integrity of vernal pool resources.

GOAL:	Preserve, protect, and enhance natural open space functions of riparian, stream and river corridors.
Objective:	Manage riparian corridors to protect natural, recreational, economic, agricultural and cultural resources as well as water quality, supply and conveyance.
Objective:	Maintain the natural character of the 100-year floodplain by limiting fill and excavation.
Objective	Maintain levee protection, riparian vegetation, function and topographic diversity by stream channel and bank stabilization projects.
Objective	Stabilize riverbanks to protect levees, water conveyance and riparian functions.
Objective	Conserve and protect the Sacramento, Cosumnes, Mokelumne and American Rivers to preserve natural habitat and recreational opportunities.
Objective	Protect and restore natural stream functions.
Objective	Land uses within and development adjacent to stream corridors are to be consistent with natural values.
Objective	Properly manage and fund the maintenance of rivers and streams to protect and enhance natural functions.
Objective	Restore concrete sections of rivers and streams to increase natural functions.

GOAL:	Preserve and protect fisheries in County waterways and water bodies.
Objective:	Provide and protect high quality in-stream habitat, water quality and water flows to support fisheries propagation, development, and migration.

GOAL:	Sacramento County vegetative habitats preserved, protected, and enhanced.
Objective:	Tree and native vegetation management practices to promote regeneration in designated resource conservation areas.
Objective:	Heritage and landmark tree resources preserved and protected for their historic, economic, and environmental functions.
Objective:	A coordinated, funded Urban Tree Management Plan and program sufficient to achieve a doubling of the County's tree canopy by 2050 and promote trees as economic and environmental resources for the use, education, and enjoyment of current and future generations.
Objective:	One million new trees planted within the urban area between now and 2030.

Cultural Resources

The foundation of a cultural community rests upon the attributes and artifacts of its predecessors. Preserving and understanding these cultural resources needs to be an element of consideration when planning for future growth.

GOAL:	Promote the inventory, protection and interpretation of the cultural heritage of Sacramento County, including historical and archaeological settings, sites, buildings, features, artifacts and/or areas of ethnic historical, religious or socioeconomical importance.
Objective:	Comprehensive knowledge of archeological and historic site locations.
Objective:	Attention and care during project review and construction to ensure that cultural resource sites, either previously known or discovered on the project site, are properly protected with sensitivity to cultural and ethnic values of all affected.
Objective	Preserve structures such as buildings, bridges, or other permanent structures with architectural or historical importance to maintain contributing design elements.
Objective	Protect any known cultural resources from vandalism, unauthorized excavation, or accidental destruction.
Objective	Properly stored and classified artifacts for ongoing study.
Objective	Increase public education, awareness and appreciation of both visible and intangible cultural resources.

Delta Protection Element

Recognizing the threats to the Primary Zone of the Delta from potential urban and suburban encroachment and the need to protect the area for agriculture, wildlife habitat, and recreation uses, the California Legislature passed and the Governor signed into law on September 23, 1992, the Delta Protection Act of 1992 (SB 1866). The Act directs the Delta Protection Commission to prepare a comprehensive resource management plan for land uses within the Primary Zone of the Delta (Plan).

The planning conducted by the Delta Protection Commission involved preparation and public review of nine background reports: Environment; Utilities and Infrastructure; Land Use and Development; Water; Levees; Agriculture; Recreation and Access; Marine Patrol, Boater Education, and Safety Programs; and Implementation. These reports provided the information base for the Plan findings and policies, as well as

allowing opportunities for public review and comment through circulation and public hearings before the Commission.

Environment

- Goal: Preserve and protect the natural resources of the Delta, including soils. Promote protection of remnants of riparian habitat. Promote seasonal flooding and agriculture practices on agricultural lands to maximize wildlife use of the hundreds of thousands of acres of lands in the Delta. Promote levee maintenance and rehabilitation to preserve the land areas and channel configurations in the Delta.

Utilities and Infrastructure

- Goal: Protect the Delta from excessive construction of utilities and infrastructure facilities, including those that support uses and development outside the Delta. Where construction of new utility and infrastructure facilities is appropriate, ensure the impacts of such new construction on the integrity of levees, wildlife, and agriculture are minimized.

Land Use

- Goal: Protect the unique character and qualities of the Primary Zone by preserving the cultural heritage and strong agricultural base of the Primary Zone. Direct new residential, commercial, and industrial development within the existing communities as currently designated and where appropriate services are available.

Agriculture

- Goal: To support long-term viability of commercial agriculture and to discourage inappropriate development of agricultural lands.

Water

- Goal: Protect long-term water quality in the Delta for agriculture, municipal, industrial, water-contact recreation, and fish and wildlife habitat uses, as well as all other designated beneficial uses.

Recreation and Access

- Goal: To promote continued recreational use of the land and waters of the Delta; to ensure that needed facilities that allow such uses are constructed, maintained, and supervised; to protect landowners from unauthorized recreational uses on private lands; and to maximize dwindling public funds for recreation by promoting public-private partnerships and multiple use of Delta lands.

Levees

- Goal: Support the improvement and long-term maintenance of Delta levees by coordinating permit reviews and guidelines for levee maintenance. Develop a long-term funding program for levee maintenance. Protect levees in emergency situations. Give levee rehabilitation and maintenance the priority over other uses of levee areas.

Land Use Element

The Land Use Element is the central focus of the General Plan. This Element sets policy for land uses in the unincorporated county for the next 25 years, establishing the foundation for future land use and development. The Land Use Element designates the distribution of land uses, such as residential, commercial, industrial, agricultural, open space, recreation and public uses. It also addresses the permitted density and intensity of the various land use designations as reflected on the County's General Plan Land Use Diagram. The overall goal of the land use element is:

- An orderly pattern of land use that concentrates urban development, enhances community character and identity through the creation and maintenance of neighborhoods, is functionally linked with transit, promotes public health and protects the County's natural, environmental and agricultural resources.

The County's land use strategy is illustrated in four sections. Each section contains objectives and policies that are intended to guide the County toward a more compact urban character by concentrating growth within existing urbanized areas and strategically-located new growth areas, thereby utilizing land resources as efficiently as possible.

Section 1: Logical Progression of Urban Development

GOAL:	**Direct new growth to previously urbanized areas, planned growth areas and strategically located new growth areas to promote efficient use of land, to reduce urban sprawl and its impacts, to preserve valuable environmental resources, and to protect agricultural and rangeland operations.**
Objective:	Reserve the land supply to amounts that can be systematically provided with urban services and confines the ultimate urban area within limits established by natural resources.
Objective:	Coordinated near- and long-term planning efforts for the development of the greater Jackson Highway area that creates cohesive and complete communities while protecting environmental resources.

Section 2: Growth Accommodation

GOAL:	**Accommodate projected population and employment growth in areas where the appropriate level of public infrastructure and services are or will be available during the planning period.**
Objective:	On average, achieve buildout of vacant and underutilized infill parcels at existing zoned densities, while recognizing that individual projects may be approved or denied at higher or lower densities based on their community and site suitability.
Objective:	Buildout of planned communities consistent with their approved plans.
Objective:	New retail and employment opportunities in targeted corridors to support community economic health and vitality, and additional residential dwelling units to support these stores and jobs.
Objective:	New communities that feature a mix of housing, jobs and retail development configured in a compact and transit supportive manner, that incorporate mixed use development (both vertical and horizontal), and that protect environmental resources and preserve open space.
Objective:	Historical rate of Agricultural-Residential development accommodated through build-out and limited expansion of existing Agricultural-Residential communities.

Section 3: Growth Management and Design

GOAL:	Land use patterns that maximize the benefits of new and existing development while maintaining the quality, character, and identity of neighborhood and community areas.
Objective:	Urban design that is functional, aesthetically pleasing, and distinctive.
Objective:	New development that maintains and/or enhances community identity while remaining compatible with existing neighborhoods.
Objective:	Neighborhoods with a mix of employment opportunities, commercial amenities, neighborhood services, and a variety of housing types and sizes.
Objective:	Compact, mixed use developments concentrated in nodes around transit stops, in community centers, and along commercial and transportation corridors.
Objective:	New development in existing communities, in new growth areas and improvements to existing buildings and housing stock that are designed and constructed to be energy efficient and incorporate renewable energy technologies where cost-effective and feasible.
Objective:	Reduced levels of light pollution in both new and existing communities.
Objective:	A community wide pattern of development with the most intensive land uses in close proximity to transit stops.
Objective:	High intensity, mixed use neighborhoods that provide a pedestrian environment and are closely linked to transit.
Objective:	Communities, neighborhoods, and single projects that promote pedestrian circulation and safety through amenities, good design, and a mix of different land uses in close proximity.
Objective:	A sufficient, yet efficient supply of parking.
Objective:	Improved housing affordability for residents earning below median incomes, and a continued supply of affordable housing units.
Objective:	Viable commercial services and a diversity of employment opportunities located in proximity to residents.
Objective:	Efficient build-out of existing Agricultural-Residential areas within the USB to meet rural residential demand without contaminating or overdrafting groundwater aquifers.
Objective:	Coordinate private development with the provision of adequate public facilities and services.
Objective:	Limited urban growth in rural towns consistent with infrastructure capacity, natural constraints, and the economic base.
Objective:	Limited agricultural-residential land use expansion outside the USB that does not compromise objectives for protecting prime agricultural lands and open space, and avoids groundwater overdraft and contamination.
Objective:	Important farmlands protected to ensure the continuation of agricultural production and to preserve open space.

Section 4: Built Environment Preservation and Enhancement

Sacramento County is unique in being a county that has a large percentage of urbanized and built out land under its jurisdiction, along with vast areas of open space, agriculture and rural development. Urban areas, ranging from new peripheral development to older existing communities, serve as the County's economic and employment backbone and are home to the majority of residents living in the unincorporated areas.

GOAL:	Reinvestment in and revitalization of existing communities through comprehensive and coordinated planning strategies and public participation that addresses housing, economic development, commercial development, employment opportunities, public facilities and infrastructure improvements.
Objective:	Revitalized commercial corridors that will enhance community image and stimulate private reinvestment, that support provision of enhanced public transit, and that will encourage new economic and commercial development and improvements to housing and infrastructure.
Objective:	Targeted planning efforts that focus on distinct districts within existing communities.
Objective:	Maximize compact, mixed use development opportunities along transportation corridors.
Objective:	Preserve and enhance the quality and character of the County's unique communities.
Objective:	Decentralized municipal services that will improve services, enhance and localize service delivery, and increase public involvement and authority in the planning process.
Objective:	Create and maintain a diversity of housing within existing communities, varying in terms of type, cost, design, size and tenure.
Objective:	Promote development in established communities that integrates well into the community and minimizes impacts to surrounding neighborhoods.
Objective:	Create and enhance dynamic, identifiable places unique to each community.
Objective:	Enhance the quality of life and economic vitality of each community area through strategic redevelopment, infill development and revitalization.
Objective:	Habitat enhancement, open space protection, and cohesive urban design accomplished by local, state, and federal agency coordination.
Objective:	Zoning consistent with the adopted General Plan Land Use Diagram.
Objective:	Accommodate land use proposals which are in the interest of the public health, safety, and welfare of the residents of Sacramento County.

Open Space Element

The Open Space Element is in many ways a plan for implementing other Elements of the General Plan. For example, maintaining intact habitat, productive soils, and mineral resource availability as open space is essential to resource conservation. Keeping floodplains undeveloped is likewise an important way to implement flood protection goals in the Safety Element. And, preserving open space areas within the fabric of urban development can address Land Use Element policies relating to neighborhood identity and land use conflicts. Indeed, the key role that open space plays in synthesizing land use objectives lends it the distinction as the only Element where an action plan is specifically required by state law.

GOAL:	Open space lands in Sacramento permanently protected through coordinated use of regulation, education, acquisition, density transfer and incentive programs.
Objective:	Effective open space preservation strategy that supports the Open Space Vision Diagram.
Objective:	Establishment of trails and greenbelts to provide for recreational opportunities and community separators.
Objective:	Appropriate urban and rural development clustered to provide open space resource protection.

Public Facilities Element

The Water Facilities Section addresses how future water supply facilities might be financed and provided for in an equitable fashion, while minimizing impacts on ground and surface water resources, as well as riverine and wetland environments. These facilities are a vital part of ensuring that enough public water is available to serve both existing residents as well as anticipated growth through 2030. This section describes policies and programs under two objectives:

- Environmentally sensitive and cost efficient placement of water treatment and distribution facilities.
- Timely and equitable financing of new water facilities

GOAL:	Efficient and effective fire protection and emergency response serving existing and new development.
Objective:	Fire and emergency safety measures integrated into all neighborhood and building design.
Objective:	Equitable and adequate funding for new fire protection facilities, equipment and personnel to serve growth.
Objective:	Encourage the service utility to develop cogeneration facilities in compliance with land use plans, ordinances, regulations, standards, and zoning restrictions without degrading natural and cultural resources.
Objective:	Plan and design electrical transmission facilities to minimize visual impacts, preserve existing land uses, and avoid biological and cultural resources.
Objective:	Develop new land uses adjacent to transmission facilities without compromising the safety and health of residents.

Safety Element

The purpose of the Safety Element is to identify and assess the potential for hazards to occur in Sacramento County and to formulate measures that provide adequate public protection. Sacramento County's physical setting and the projected rate of urban expansion create a potential for the residents of the County to be greatly affected by several hazards. Hazards can result from the action of nature, as in the case of earthquakes and floods; they can be man-made, as in the case of fires caused by arson or through carelessness. They can also originate from a combination of both natural and man-made causes, such as dam failure that results from an earthquake. This element examines both natural and man-made hazards, including seismic events, flooding, and fires. Minimizing and preventing these hazards are the focus of this Element.

Seismic and Geologic Hazards

- Goal: Minimize the loss of life, injury, and property damage due to seismic and geological hazards.

Flooding

- Goal: Minimize the loss of life, injury, and property damage due to flood hazards.

Fire Hazards

- Goal: Minimize the loss of life, injury, and property damage due to fire hazards.

Emergency Response

- Goal: An Emergency Preparedness System that can effectively respond in the event of a natural or manmade disaster.

Repetitive Loss Area Analysis Report (July 2015)

The purpose of this Report is to assist home owners in reducing their flood risk by providing a broader understanding of the potential and existing flooding problems and identifying potential solutions. This is one component of Sacramento County's overall floodplain management program. Due to the number of properties in Sacramento County that meet the National Flood Insurance Program's (NFIP's) definition of Repetitive Loss properties, a Repetitive Loss Area Analysis (RLAA) is required for Sacramento County as a part of its participation in the Community Rating System (CRS) program. This Report contains all twenty-eight (28) designated Repetitive Loss Areas (RLAs) within Sacramento County.

The County followed a process prescribed by the CRS program. An area analyses must have been prepared and adopted for each repetitive loss area in the community. The analyses must meet the following criteria:

- The repetitive loss areas must be mapped.
- A five-step process must be followed. Although all five steps must be completed, steps 2–4 do not have to be done in the order listed. For example, staff may want to contact agencies and organizations to see if they have useful data (Step 2) after the site visit is conducted (Step 3).
- The repetitive loss area analysis report(s) must be submitted to the community's governing body and made available to the media and the public. If private or sensitive information is included in the report, then a summary report may be prepared for the media and the public. The complete repetitive loss area analysis report(s) must be adopted by the community's governing body or by an office that has been delegated approval authority by the community's governing body.
- An annual evaluation report must be done.
- The analysis must be updated in time for each CRS cycle verification visit.

Properties in the RLAs were notified of the analysis and data was collected from various sources to identify the hazard and capabilities to mitigate them.

Sacramento Metropolitan Fire Protection District Community Wildfire Protection Plan (June 2014)

In 2008, a wildfire that injured Sacramento Metropolitan Fire District firefighters in a burnover, a fire in which personnel were overrun by a wildland fire, highlighted the need for Metro Fire to implement additional strategies to prevent and combat wildfire within Metro Fire's jurisdictional boundaries (District). In response to this fire, Metro Fire applied for and successfully obtained a grant from the Assistance to Firefighters Grants Program of the Federal Emergency Management Agency (FEMA) to develop this

community wildfire protection plans (CWPP) and to launch an integrated wildfire prevention program that would reduce wildfire risk and increase community resiliency within district boundaries.

Program for Public Involvement (September 2015)

Communities that participate in the Community Rating System (CRS) of the National Flood Insurance Program (NFIP) receive credit points for developing and implementing a Program for Public Information (PPI.) The PPI is a new approach to identify, prepare, implement, and monitor a range of public information activities tailored to meet community's unique needs for flood preparedness and response. The Sacramento County PPI committee reviewed the history of the Sacramento region's flood risk and defined target areas (specific risk and demographic, that would benefit from outreach projects.

- Target Areas (Specific Risk)
  - ✓ Residents living in Special Flood Hazard Areas (SFHA)s
  - ✓ Residents living in areas that have a non-mapped flood risk
  - ✓ Repetitive Loss Areas
  - ✓ Areas Protected by Levees
  - ✓ Areas Protected by Dams

- Target Audience (Demographics)
  - ✓ All County residents (will benefit from general flood message outreach)
  - ✓ Residents affected by NFIP map/policy change
  - ✓ School aged children
  - ✓ Relators, agents, lenders
  - ✓ Individuals that primarily use social media

There are six mandatory flood awareness and preparedness topics that must be included in the PPI. A community can include up to four additional topics based on the community's public information needs as identified by the PPI Committee. The Committee also determines the goal or desired outcome for each outreach topic. The Sacramento County PPI includes a total of ten outreach topics:

- Mandatory Topics
  - ✓ Know your flood hazard
  - ✓ Insure your property for your hazard
  - ✓ Protect people from the hazard
  - ✓ Protect your property from the flood hazard
  - ✓ Build responsibly
  - ✓ Protect natural floodplain functions

- Community Specific Topics
  - ✓ Check out a low cost Preferred Risk Policy
  - ✓ Call 875-RAIN for flood-related topics
  - ✓ Keep streams and ditches clean
  - ✓ Only rain down the drain (scoop the poop)

Table 4-105 contains initiatives that are in place that support the goal and CRS messages that are conducted by organizations other than Sacramento County. The list was composed by County staff research and PPI Committee members' feedback.

Table 4-105 PPI Outreach Initiatives

OP#	Organization/Stakeholder	Project	Subject Matter	Frequency	Outreach Classification	Target Audience
16	Homeowner's Association	Association meeting	Message: 1-10	Once a year	General Outreach	All County Residents
17	SAFCA	website	Message: 1, 2, 4, 6	Year-round	Informational Material	All County Residents
18	Sacramento Stormwater Quality Partnership	website	Message: 6, 9, 10	Year-round	Informational Material	All County Residents
		Events	Message: 6, 9, 10	Year-round	General Outreach	All County Residents
19	Department of Water Resources' (DWR) FloodSAFE California Initiative	Levee Mailer	Message: 1, 2, 3, 5	Fall	Targeted Outreach	Areas Protected by Levees
20	Sacramento Association of Realtors	member newsletter	Message: 1,2,7	Year-round	Informational Material	All County Residents
21	Sacramento Area Creeks Council	Creek Week	Message: 9	April	General Outreach	All County Residents
		Tours	Message: 6	multiple	General Outreach	School-Aged Children
		Website	Message: 9	Year-round	Informational Material	All County Residents
22	U.S. Fish & Wildlife Service (Stone Lakes National Wildlife Refuge)	Website	Message: 6	Year-round	Informational Material	All County Residents
		Tours		All County Residents	Tours	General Outreach
23	Sacramento County Parks and Recreation District	Scoop the Poop	Message: 10	Year-round	General Outreach	All County Residents
24	Sacramento Valley Conservancy (Deer Creek Hills)	Website	Message: 6	Year-round	Informational Material	All County Residents
		tours			General Outreach	All County Residents
25	Cosumnes River Preserve	Website	Message: 6	Year-round	Informational Material	All County Residents
		Tours			General Outreach	All County Residents
26	Sacramento Splash	Website	Message: 6	Year-round	Informational Material	All County Residents
		tours			General Outreach	School-Aged Children

OP#	Organization/Stakeholder	Project	Subject Matter	Frequency	Outreach Classification	Target Audience
27	American River Flood Control District	levee maintenance	Message: 1, 2, 4, 6	Year-round	Informational Material	SFHA residents along American River
28	Water Education Foundation	tours, lectures	Message: 1, 4, 5, 6	Year-round	Informational Material	School-Aged Children
29	Sacramento Regional County Sanitation District	Environmental Protection	Message: 6, 9, 10	Year-round	General Outreach	All County Residents
		Walk on the Wild Side	Message: 6	May	General Outreach	All County Residents
30	American Red Cross Sierra-Delta Chapter	trainings, community events, social media messaging, website, telephone/tablet applications	Message: 1,2, 3	Year-round	General Outreach	All County Residents

Sacramento County Stormwater Management Program

The County of Sacramento, along with the cities of Sacramento, Citrus Heights, Galt, Elk Grove, Folsom and Rancho Cordova (collectively known as the Sacramento Stormwater Quality Partnership), is subject to Waste Discharge Requirements Order No. R5-2008-0142 (National Pollutant Discharge Elimination System (NPDES) Permit No. CAS082597) (Municipal Stormwater Permit) issued by the Central Valley Regional Water Quality Control Board (Regional Water Board). This comprehensive plan is designed to ultimately reduce pollution in stormwater runoff in compliance with the County's National Pollutant Discharge Elimination System (NPDES) stormwater permit within Sacramento County. The plan includes processes for accomplishing the goals of minimizing construction site runoff as well as post-construction stormwater management in newly developed and redeveloped areas.

Sacramento County Watershed Management Plan (2009)

A watershed management plan is a document that guides efforts to control pollution, manage stormwater, and protect and improve local streams and the uplands that surround them. These plans also provide collaborative agreement among government, other local stakeholders, and citizens during the planning process. Sacramento County has been involved in the development of a comprehensive watershed management plan. This watershed plan guides the County and other stakeholders in protecting, managing, and improving environmental resources and habitat.

Sacramento and San Joaquin River Basins Comprehensive Study (2002)

This study was a joint effort by the State of California Reclamation Board and the U.S. Army Corps of Engineers (USACE) in coordination with Federal, State and local agencies. It provides a Comprehensive

Plan for Flood Damage Reduction and Ecosystem Restoration within the two river basins, and a strategy for implementation. Numerous technical analyses were performed for this study using computer modeling tools developed by the USACE and DWR to simulate the hydrology, hydraulics, ecosystem function, flood risk and associated economic damages in the Sacramento and San Joaquin river systems. DWR, USACE, and others will use these models in developing future flood management and environmental improvement projects in the Sacramento and San Joaquin river basins.

Community Plans

Sacramento County includes 25 mapped communities, some of which are incorporated cities that are not within County jurisdiction. In some cases, the communities within the unincorporated County have adopted Community or Specific Plans. Community Plans and Specific Plans provide direction for entire communities or other defined new geographic areas. These plans will take different forms depending on the specific needs of our communities. They typically set forth policy and implementation strategies for such items as land use, transportation, urban design, parks, school facilities and public services. A Community Plan for a developed, mature area would focus on neighborhood enhancement and commercial revitalization goals and action items; whereas a Specific Plan or Community Plan for an area that is newly developing would focus more on new development needs, location of new public facilities and infrastructure financing. These plans help implement the County General Plan on area-specific basis. In addition, the County has initiated and implemented special planning programs for projects that are unique and controversial in nature.

A Community Plan includes goals and policies specific to each individual community, and is accompanied by a Community Land Use Plan map. Status of these plans can be found in Table 4-106.

Table 4-106 Community Plans in Sacramento County

Community Plan	Last Adopted
Antelope	1985
Arden Arcade	1980 (currently being updated)
Carmichael	1975 (update process will begin soon)
Citrus Heights	1978
Cordova	1978 (currently being updated)
Delta	1983
Elk Grove	1978*
Fair Oaks	1975
Florin-Vineyard	1985
Laguna	1978*
North Highlands/Foothill Farms	1974
Orangevale	1976
Rio Linda/Elverta	1998
Southeast	1976 (map only)

Community Plan	Last Adopted
South Sacramento	1978

*These plans are no longer relevant as a result of the incorporation of the City of Elk Grove.

There are five specific plans adopted within Sacramento County. The plans are:

- Easton Project
- East Antelope
- Elverta
- Mather Field
- North Vineyard Station

Sacramento County Emergency Operations Plan (2012, 2016 in-process)

The Sacramento County Office of Emergency Services coordinates planning, preparedness, response, and recovery efforts for disasters in unincorporated Sacramento County. The Sacramento County Emergency Operations Plan addresses the County's planned response to emergency situations associated with natural disasters, technological incidents and national security emergencies in or affecting Sacramento County. Response issues and responsibilities contained in an EOP include:

- Emergency public information and warning
- Situation survey and analysis
- Allocation and mobilization of response resources
- Implementation of health and safety measures
- Enforcement of police powers
- Access control and movement
- Evacuation and rescue
- Care and treatment of casualties
- Control and allocation of vital resources and supplies
- Protection and restoration of facilities and systems
- Mass care for displaced individuals and families
- Collection, identification and disposal of the deceased

Sacramento County Warning and Evacuation Procedures

Sacramento County and its incorporated communities have a variety of systems and procedures established to protect its residents and visitors to plan for, avoid, and respond to a hazard event including those associated with floods and other natural disasters. This includes Pre-Disaster Public Awareness and Education information which is major component in successfully reducing loss of life and property in a community when faced with a potentially catastrophic incident. Much of this information is not specific to a given hazard event and is always accessible to the public on local County and City websites, while other information is incident-specific. A general overview of specific warning and evacuation systems and procedures are summarized further below.

Monitoring for Alerts, Watches and Warnings

Emergency officials constantly monitor events and the environment to identify specific threats that may affect their jurisdiction and increase awareness levels of emergency personnel and the community when a threat is approaching or imminent.

The National Weather Service (NWS), a part of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), is the prime agency for detecting meteorological threats, such as floods and severe weather. Severe weather warnings are transmitted through NOAA's Weather Radio System, considered by the federal government as the official source for weather information. Federal agencies can only look at the large scale, (e.g., whether conditions are appropriate for the formation of a thunderstorm.) Local emergency managers can provide more site-specific and timely recognition by sending out NWS trained spotters to watch the skies when the Weather Service issues a watch or a warning. The NWS page for Sacramento County is accessible through the Sacramento County website and at the following: http://forecast.weather.gov/MapClick.php?zoneid=CAZ017

A flood threat recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On larger rivers, this measuring and calculating is performed by the NWS. Support for NOAA's efforts is provided by cooperating partners from state and local agencies. Forecasts of expected river stages are made through the Advanced Hydrologic Prediction Service (AHPS) of the NWS. Flood threat predictions are disseminated on the NOAA Weather Wire or NOAA Weather Radio.

On smaller rivers, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

The County and City EOPs include procedures for threat identification. The City and County work closely with the NWS for issuing an Emergency Alert System (EAS). Additional Sacramento County's threat identification mechanisms include:

California Data Exchange Center (CDEC). The CDEC provides information for flood forecasting information at http://cdec.water.ca.gov/. The CDEC installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gages for the Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting.

Automated Local Evaluation in Real Time (ALERT) System. ALERT was created by the NWS to provide continuous and automatic reports from river levels and rainfall gauges detect impending high water levels. ALERT information includes:

- Rainfall Summary
- Stage Summary
- Storm Ready
- Sandbag Information
- Detailed Forecast
- Quantitative Precipitation Forecasts (QPF)
- NWS River Forecasts

The Sacramento County's ALERT system consists of 2 base stations, and 50 gaging stations. The purpose of the County's ALERT website is to provide real time monitoring information to stage and rainfall information during storm events, which assist in informing the activation of additional warning and potential evacuation of affected areas. This information which can be accessed through the Sacramento County website includes information for: Stream Level Summaries and Maps; and Rainfall Summaries and Maps. See https://www.sacflood.org/home.php.

Dam Protocols. Should an event trigger the activation of an Emergency Action Plan (EAP) for a potential dam failure, County OES receives this information via direct phone calls from the originating source/agency or from Sacramento County Dispatch and/or Cal OES. County OES then follows the notification and evacuation procedures called for in the EOP.

Notifications and Warning Systems

Once a disaster is imminent, action is taken to control the situation, save lives, protect property, and minimize the effects of the disaster. During this phase, warning systems are activated; resources and first responders notified and mobilized; and evacuations begin.

After a threat recognition system tells the emergency services office that a flood, severe weather or other hazard is coming, the next step is to notify the public and staff of other agencies and critical facilities. Providing adequate and timely notification to the public is the greatest challenge, especially with sudden or no-notice events. The earlier and more specific the warning, the greater the number of people that can implement protection measures.

As previously described, the NWS issues notices to the public using two levels of notification:

- **Watch.** Conditions are right for flooding, thunderstorms, or other hazard event.
- **Warning**. A flood or other event has started or been observed.

In coordination with established public safety warning protocols, the activated EOC will manage the dissemination of timely and adequate warnings to threatened populations in the most direct and effective means possible. Depending upon the threat and time availability, the County and City EOCs will initiate alerts and warnings utilizing any of the following methods:

- Activation of the Emergency Alert System (EAS)
- Activation of the Telephonic Alert and Warning System (Everbridge and Reverse 911)
- Activation of the Emergency Digital Information System (EDIS)
- Activation of the California Law Enforcement Mutual Aid Radio System (CLEMARS)
- Media broadcast alerts.
- Commercial or public radio or TV stations

- ✓ Radio: KFBK 1530 am, KSTE 650, KGBY, 92.5 FM
- ✓ TV: KCRA Channel 3, www.KCRA.com; KXTV Channel 10; KOVR Channel 13; KTXL Channel 40

- NOAA Weather Radio
- www.saccounty.net; SacramentoReady.org websites
- 211/311 Sacramento
- CalTrans 511
- Telephone trees/mass telephone notifications
- Tone activated receivers in key facilities
- Fire and Law enforcement loudspeakers
- Outdoor warning sirens
- Mobile public address sirens/systems
- Door-to-door contact
- Vulnerable population databases
- Email notifications

Multiple or redundant systems are most effective – if people do not hear one warning, they may still get the message from another part of the system. Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should have a public information aspect that details appropriate warnings and responses.

Sacramento ALERT

The Sacramento County OES, in partnership with Yolo and Placer emergency agencies, use a state-of-the-art emergency alert system known as Sacramento Alert. The system provides information to residents about emergency events quickly and through a variety of communication methods.

The alert system currently includes all listed and unlisted landline telephone numbers in Yolo, Placer, and Sacramento counties that are serviced by AT&T and Verizon.

To ensure emergency notices are received quickly both at work and home, residents are encouraged to log onto the Sacramento Alert Self- Registration Portal and provide phone numbers for both home and work, including land and cell phone numbers, email addresses, TTY device information and instant messaging information.

Residents will only receive alerts that are critical and time-sensitive, including: flooding, levee failures, severe weather, disaster events, unexpected road closures, missing persons, and evacuations of buildings or neighborhoods in specific geographic locations.

The system, which uses Everbridge Alert and Notifications System, was made possible for all three counties by a grant from CAL OES and supported by CA Department of Water Resources, Flood Operations Center through the Sacramento County OES.

StormReady

The NWS established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. Both Sacramento County and the City

of Sacramento are StormReady certified. StormReady communities are better prepared to save live from the onslaught of severe weather through advanced planning, education, and awareness. Being designated a StormReady community by the NWS is a good measure of a community's emergency warning program for weather hazards.

Evacuation and Shelter-in-Place

The principle of evacuation is to move citizens from a place of relative danger to a place of relative safety, via a route that does not pose significant danger. There are six key components to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., disabled, hospital patients, school children)

Evacuation planning also considers sheltering options for those that cannot get out of harm's way. Shelters can also serve as a temporary place after the storm for those who have lost their homes.

The County and City both maintain Evacuation Plans that outline strategies and protocols for medium to high-level (catastrophic) evacuation events in the County. These plans also include procedures for sheltering to provide people affected by a disaster with a safe, temporary place to be housed during or immediately after a disaster until they can either return to their homes or be relocated to other housing facilities. Highlights of these County/City plans are detailed below.

Sacramento County Evacuation Plan (2008 Annex to EOP)

Sacramento County's Evacuation Plan, 2008, is an annex to the County EOP. An update to the 2008 Evacuation Plan is scheduled for 2016. The purpose of the Evacuation Plan is to document agreed upon strategy for the County's response to emergencies that involve the evacuation of persons from an impacted area to a safe area. This involves coordination and support for the safe and effective evacuation of the general population and for those who need additional support to evacuate, such as health care facilities and schools. This plan also includes considerations for shelter-in-place options, in circumstances where evacuation may be a higher risk option. All evacuation and sheltering-in-place for medium and high level catastrophic incidents will be coordinated through Sacramento County EOC. Low level incidents will be handled at a more local level, such as through local fire departments. Care and sheltering of evacuees will be handled through Sacramento County's Department of Human Assistance (DHA), with support from Red Cross. The County's Evacuation Plan identifies criteria and triggers for determining what level of evacuation is warranted; information on transportation and evacuation movement control; and roles and responsibilities of agencies/organizations supporting the evacuation.

Information about flood depth maps and evacuation plan maps can be found online by accessing http://www.msa.saccounty.net/waterresources/stormready/default.asp?page=maps.

The Evacuation Plan is broken down in to the following sections:

- Section 1—Introduction
- Section 2—Concept of Operations
- Section 3—Levels of Activation and Evacuation Triggers
- Section 4— Emergency Communication—Public Warning and Alerts
- Section 5—Transportation and Evacuation Movement Control
- Section 6—Care and Shelter
- Section 7—Roles and Responsibilities

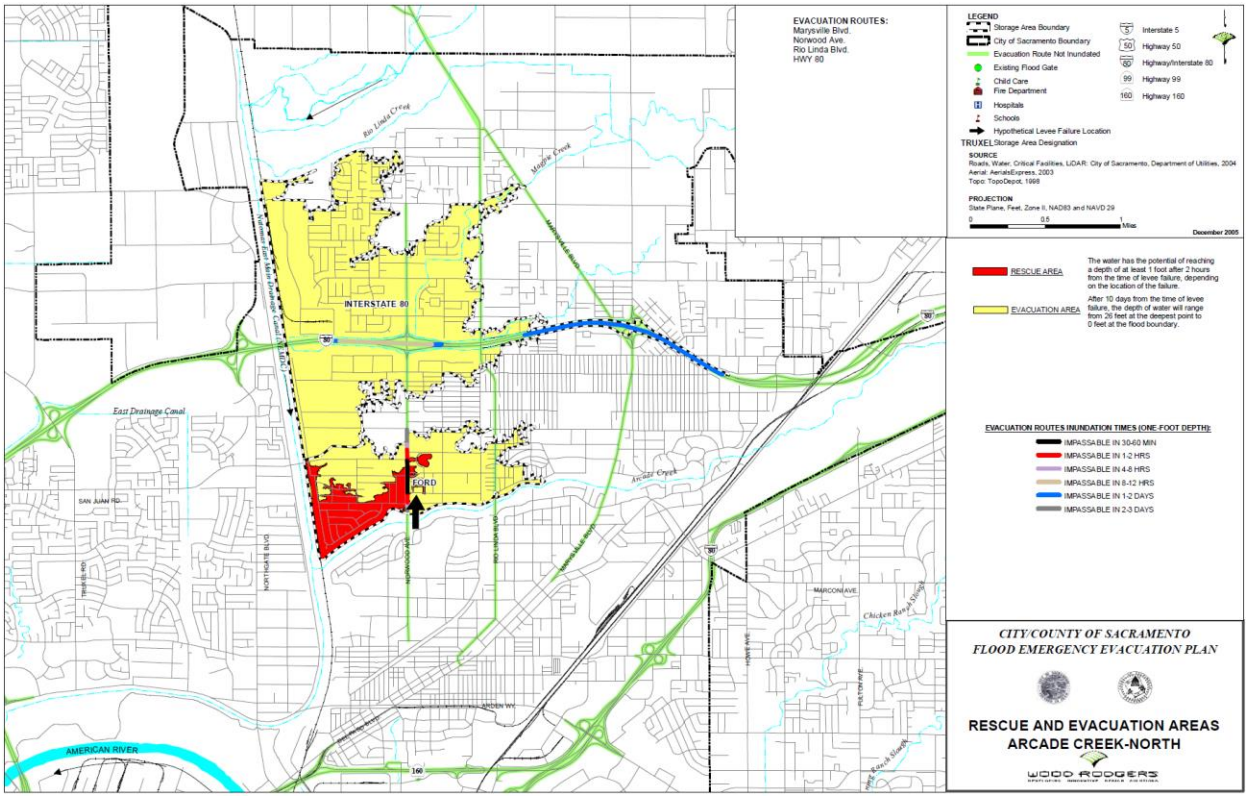
The overall objectives of emergency evacuation actions include:

- Alert and warning of the public to the threat and need to evacuate, and the establishment of the Joint Information Center (JIC) for information coordination.
- Movement and control of the general population out of the threatened area, including traffic control and directions.
- Transportation support of vulnerable populations (people with disabilities, elderly, persons without vehicles, et al.) out of the threatened area.
- Establishment of Evacuation Transfer Points.
- Provision of shelters for care of the county's population and animals.
- Access control into the hazard area.
- Assure safe and orderly re-entry to evacuated persons, with clear instructions.

A key evacuation and safety concern is when roads and bridges go under water. Generally, the larger the road, the less likely it is to flood, but this is not always the case. In addition, a bridge does not have to be under water to be damaged or to cut off an evacuation route. In some cases the bridge is high, but the access road may be flooded. In other cases, the bridge or culvert can be washed out. This is especially dangerous if a person drives on a flooded road and assumes that the bridge is still there.

Residents and visitors within Sacramento County should be made aware of evacuation routes. It is important that the County work with both public and private entities to ensure that everyone knows which roads and thoroughfares are designated for evacuation. Figure 4-98 is an example map that indicates the designated evacuation routes for a portion of Sacramento County. Additional evacuation maps can be found at www.stormready.org.

Figure 4-98 Arcade Creek Area Evacuation Plan Map



Source: Sacramento County Evacuation Plan

More information on the importance of including evacuation procedures and maps as part of a sound mitigation strategy can be found in Appendix C to this plan. In addition, Appendix C contains information on post mitigation policies and procedures. More information specific to the County can be found in their various response and recovery plans.

Sacramento County Post Disaster Mitigation Policies and Procedure

The Sacramento County EOP, and its annexes, is intended to facilitate multi-agency and multi-jurisdictional coordination during emergencies including hazard events. Through it policies and procedures it seeks to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system in order to return the community to their normal state of affairs.

The goal of the recovery phase of an emergency incident or natural disaster is to return the residents, public services and private sector in an impacted area to their pre-disaster state, and through implementation of hazard mitigation measures, seek to prevent, as much as possible, similar damage, destruction or chaos after incidents and disasters in the future. Sacramento policies include objectives, responsibilities and procedures for restoration of services and returning of the affected area to its pre-emergency condition. Mitigation is emphasized as a major component of recovery efforts.

Post-disaster recovery activities are designed to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrolling evacuated areas to prevent looting
- Providing safe drinking water
- Monitoring for diseases
- Vaccinating residents for tetanus and other diseases
- Clearing streets
- Cleaning up debris and garbage

As the initial and sustained operational priorities are met, emergency management officials consider the recovery phase needs. Short-term and long-term recovery is covered in the EOP. Short-term recovery operations begin during the response phase and include rapid debris removal and cleanup and restoration of essential services to minimum operating standards. Long-term recovery operations work to restore the community to pre-disaster conditions and include hazard mitigation activities, restoration and reconstruction of public facilities, and disaster response cost recovery. Local Assistance Centers and/or Disaster Recovery Centers are opened and damages assessed. Elements of recovery include:

- Windshield survey and documentation of flood impacts
- Safety assessment
- Damage assessments
- Determination of substantially damaged structures
- Engineering assessments
- Post-flood building entry
- High water marks
- Risk communication/Public Information
- Code enforcement/triage process
- Permitting process
- Integration of mitigation/loss reduction activities into recovery
- Temporary housing
- After action reporting

Regulating Reconstruction

Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

Mitigation

Mitigation measures to reduce the risk and vulnerability of a community to future disaster losses can be implemented in advance of a disaster event and also as part of post-disaster recovery efforts. Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. Effective mitigation can break the cycle of disaster damage, reconstruction, and repeated damage. Categories of mitigation measures

include prevention, emergency services, property protection, natural resource protection, structural, and public information, many of which are discussed throughout this document.

Additional mitigation elements specific to the Sacramento area are discussed further below.

LHMP

The Federal Disaster Mitigation Act (DMA) of 2000 requires communities to develop an approved Local Hazard Mitigation Plan (LHMP) to remain eligible to apply for certain FEMA Hazard Mitigation Assistance (HMA) grants. Applications submitted for funding from the FEMA HMA grant programs must "be consistent with" the mitigation strategy outlined in the LHMP. Sacramento County and the City of Sacramento are in process with the update of their 2016 LHMP Update. Once complete and adopted, this LHMP update will provide continued eligibility for all participating jurisdictions for FEMA pre- and post-disaster mitigation funding.

Grant Funding

An understanding of the various funding streams and opportunities will enable the communities to match up identified flood mitigation projects with the grant programs that are most likely to fund them. Additionally, some of the funding opportunities can be utilized together. Mitigation grant funding opportunities available pre- and post- disaster include the following:

- FEMA Hazard Mitigation Assistance (HMA) Grants (Pre-disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), and Hazard Mitigation Grant Program (HMGP))
- FEMA Public Assistance Section 406 Mitigation
- Community Development Block Grants
- Small Business Loans
- Increased Cost of Compliance

Other Key Sacramento Area Emergency Plans

- Mass Care and Sheltering Plan, 2012 Annex to the EOP
- People with Access and Functional Needs, 2012 Annex to the Mass Care and Sheltering Plan
- Sheltering the Medically Fragile, 2012 Annex to the Mass Care and Sheltering Plan
- Severe Weather Guidance, 2012 Annex to the EOP
- Animal Care and Shelter, 2012 Annex to the EOP
- Continuity of Governmental Operations Functional Annex and departmental COOP plans, 2011
- Local Hazard Mitigation Plan, Update 2011; 2016 Update in process

South Sacramento Habitat Conservation Plan

The South Sacramento Habitat Conservation Plan (SSHCP) is a regional approach to addressing issues related to urban development, habitat conservation and agricultural protection. As of the writing of this plan, the SSHCP was undergoing environmental review. The SSHCP will consolidate environmental efforts to protect and enhance wetlands (primarily vernal pools) and upland habitats to provide ecologically viable conservation areas. It will also minimize regulatory hurdles and streamline the permitting process

for development projects. The SSHCP will cover 40 different species of plants and wildlife including 10 that are state or federally listed as threatened or endangered. The SSHCP will be an agreement between state/federal wildlife and wetland regulators and local jurisdictions, which will allow land owners to engage in the "incidental take" of listed species (i.e., to destroy or degrade habitat) in return for conservation commitments from local jurisdictions.

The options for securing these commitments are currently being developed and will be identified prior to the adoption of the SSHCP. The geographic scope of the SSHCP includes U.S. Highway 50 to the north, Interstate 5 to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and San Joaquin County to the south. The Study Area excludes the City of Sacramento, the City of Folsom and Folsom's Sphere of Influence, the Sacramento-San Joaquin Delta, and the Sacramento County community of Rancho Murieta. Sacramento County is partnering with the incorporated cities of Rancho Cordova, Galt, and Elk Grove as well as the Sacramento Regional County Sanitation District and Sacramento County Water Agency to further advance the regional planning goals of the SSHCP.

SSHCP Goals and Objectives

Key Principles - Develop a Habitat Conservation Plan through a process that:

- Involves all stakeholders in the study area including developers, environmentalists, agriculturists and government agencies.
- Educates stakeholders regarding the importance of the plan, its components and its significance to them.
- Progresses in an efficient and expeditious manner through consensus building.

Stakeholder Goals - Create a Habitat Conservation Plan that:

- Ensures long-term viability to aid and enhance recovery of sensitive species in the study area by protecting an adequate quality and quantity of habitat in an integrated manner.
- Accommodates development in appropriate sites with fair and reasonable mitigation cost structure.
- Protects agricultural lands and operations from constraints associated with the plan's implementation.
- Gains the trust of all stakeholders in the permitting process by providing certainty that their interests will be considered in a fair and predictable process.
- Relies on voluntary participation through incentives that make the HCP process preferable to the existing process.
- Provides a streamlined permitting process that reduces permitting cost to developers and taxpayers.
- Provides a comprehensive framework for use in linking plant and animal conservation with local land use programs, consistent with Sacramento County General Plan goals and policies.

Emergency Safety Plans (2016)

Sacramento County received a grant from the California Department of Water Resources to prepare a series of Flood Emergency Safety Plans in accordance with the state and federal laws and regulations. The ESP is intended to improve the local flood emergency preparedness and response to satisfy the requirements of the Central Valley Flood Protection Act of 2008 and California Water Code Section 9650 (AB156). Each plan will help the County and its regional partners in the Delta to efficiently respond to emergencies and fulfill their missions to protect life and property. This plan is to facilitate a multi-agency alliance between

the County OES and LMAs, to update the emergency action plans for all the LMAs, and to further create an integrated regional master plan with maps for possible evacuation. As of fall 2016, this process was in progress.

Sacramento County Ordinances

The Sacramento County General Plan provides policy direction for land use, development, open space protection, and environmental quality; however, this policy direction must be carried out through numerous ordinances, programs, and agreements. The following ordinances are among the most important tools for implementing the General Plan and/or are critical to the mitigation of hazards identified in this plan.

Emergency Organization (Sacramento County Code Title 2, Chapter 2.46)

The purposes of this chapter are to provide for the preparation, unification and carrying out of plans for the protection of persons and property within the incorporated and unincorporated areas of the County in the event of an emergency; to provide for the direction of the emergency management organization and the coordination of the emergency functions of the County with all other political subdivisions, emergency services agencies both public and private, corporations, organizations and affected persons within the County.

Mosquito Ordinance (Sacramento County Code Title 6, Chapter 24)

The purpose of this ordinance is to control the mosquito population and breeding grounds in the County. The natural presence of mosquito larvae in any such water shall be deemed conclusive evidence of mosquito breeding and of the existence of a public nuisance, provided such water, receptacle, container or mosquito breeding occurs within two thousand (2000) feet of any occupied dwelling house. The health officer of the County is tasked with the eradication of the mosquito population.

Sacramento County Building Code (Sacramento County Code Title 16, Chapter 4)

The purpose of this Code is to provide minimum standards to safeguard life, limb, health, property and public welfare by regulating and controlling the design, construction, installation, quality of materials, use, occupancy, location and of all buildings and structures within this jurisdiction, and certain equipment specifically regulated herein.

The 2013 California Building Code, Title 24, Part 2 of the California Code of Regulations, a portion of the California Building Standards Code as defined in the California State Health and Safety Code Sections 17922 and 18901 et seq., (hereinafter referred to as the "Building Code") and Building Code Appendix C (Group U Agricultural Buildings) and any rules and regulations promulgated pursuant thereto are hereby adopted and incorporated by reference herein. Except as otherwise provided by this chapter, Chapters 16.02 and 16.10 of the Sacramento County Code, all construction, alteration, moving, demolition, repair and use of any building or structure within this jurisdiction shall be made in conformance with the Building Code and any rules and regulations promulgated pursuant thereto.

Sacramento County Land Grading and Erosion Control Ordinance (Sacramento County Code Title 16, Chapter 44).

The ordinance was established to minimize damage to surrounding properties and public rights-of-way; limit degradation to the water quality of watercourses; and curb the disruption of drainage system flow caused by the activities of clearing, grubbing, grading, filling, and excavating land. The ordinance establishes administrative procedures, minimum standards of review, and implementation and enforcement procedures for the control of erosion and sedimentation that are directly related to land grading activities.

Sacramento County Fire Code (Sacramento County Code Title 17, Chapter 4)

There is hereby adopted by the Board of Supervisors of the County of Sacramento for the purpose of prescribing regulations governing conditions hazardous to life and property from fire or explosion, that certain code known as the California Fire Code, Title 24, California Code of Regulations, Part 9, incorporating the International Fire Code published by the International Code Council, being particularly the 2012 Edition, including the appendices thereof, and the International Fire Code Standards published by the International Code Council, being particularly the 2012 Edition, and the wholes thereof, save and except such portions as hereinafter deleted, modified or amended herein. Not less than one copy of such code has been and now is filed with the Clerk of the Board of Supervisors. From the effective date of the ordinance codified in this chapter, the provisions thereof shall be controlling within the limits of Sacramento County except that any inconsistent regulations and ordinances adopted pursuant to applicable law by a fire protection district or a community service district having a fire department within the County shall be controlling within that district's jurisdictional areas.

Sacramento County Weed Control Ordinance (Sacramento County Code Title 17, Chapter 12)

This ordinance establishes that the uncontrolled growth or accumulation of grass, weeds or other materials or obstructions on sidewalks, streets, and on lands or lots is dangerous or injurious to neighboring property and the health or welfare of residents of the vicinity and is a public nuisance in that it creates a condition that reduces the value of private property, promotes blight and deterioration, invites plundering, creates fire hazards, constitutes an attractive nuisance creating a hazard to the health and safety of minors, creates a harbor for rodents and insects and is injurious to the health, safety and general welfare. This ordinance tasks the Chief of any County Fire Department with the authority to enforce the ordinance.

Zoning and Subdivision Ordinance (Sacramento County Code Title 22)

The Sacramento County Zoning Code has been adopted by the Board of Supervisors and is used to encourage the most appropriate use of land; to conserve, protect and stabilize the value of property; to provide adequate open space for light and air; to prevent undue concentration of population; to lessen congestion on the streets; to facilitate adequate provisions for community utilities such as transportation, water, sewerage, schools, parks and other publicly owned facilities; and to promote the public health, safety and general welfare.

Sacramento County's subdivision ordinance regulates the design and improvement of land divisions and the dedication of public improvements needed in connection with land divisions.

Generally, Sacramento County's zoning ordinance separates hazardous land uses from sensitive land uses and addresses risks e.g. flood, erosion and traffic. The zoning ordinance contains a Flood (F) Combining Zoning District and Tributary Standards, and Natural Streams (NS) Combining Zoning District to reduce the impacts of flood hazards. Additionally, the ordinance contains a Parkway Corridor (PC) Combining Zoning District to ensure that bluff development does not create erosion or geologic instability.

Stormwater Management Ordinance

Sacramento County's Stormwater Management Ordinance authorizes the County to exercise its police power to protect and promote the public health, safety and general welfare. The purpose of this chapter is to protect and enhance the watercourses within the unincorporated area of the County, by controlling the contribution of urban pollutants to stormwater runoff which enters the County storm drain system in a manner consistent with the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act and Municipal discharge Permit No. CAS082597, and by controlling pollutants that are discharged directly to natural surface waters. The County's Stormwater Program also uses its Land Grading and Erosion Control Ordinance to minimize damage to surrounding properties and public rights-of-way, the degradation of the water quality of watercourses, and the disruption of natural or County authorized drainage flows caused by the activities of clearing and grubbing, grading, filling and excavating of land, and sediment and pollutant runoff from other construction related activities, and to comply with the provisions of the County's NPDES Permit Number, CA0082597, issued by the California Regional Water Quality Control Board (Regional Board). These goals will be achieved by establishing administrative procedures, minimum standards of review, and implementation and enforcement procedures for controlling erosion, sedimentation and other pollutant runoff, including construction debris and hazardous substances used on construction sites, and the disruption of existing drainage and related environmental damage caused by the aforementioned activities.

Floodplain Management Ordinance (Ordinance No. SZC-2014-0007)

Sacramento County has a Floodplain Management Ordinance (2014) that exceeds minimum NFIP standards and includes some higher regulatory standards. The County is in the process of updating their General Plan and Floodplain Management Ordinance to incorporate the 200-year flood standard of protection in urban or urbanizing areas (i.e., ULOP). The County's regulations are designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding;
- Minimize business interruptions;
- Minimize damage to public facilities, including streets, sewers, bridges, and utilities;

The County and City's regulations include methods and provisions for:

- Restricting or prohibiting development which are dangerous to health, safety, and property due to flood hazards, or which result in damaging increase in flood heights or velocities;
- Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Controlling fill, grading, dredging, and other development which may increase flood damage; and

- Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

In addition, all new construction or substantial improvements shall be:

- Designed or modified and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy
- Constructed in ways that minimize flood damage
- Constructed with materials resistant to flood damage
- Constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities designed or located so as to prevent water from entering or accumulating within components during flooding

Future flood losses should be reduced by enforcement of current floodplain regulations that regulate development within flood hazard areas. For new residential construction or substantial improvements, Sacramento County requires that either the lowest finished floor be elevated at least 1.5 feet above the base flood elevation. For nonresidential construction or substantial improvements, Sacramento County requires that either the lowest finished floor be elevated at least 1.5 feet above the base flood elevation or that below the base flood level the structure is dry flood-proofed and watertight, with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

County Departments/Agencies

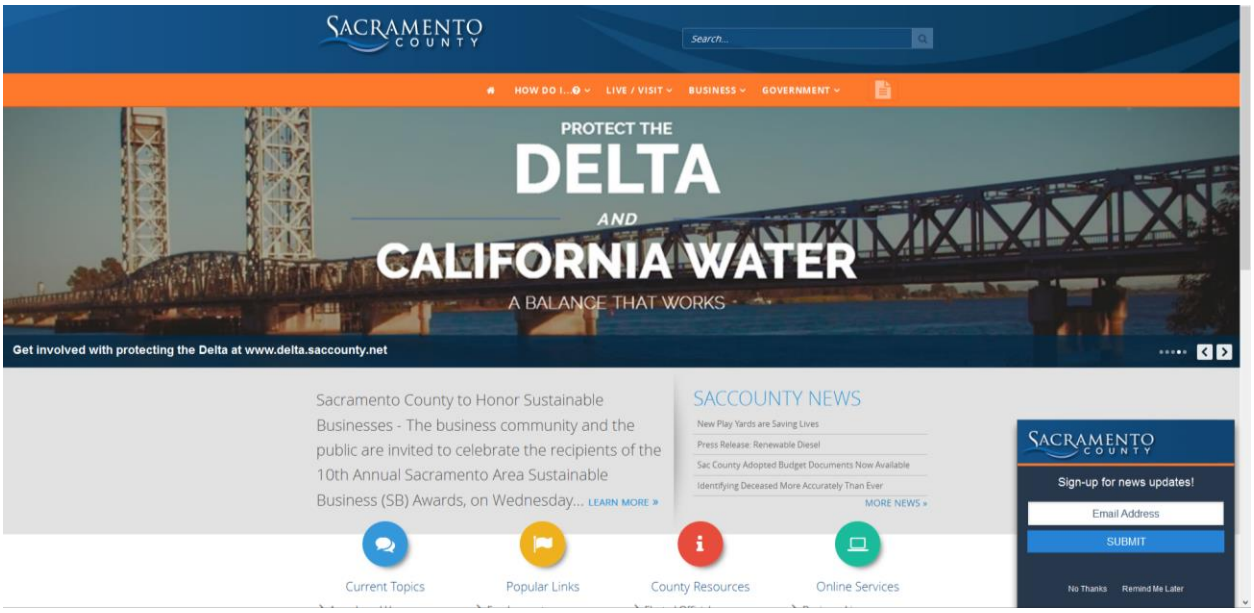
Sacramento County has structured its governmental organization to mitigate and respond to natural hazards. The discussion below highlights offices that have either direct or indirect responsibility for planning for or responding to natural hazards.

Office of Emergency Services

The Sacramento County Office of Emergency Services (OES) is the emergency management agency for Sacramento County. Sacramento County OES is headquartered in the City of Sacramento, the County seat. The office provides service countywide, in cooperation with cities and special districts, such as the fire department and law agencies.

OES also provides updated emergency-related information to the public on their website, SacramentoReady.org (shown in Figure 4-99). This site provides weather and flooding information, which includes guidance on protecting your home from winter storms, where to get sandbags, preparation for what to do before, during and after floods, etc. Also provided are links to national, state, and local information on fires, earthquakes, highway and road information, and general federal and state emergency information.

Figure 4-99 SacramentoReady.org Website



Source: www.sacramentoready.org

Agricultural Commission & Weights and Measures

The Agricultural Commissioner/Director of Weights and Measures monitors agriculture related commodities entering and exiting Sacramento Count. The agricultural division:

- Protects the public by enforcing pesticide laws and regulations, monitors applications for safety and environmental compliance, investigates pesticide related illnesses and complaints, and provides education to industry and the public on lawful pesticide usage.
- Monitors pest conditions and provides for the safe and efficacious control of those pests through issuance of restricted pesticide materials permits or alternative management methods.
- Monitors and facilitates the eradication of exotic pests harmful to California agriculture, including inspection of wholesale nursery stock and all plant material shipped to Sacramento through the postal, express and freight systems.
- Inspects plant products for export to a wide variety of foreign ports and issues export certificates required by importing countries.
- Collects and compiles crop and livestock statistics and prepares reports on crop damage and crop production.
- Manages the orderly burning of agricultural crop residues in an effort to allow the use of this important tool while minimizing the impact on urban areas, and works with producers to find alternative methods of agricultural waste removal.
- Administers the hazardous material storage inventory and carries out inspections of those facilities related to agricultural operations

County Engineering Department

Working with contractors, developers and homeowners we ensure safe and reliable construction projects, handle surveying for County projects and provide a call center that provides information to the community

about utilities and general service referral and takes reports of problems and routes them to the appropriate department. The Department of County Engineering includes the following divisions related to mitigation:

Building Inspection

The Building Inspection Department issues building permits and provides plan review and field inspection services for all private development building projects within unincorporated Sacramento County. Excluded are the cities of Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and Sacramento.

Infill Development Program

Infill development is the re-use of land or existing developed sites within an urban/suburban area. Infill development promotes better use of sites through reuse and repositioning of obsolete or underutilized buildings. Infill uses vital land left vacant during early development and contributes to community revitalization. Infill is representative of smart growth.

Infill development is valuable not only for the environmental benefits of using land more efficiently and directing growth into existing urbanized areas, but also the benefit that quality projects bring to neighborhoods and communities. Good infill conserves open space, helps to energize communities and contributes to jobs, housing and area sustainability.

The County of Sacramento joined the City of Sacramento in an Infill Home Plan Program in 2010. Established by the City of Sacramento, this program was developed to streamline the process for development of high quality single family homes in older neighborhoods and redevelopment areas.

Planning and Community Development

The Department of Planning and Community Development administers the County's land use and planning programs in the unincorporated area, including:

- County-wide, specific and community planning
- Specific and community planning
- Current Planning and zoning
- Community Planning Advisory Councils
- Planning Review

Water Resources

The Department of Water Resources provides drainage, flood control, water supply, rain and creek level information, regulation and permits, flood insurance program and stormwater management services to various service areas of unincorporated Sacramento County and the Cities of Citrus Heights, Elk Grove and Rancho Cordova.

Drought Capabilities

In September 2014, Governor Edmund G. Brown Jr. signed a three-bill package known as the Sustainable Groundwater Management Act. The legislation allows local agencies to customize groundwater sustainability plans to their regional economic and environmental needs. SGMA creates a framework for sustainable, local groundwater management for the first time in California history.

The three bills that make up SGMA are AB 1739 by Assembly Member Roger Dickinson, and SB 1319 and SB 1168by Senator Fran Pavley.

In September 2015, Governor Brown signed SB 13, by Senator Fran Pavley. The Bill makes various technical, clarifying changes to SGMA including requirements for groundwater sustainability agency formation, the process for State Water Board intervention if no responsible agency is specified for a basin, guidelines for high- and medium-priority basins, and participation of mutual water companies in a groundwater sustainability agency.

"A central feature of these bills is the recognition that groundwater management in California is best accomplished locally. Local agencies will now have the power to assess the conditions of their local groundwater basins and take the necessary steps to bring those basins in a state of chronic long-term overdraft into balance." –Governor Edmund G. Brown Jr.

The Sustainable Groundwater Management Act:

- Provides for sustainable management of groundwater basins
- Enhances local management of groundwater consistent with rights to use or store groundwater
- Establishes minimum standards for effective, continuous management of groundwater
- Provides local groundwater agencies with the authority, technical, and financial assistance needed to maintain groundwater supplies
- Avoids or minimizes impacts for land subsidence
- Improves data collection and understanding of groundwater resources and management
- Increases groundwater storage and removes impediments to recharge
- Empowers local agencies to manage groundwater basins, while minimizing state intervention

SGMA requires local agencies to establish a new governance structure, known as Groundwater Sustainability Agencies, prior to developing groundwater sustainability plans for groundwater basins or sub-basins that are designated as medium or high priority.

Flood Capabilities

FloodSAFE California

FloodSAFE is a multifaceted and collaborative statewide initiative to improve public safety through integrated flood management. A long-term initiative, FloodSAFE is focused on the following goals: 1) Reduce the chance of flooding, 2) Reduce the consequences of flooding, 3) Sustain economic growth, 4) Protect and enhance the ecosystems, and 5) Promote sustainability. FloodSAFE will accomplish these

goals through four types of activities: 1) improving emergency response, improving flood management systems, improving operations and maintenance, and informing and assisting the public.

Central Valley Flood Protection Plan

The Central Valley Flood Management (CVFMP) Program is one of several programs managed by DWR under FloodSAFE California (FloodSAFE), a multifaceted initiative launched in 2006 to improve integrated flood management in the State of California. The CVFMP Program addresses flood management planning activities within the Central Valley that require State leadership and participation.

The Central Valley of California has experienced some of the State's largest and most damaging floods. The existing flood management system, consisting of a number of projects (e.g., dams, reservoirs, weirs, levees, channels, bypasses and other features) individually constructed over the last 150 years, provides varying levels of flood protection. However, this legacy system is now characterized by aging infrastructure constructed using outdated techniques. This system is now relied on to provide benefits and levels of protection that were not envisioned when its elements were first constructed. As currently configured, the system is prone to erosive river forces, is easily distressed from high water, and does not support healthy ecosystem functions and natural floodplain habitats. Further, funding and other constraints have made it difficult to carry out adequate maintenance programs. At the same time, escalating development in the Central Valley floodplains has increased the population at risk and the potential for flood damages to homes, businesses, communities and critical statewide infrastructure. This increased vulnerability of the Central Valley to catastrophic floods threatens the life safety, property and the financial stability of the State. As a result, in 2008, the DWR embarked on the CVFMP Program, a long-term planning effort to improve integrated flood management within the Central Valley.

The 2012 CVRPP will have three primary elements: vision for flood management in the Central Valley, a framework for implementing future projects to achieve this vision, and initial recommendations for improvements. (Source: Central Valley Flood Protection Plan, Progress Report, January 2011)

Delta Planning Initiatives

The Sacramento-San Joaquin River Delta (Delta) and Suisun Marsh, collectively referred to as the Delta Region, is the largest estuary in the western United States. The Delta Region is home to numerous plant and animal species and is also the hub of California's water supply system. Key transportation, transmission and communication lines cross the region. The region also supports a highly productive farming industry.

A complex system of over 1,330 miles of levees in the Delta Region protects property, infrastructure and people. Levees also protect the region's water supply and ecosystem functions. According to the Delta Risk Management Strategy Plan, the Delta Region levees and the areas and resources they protect are not sustainable under business-as-usual practices.

To address these concerns, numerous initiatives are ongoing that focus on long-term management strategies for the region, including various actions for reducing the risks and consequences of levee failure in the region.

A summary of Delta Planning Initiatives are:

- Conveyance and Flood Risk Reduction
  - ✓ 1.1 Improved Delta Levee Maintenance
  - ✓ 1.2 Upgraded Delta Levees
  - ✓ 1.3 Enhanced Emergency Preparedness/Response
  - ✓ 1.4 Pre-Flooding of Selected Islands
  - ✓ 1.5 Land Use Changes to Reduce Island Subsidence
  - ✓ 1.6 Armored Pathway Through Delta Conveyance (modified PPIC "Armored Island" Concept)
  - ✓ 1.7 Isolated Conveyance Facility Alternatives
  - ✓ 1.8a San Joaquin Bypass
  - ✓ 1.8b San Joaquin River Widening

- Infrastructure Risk Reduction
  - ✓ 2.1 Raise State Highways and Place on Piers (similar to I-80 across Yolo Bypass)
  - ✓ 2.2 Construct Armored Infrastructure Corridor Across Central Delta

- Environmental Risk Mitigation
  - ✓ 3.1. Suisun Marsh Tidal Wetland Restoration
  - ✓ 3.2 Tidal Marsh Cache Slough Restoration
  - ✓ 3.3 Install Fish Screens
  - ✓ 3.4 Setback Levees to Restore Shaded Riverine Habitat
  - ✓ 3.5 Reduce water exports from the Delta

Table 4-107, prepared by the Sacramento County Department of Water Resources, summarizes Delta projects and plans to mitigate natural hazards in the Delta.

Table 4-107 Sacramento County Delta-centric Projects/Plans

Project Name	Responsible Agency/Department	Project Description/Intent	Target Due Dates
Bay Delta Conservation Plan (BDCP)	California Natural Resources Agency/State Department of Water Resources	The BDCP is being developed in compliance with the Federal Endangered Species Act (ESA) and the California Natural Communities Conservation Planning Act (NCCPA). When completed, the BDCP with provide the basis for the issuance of endangered species permits for the operation of state and federal water projects. The plan would be implemented over the next 50 years. BDCP staff now proposing a re-tooled public/stakeholder input process, lead by a ""Management Committee"" and augmented by 13 separate working groups (e.g., Governance, Levee Maintenance, BDCP Compatibility w/Agriculture, Stone Lakes National Wildlife Refuge, Conveyance Facility - size and configuration & Financing).	• May 18, 2011: 1st Management Committee convenes. Committee will meet every 2 weeks. • June 9, 2011: 1st Governance workgroup convenes. • 2013: Completion of the Plan still 2 years (approx) away. Monitor the revised schedule/workplan on the BDCP website.
The Delta Plan	7-Member Delta Stewardship Council (DSC)	The DSC must adopt and implement a comprehensive management plan for the Sacramento-San Joaquin Delta by January 1, 2012. This Delta Plan is intended to guide state and local agencies to help achieve the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The Delta Plan will also guide protection and enhancement of the unique resources, culture, and values of the Delta as an evolving place.	• Feb 14, 2010: Draft #1 released. • March 18, 2011: Draft #2 released. Sac Co. submitted written comments on April 15th. • April 22, 2011: Draft #3 released. Sac Co. submitted comments on May 6th. • June 13, 2011: Draft #4 released. Comments due to DSC by June 20th. • August 2011: Release of EIR for 45-day comment. • October 2011: Final draft of DP submitted to the Office of Administrative Law (OAL). • November 18, 2011: DSC will certify EIR and adopt the DP. • January 1, 2012: Delta Plan becomes law.

Project Name	Responsible Agency/Department	Project Description/Intent	Target Due Dates
The Delta Economic Sustainability Plan	Delta Protection Commission (DPC)	The Sacramento-San Joaquin Delta Reform Act of 2009 (SB7X 1) requires the DPC to develop an Economic Sustainability Plan (ESP) to be completed by July 1, 2011. The Plan will include, but not be limited to the following: (1) Public safety recommendations, such as flood protection recommendations; (2) A summation of economic goals, policies, and objectives consistent with local general plans and other local economic efforts, including recommendations on continued socioeconomic sustainability of agriculture and its infrastructure and legacy communities in the Delta; (3) Comments and recommendations to the Department of Water Resources concerning its periodic update of the flood management plan for the Delta; and (4) Identification of ways to encourage recreational investment along the key river corridors, as appropriate	• December 6, 2010: Report on Phase I (ESP Framework Study) presented to the DPC. • May 26, 2011: Status of Phase II (preparation of the Plan) presented to the DPC. • August 2011: Final ESP to be adopted.
The Primary Zone (PZ) Study	Delta Protection Commission (DPC)	The Sacramento-San Joaquin Delta Reform Act of 2009 (SB7X 1) requires the DPC to prepare and submit recommendations to the legislature regarding the expansion or change of/to the Delta Primary Zone (PZ). The key purpose of the PZ study is to define those areas of the Delta that contain viable agricultural, recreational, wildlife, and cultural resources that can be sustained into the future. Defining these unique Delta-related resources will be a key factor in the DPC's recommendations to the legislature. The 6 areas identified in the Reform Act include: Rio Vista, Isleton, Bethel Island, Brannan-Andrus Island, Cosumnes/Mokelumne floodway, and the San Joaquin /South Delta Lowlands.	• December 16, 2010: Consultant's recommendations presented to the DPC. DPC membership opted to defer/incorporate final recommendations into the forthcoming ESP. • January 14, 2011: DPC sent update/status letter to the Legislature.

Project Name	Responsible Agency/Department	Project Description/Intent	Target Due Dates
National Heritage Area (NHA) Establishment	Delta Protection Commission and Federal Legislation	Concurrent processes are occurring at the state and federal levels. The Delta Protection Commission as provided for in the Delta Reform Act (Water Code Section 85301(b)(1)) is using the services of a consultant to craft the basic framework of an NHA and requisite management plan. The initial stages of this process include a comprehensive public outreach and education component. At the federal level, Senator Feinstein's office is drafting legislation to "establish" NHA boundaries that will cover the legal Delta, the Suisun Marsh and the Yolo Wildlife Area/Bypass. The Delta NHA will be the first of its kind in California and will provide $10 million over 20 years to fund Delta enhancement projects/programs. The NHA designation will not affect water rights or usurp local land use authority	• Federal authorization (via legislation): Nothing pending. • DPC's consultant continues to work on feasibilty study as called for in the Delta Reform Act (WC Section 85301(b)(1)). • December 2011: Consultant's findings presented to DPC.
The Delta Strategic Plan	Delta Conservancy Board (DCB)	Per the Delta Reform Act, the DCB must prepare and adopt a strategic plan to achieve the goals of the conservancy. The plan will describe its interaction with local, regional, state, and federal land use, recreation, water and flood management, and habitat conservation and protection efforts within and adjacent to the Delta. The strategic plan must also establish priorities and criteria for projects and programs, based upon an assessment of program requirements, institutional capabilities, and funding needs throughout the Delta. The strategic plan must be consistent with the Delta Plan, the Delta Protection Commission's resources management plan, the Central Valley Flood Protection Plan, the Suisun Marsh Preservation Act of 1977, and the Habitat Management, Preservation and Restoration Plan for the Suisun Marsh.	• March 7, 2011: ExO, Campbell Ingram, hired. • March 16, 2011:Interim Strategic Plan (SP) adopted. • June 2011: Request for participation on five 5 SP workgroups (see DCB website). • December 2011: Adoption of final SP.

Project Name	Responsible Agency/Department	Project Description/Intent	Target Due Dates
FEMA Mapping	County Water Resources	In 2006 FEMA began a nationwide process to update all Flood Insurance Rate Maps(FIRMs) including review of all levees which were previously certified to provide 100-year protection. Intent is to verify that original levee certification is valid and document basis of certification. Levee maintaining agencies were required to provide the original levee certification documentation, or new engineering analysis, to recertify the levees. Agencies providing sufficient initial information on maintenance could receive provisional accreditation. Ultimately, all levee maintaining agencies must provide sufficient information to fully certify their levees. Otherwise, these levees are to be decertified by FEMA and areas behind those levees will be mapped in the 100-year floodplain. The maps are scheduled to become effective in February 2012 (+/-) depending on public comments, which are due in August 201	• September 2010: FEMA released Preliminary Draft Flood Maps • October 2010: County staff meeting with FEMA to identify major issues/comment • Dec 2010/Jan 2011: FEMA to hold final public meeting • Jun-Aug 2011: 90 day public appeal period/public meetings in affected communities • March 2012: Final adoption of new FEMA maps.
Central Valley Flood Protection Plan	CVFPP 200 year Floodplain Standard; State Department of Water Resources	The Central Valley Flood Protection Plan (CVFPP) is part of a larger Central Valley Flood Management Planning Program intended to develop a sustainable, integrated flood management plan for areas protected by facilities of the State-Federal flood protection system in the Central Valley. State legislation in 2007 (SB5, SB17, AB5, AB70, AB156) aimed at addressing the problems of flood protection and liability and helping direct use of bond funds also set strict regulation on cities and county to assure that homes are not being built at risk of flooding in the 200-year flood. These regulations take effect 24 months after the Central Valley Flood Protection Plan is adopted. At this time the engineers are working on the 200-year maps and the regulations. A public outreach meeting is scheduled for June 21, 2011 to discuss "FloodSafe" building standards. The CVFPP is scheduled to be published in December 2011, with adoption for follow in June 2012.	• July 1, 2012: CVFPP plan is to be adopted with 200-year flood maps scheduled to be published. • July 1, 2014: County General Plan must be updated to reflect new 200-year standard. • July 1, 2015: County Zoning Code must be updated to reflect 200-year standard. New 200-year standard becomes effective.

Source: Sacramento County Department of Water Resources

Levee and Streambank Erosion Capabilities

Throughout the Central Valley, levees provide essential protection for both urban and rural lands, preventing possible catastrophic flooding and loss of life. On February 24, 2006, following sustained heavy rainfall and runoff, Governor Arnold Schwarzenegger declared a State of Emergency for California's levee system, commissioning up to $500 million of state funds (AB142) to repair and evaluate State/federal project levees. This declaration was a necessary step in preventing possible catastrophic consequences of hurricane Katrina-like proportion.

Following the emergency declaration, Governor Schwarzenegger directed the California Department of Water Resources (DWR) to secure the necessary means to fast-track repairs of critical erosion sites. In addition, California's lengthy environmental permitting process was streamlined without compromising the protection of the important aquatic and terrestrial species inhabiting the river's ecosystem.

Repairs to State/Federal project levees are being conducted under the Levee Repairs Program funded by Section 821 of the Disaster Preparedness and Flood Prevention Bond Act of 2006 (Proposition 1E).

To date, nearly 300 levee repair sites, many of which are in Sacramento County, have been identified, with more than 100 of the most critical sites having already been completed with AB142 funds. Repairs to others are either in progress or scheduled to be completed in the near future, and still more repair sites are in the process of being identified, planned, and prioritized.

California Levee Database

California has over 13,000 miles of levees that protect residential and agricultural lands. The levee failures resulting from hurricane Katrina prompted the State and the Department of Water Resources (DWR) to initiate development of a state-of-the-art California Levee Database (CLD) for the purpose of better understanding and managing levees in California. The CLD is an efficient tool for assessing levee reliability risk factors using a GIS-enabled geospatial database.

Starting in 2005, partnering with the Federal Emergency Management Agency (FEMA) under the auspices of FEMA's Map Modernization Management Support program, the Department has started assembling critically needed levee information on ownership, location, and risk assessment factors for all the levees in California. Recognizing that other agencies are engaged in similar efforts, DWR is actively participating on national committees organized by FEMA and the U.S. Army Corps of Engineers (USACE) to ensure compatibility and coordination with other national efforts.

Currently, the California Levee Database has location information for more than 10,000 miles of levees and flood control structures throughout California. Major features of the CLD include

- Levee centerlines for both State-Federal project levees and non-project levees. The project levees use surveyed levee centerlines from USACE's National Levee Database.
- Boundaries, such as those of levee districts, state levee maintenance area, cities, federal congressional districts, state assembly districts, and hydrologic sub-basins.
- Feature locations, such as those of boreholes, burrow sites, cross sections, encroachments, high water marks, levee stress, levee failures, and levee relief wells.

These features are continuously refined and populated for all identified levees in California. Additionally, web-based levee profile viewer, levee information viewer, and technical resources viewer will be developed and released to public in the near future.

Natomas Levee Improvement Project

In December 2008, Natomas was mapped into the FEMA 100-year floodplain. SAFCA's efforts have been to restore at a minimum a 100-year level of protection, while working toward 200-year level of protection. SAFCA, in partnership with DWR and the CVFPB, began constructing levee improvements in 2007 in advance of the full authorization of the federal project, with the expectation of receiving credit for such work towards the non-federal share of the authorized project. SAFCA's work included levee improvements along the Natomas Cross Canal and the upper reaches of the Sacramento River levees in Natomas. With passage of the Water Resources Reform and Development Act of 2014, USACE is taking the lead on completion of the remaining components of the NLIP. USACE' FY 2014 Work Plan includes $1.0 million for preconstruction engineering and design work for the Natomas Common Features. USACE will commence construction of levee improvements along the southern and eastern portions of the Natomas Basin leading to 100-year and 200-year levels of flood protection over time. This estimated authorized project cost is approximately $1.1 billion.

American River Common Features

Currently, SAFCA and its partners are studying what improvements are needed to meet a 200-year standard of protection for Sacramento's levee system. These improvements will be identified in a report to be produced by USACE called the Common Features General Re-evaluation Report (GRR). This GRR will identify future improvements to the levee system to meet the goal of 200-year level flood protection and address erosion protection, vegetation, seepage, and access requirements. The levee systems being reviewed are the American River levees, the Sacramento River levees downstream of the American River, and the north area streams (Natomas East Main Drain Canal, Magpie Creek Diversion Channel, and Arcade Creek).

SAFCA expects the final report to be complete in late 2015. Until the report is complete, USACE will continue to strengthen various portions of the American River levee system over the next year, work that should be completed by the time the GRR is completed. Current authorization is $280 million. After the study, it is expected that the authorization project will cost over $1.5 billion.

Folsom Dam Modifications/Joint Federal Project (JFP)

This joint federal project consists of a six-gated control structure, a 2,100-foot auxiliary spillway with a stilling basin, and an approach channel in the reservoir leading to the control structure. The auxiliary spillway design can be used for flood control as well as ensuring dam safety. As a result of its joint purpose, portions of these improvements were being constructed by the Bureau, which has completed Phase 1 and Phase 2. The two phases of work almost finished the spillway. USACE in 2010 awarded Phase 3 (construction of the control structure itself) with approximate cost of $220 million. Work on Phase 3 was completed in 2015. Phase 4 (the last part needed for flood control) was awarded in 2013 with a completion of all flood control features to be done in late 2016. Total project cost is estimated at $810 million.

Folsom Dam Raise Project

The Folsom Dam Raise project will raise the height of the dikes around Folsom Lake by about 3.5 feet. Construction on this project will begin sometime around 2017 based on the progress of the JFP. The implementation of the JFP and the Dam Raise, along with downstream levee improvements, will give the City greater than 200-year level of flood protection along the American River. The Raise project should be complete in 2021/2022. The estimated project cost is $122 million.

South Sacramento Streams Group

This project is complete downstream of Franklin Boulevard. The Union Pacific Railroad embankment was completed at the end 2012. The Florin Creek Channel Project and Florin Creek Multi-Use Basin Project are expected to begin in 2016 to provide channel improvements and construct a detention basin. These projects will allow the 100-year flood event to be non-damaging to surrounding properties.

Sacramento River Bank Protection Program (Sac Bank)

USACE receives yearly appropriations to implement the Sac Bank program, which addresses erosion issues. As a result, erosion repair work occurs yearly along the river system. Over the last several years, the Sacramento area has had an average of three to four sites a year repaired, averaging over $2 million per year.

Regional Planning

DWR launched the Regional Flood Management Plan (RFMP) effort to assist local agencies to develop long-term regional flood management plans that address local needs, articulate local and regional flood management priorities, and establish the common vision of regional partners. DWR is currently providing the funding and resource support to help develop phase 2 of the regional plans consistent with the 2012 CVFPP. There are six regions; and when the regional plans are completed, DWR will incorporate feasible components of the regional plans in the 2017 CVFPP update.

The County Department of Water Resources – Drainage Department tracks areas of erosion troubles and mitigates, to the extent possible, the root causes of erosion. These are shown on Table 4-108.

Table 4-108 Unincorporated Sacramento County Erosion Areas and Responses

Address	City/Area	Work Requested
6809 Thunderhead Cir	Orangevale	"Remove (7) trees from the south side of Arcade Creek 11H12. - One down tree, 30"" diameter, obstructing flow. - Six trees, <4"" DBH, accelerating erosion and reducing channel capacity. Trees reside on Orangevale Park District's property (APN 259-0310-024-0000). Note: Work request originated from service request call from 8094 Chipwood Way, with the homeowner complaining about erosion beneath his deck."

Address	City/Area	Work Requested
4843 Holyoke Way	Sacramento	"Remove tree obstructing outfall 360-185-C13. Tree permit 9144-11 attached. Tree can be left onsite for tenant use (at 4970 Walnut Ave). Redefine channel extending from outfall 360-185-C13 to west fence of 4843 Holyoke Way. Place riprap (4" angular) from outfall to approximately 5 feet beyond west fence. Riprap shall be underlain with geotextile fabric. Channel dimension should be approx. 3 feet wide and 1 foot deep. Weld two rebar grates with vertical bars spaced at 4 - 6 inches for allowing the flow to pas beneath the fences, attach to fence or anchor in soil. "
11917 Pyxis Cir	Rancho Cordova	"Place erosion control at outfall 316-218-C01 consisting of quarry rock 12-18 inches in diameter. Rock shall be underlain with a non-woven geotextile fabric. Erosion control shall be approximately 8 feet wide, extending 10 feet from the spillway structure. Down trees can remain, however, trees should be moved outside of stabilized area and left as wildlife habitat. "
4970 Walnut Ave	Sacramento	"Place and install riprap from outfall 360-185-C15 to 15' downstream of pipe. Rock should be 4"" angular quarry and underlain with geotextile fabric. Excavate soil to retain original channel capacity. Channel dimensions should be approximately 3' wide and 1' deep. NOTE: Originated from service request concerning runoff from Walnut Ave."
4632 Teal Bay Ct	Antelope	"Please clear and remove the vegetation and debris from the flowline of Sierra Creek 55P17. Find and expose outfall 378-182-C07 (12"" RCP). Place 4"" angular quarry rock from outfall and extend rock 3' out. Clear vegetation surrounding 378-182-436 (12"" CMP, open-end pipe), and install flared end. Note: This work request originated from a service request concerning street flooding and ditch maintenance."
5420 Marmith Ave	Sacramento	"Place riprap on the west side of Arcade Creek segment 11C01 to re-establish the slope toe near the southeast corner of 5420 Marmith Ave. Place 12""-14"" diameter angular quarry rock along slope toe. Rock should be underlain with a few layers of 2""-3"" diameter angular drain rock atop a geotextile fabric. Riprap should cover an area of 30' along creek alignment and 2' up slope. Approximately 5 cubic yards of rock will be required. Note: Work request originated from service request concerning erosion near corner of residence."
7445 20th St	Rio Linda	"Remove channel obstructions consisting of woody vegetation, down trees up to 2' in diameter, and shrubby snags from flowline of 27C08. Property owner is experiencing increased erosion as a result of the channel obstructions. Currently, material in the flowline forms an approximately 3' high dam which will impede flows and accelerate erosion. Mr. Kenning and Ablang met with property owner on 3/1/13. This request originated from Mr. S. Pedretti."
500 Ethan Way	Sacramento	"Near D-05 Howe Ave Pump Station. Place and install riprap from newly constructed berm to approximately 30' northwest (to the point where the ditch meets and levels out into the basin). Rock should be 4" - 6" angular quarry rock and underlain with geotextile fabric. Excavate soil to retain original ditch capacity. Maintain current grade. Facility map, aerial, and photos are attached. Note: The recent JOC project at D-05 constructed a concrete berm on the west side of the channel. This work request will help protect the existing ditch adjacent to this new berm."

Address	City/Area	Work Requested
2230 Arden Way	Sacramento	"Please remove the existing failed concrete panel sections (two locations, east and south of 2230 Arden Wy). Excavate and remove loose soil and vegetation from behind and near failed concrete sections. Exposed areas should be seeded and finished with high-quality turf reinforcement mat (Western Excelsior's Excel PP5-12 Permanent Turf Reinforcement Mat) and long-term synthetic wattle at toe. Secure Excel PP5-12 mat in place per manufacturer's specifications. Gaps between remaining panels and slope should be closed with concrete to prevent further undermining and erosion. Use BMPs (including sandbags), as necessary, to mitigate environmental impact. Facility map, photos, VRF, and Western Excelsior Erosion Control Blanket installation instructions are attached. "
9373 Winding Oak Dr	Fair Oaks	"Please re-build and widen the access road to allow for vehicular access and install riprap on the west side of Fair Oaks Stream Group 25MM1 to prevent further erosion. Work extents should be limited to 50' in length. Location is near the tennis courts, see attached aerial photo. Excavate soil along eroded area until firm and suitable soil is reached. Dig a trench at the toe to key-in the riprap. The key at the toe should be at least 2' deep. Cut benches angled slightly into the slope prior to placement. Benches should roughly parallel slope contours. Place 12"-14" diameter angular quarry rock, underlain with 2"-3" diameter angular quarry rock atop a geotextile fabric. Material should be placed in lifts not exceeding 12". See attached photos, facility map, VRF documentation, and easement information. NOTE: Work request originated from Park request concerning erosion and loss of their access road towards the north portion of the parcel. This work request will help alleviate concerns with the lack of access in regards to our drainage maintenance, Park's maintenance activities, fire abatement, and firefighter access."
5543 Locust Ave	Carmichael	"Install approximately 30LF of riprap to the north side of Arcade Creek 11N05, immediately downstream of outfall 356-188-C10, to mitigate undercutting at the creek toe. Rock should be 8"-12" diameter angular quarry rock, and underlain with a few layers of 2"-3" diameter angular gravel atop a geotextile fabric. Rock will need to cover an area approximately 30' L x 2' H x 2' W. See attached facility map, photos, Right-of-Entry, and VRF documentation. Take post-construction photos. NOTE: This work request originated with the homeowner's concerns regarding erosion along this creek stretch and drainage maintenance responsibilities. Homeowner has aggressively been pushing County to perform maintenance work."
10345 Peter A McCuen Blvd	Mather	"Please install rip-rap erosion protection from outfall 326-197-C12 extending to Morrison Creek 13QQ1. Excavate to suitable soil, and re-compact. Geotextile fabric shall be be placed over soil prior to rip-rap placement. Rip-rap placement should be balanced equally on both sides of pipe. Utilize 6"-10" diameter angular quarry rock, underlain with a few layers of 2"-3" diameter angular drain rock. NOTE: Originated from grizzly investigations."
9160 Madison Ave	Fair Oaks	"Install approximately 50LF of riprap to the south side of Fair Oaks Stream Group 25MM2, alongside parking lot adjacent to tennis courts. Rock should be 8"-12" diameter angular quarry rock, and underlain with a few layers of 2"-3" diameter angular gravel atop a geotextile fabric. Rock will need to cover an area approximately 50' L x 4' H x 3' W. See attached facility map, photos, and VRF documentation. Also, please remove two palm trees from flow line. NOTE: This work request originated with Rollingwood Commons' concern with erosion potentially compromising their parking lot."
4647 Winding Way	Sacramento	"Please backfill & compact eroded soil areas underneath and around existing concrete panel erosion protection at outfall 356-182-C03. Seal newly backfilled & compacted soil with additional new concrete. Placement of new concrete should overlap 12" on existing concrete, cover new soil, and extend 12" beyond to cover existing stable non-eroded soil. Note: This issue was identified during routine outfall grizzly inspection."

Address	City/Area	Work Requested
9160 Madison (B) Ave	Fair Oaks	"Repair existing headwall by placing Class B-2 concrete in voids on upstream and downstream sides of headwall. Also, place concrete in void under the headwall through a hole in the outfall pipe. Install 8-12"" quarry rock underlain with a few layers of 2-3"" diameter angular gravel atop a geotextile fabric. Rip rap should extend 5' upstream and downstream of headwall. Smooth transition to natural side slopes.
6809 Thunderhead Cir	Orangevale	"Please reset undermined and disconnected 10"" outfall pipe 372-212-C12. Trim vegetation overgrowth to allow for access to pipe, and also to clear flowpath from outfall pipe to main invert of Arcade Creek. Install rip-rap erosion protection at outfall pipe. This land is owned by Orangevale Recreation & Park District (OVRPD). Access to this work location shall be made on foot only (no motorized vehicles) via open land adjacent to 6809 Thunderhead Circle. Trimmings shall be removed from OVRPD property. Note: This issue was discovered during routine grizzly inspection."
5432 Olympic Way	Sacramento	"Please provide erosion control surrounding outfall 370-188-C42 and inlet structure 370-188-R04. Remove existing debris and unsuitable soil, and compact native material. Place 8-12"" angular rock underlain with a few layers of 2-3"" diameter angular rock atop a geotextile fabric. At R04, work shall extend approximately 6' on both sides of the pipe and 3-4' into the creek. At C42, work shall extend throughout the undermining areas below the outfall.
4336 Poseidon Ln	Sacramento	"Perform erosion control along southerly bank nearest the west corner of the house. Remove unsuitable soil, backfill, and compact to create a 1:1 slope. Place 8-12" angular rock underlain with a few layers of 2-3" diameter gravel atop a geotextile fabric for approximately 25'-30'. During construction, please make efforts to streamline the top and toe of bank upstream and downstream of the erosion. Please remove silt bars on the northerly bank of the creek to help minimize future erosion.
5151 Myrtle Ave	Sacramento	"Please perform the following work: 1. Reset disconnected outfall pipe at 360-185-C09 (24"" RCP). 2. Install rip-rap around outfall pipe C09 to prevent erosion from causing pipe to disconnect again. 3. Clear and remove heavy vegetation D/S of outfall pipe C09 in short tributary creek segment 11RR1. Access to C09 can be made via apartment complex parking lot at 5151 Myrtle Ave. Note: This issue was discovered routine grizzly inspection."
4990 Walnut Ave	Sacramento	"Perform erosion control along westerly bank on the north side of the property at the bend about 150' downstream of the box culvert. Remove unsuitable soil, backfill, and compact to create a 1:1 slope. Place 8-12" angular rock underlain with a few layers of 2-3"" diameter gravel, 1 1/2" gravel could also suffice, atop a geotextile fabric for approximately 20'. During construction, please make efforts to streamline the top and toe of bank upstream and downstream of the erosion.
4513 North Ave	Sacramento	"Fill void at outfall 348-182-C03 with concrete. Note: SR#24463 P.O. is concerned about erosion under outfall. Soukup reported small void about 6 ft deep under structure, see picture."
4904 Manzanita Ave	Carmichael	"Please repair undermining and erosion around outfall pipe 360-191-C03. Access to work location can be made via 2214 padlock & chain on temporary fencing adjacent to outfall pipe. Since the property is undeveloped, the PO (Rev. Sands; Church of the Holy Trinity) does not need to be notified prior to performing repairs. Note: This issue was discovered during routine grizzly inspection duty by DME staff."
9411 Wiltshire Way	Orangevale	"Please install erosion protection at the outfall to Linda Creek from the detention basin located at Wiltshire Wy and Main Ave. Please repair an 8' by 8' area at the end of the concrete channel by removing all unsuitable soil, backfilling and compacting with native soil, and then placing 4-6" angular rock atop a geotextile fabric."

Address	City/Area	Work Requested
7231 Lincoln Ave	Carmichael	"Please remove debris, vegetation, and CMP culverts with in flowline of creek segment 63F21 (see attached photos and facility map). In addition, please correct grade of creek by re-establishing flow line and stabilize bank erosion using native material and angular rock. Work should be completed after bird nesting season, and can be performed between, 9/15/16 - 10/15/16. Equipment access via 4310 Hussey Dr. Please see attached facility map, ROEs, photos and VRF. NOTE: Work request originated from owner concern of bank erosion encroaching on day care playground."
4310 Hussey Dr	Carmichael	"Please place angular rock along bank (approx. 25 sqft) to mitigate for erosion encroaching on homeowner's patio. Also remove downed tree and existing tree near creek bank. Existing tree could potentially fall causing further erosion. Please complete work in conjunction with 7231 Lincoln Ave work request. Note: Work Request originated from owners concern of bank erosion encroaching on patio."

4.4.2. Sacramento County's Administrative/Technical Mitigation Capabilities

Table 4-109 identifies the County personnel responsible for activities related to mitigation and loss prevention in the County.

Table 4-109 Sacramento County Administrative/Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	Y	Every five years hazards are reviewed by committee of officials from Countywide departments Planning, Stormwater, Agriculture, Transportation and more. Mitigation is planned and recorded.
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Drainages throughout the County are cleared during routine maintenance, and inspected and cleared immediately before storms. Fire fuel (vegetative litter) is cleared though a grant funded program to prevent wildfires.
Mutual aid agreements	N	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y FT	
Floodplain Administrator	Y FT	There are five CFM in DWR and all staff are knowledgeable with the Floodplain Ordinance. Coordination between departments is effective and is ongoing for all permitted uses in the floodplain.
Emergency Manager	Y FT	

Community Planner	Y FT	
Civil Engineer	Y FT	County DWR –drainage unit has six staff that are licensed Civil Engineers whom are all educated in hazards & mitigation. Staffing is adequate.
GIS Coordinator	Y FT	
Other		
Technical	**Y/N**	**Describe capability Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)		
Hazard data and information	Y FT	
Grant writing	Y FT	
Hazus analysis		
Other	Y	Dam Failure
How can these capabilities be expanded and improved to reduce risk?		

4.4.3. Sacramento County's Fiscal Mitigation Capabilities

Table 4-110 identifies financial tools or resources that the County could potentially use to help fund mitigation activities.

Table 4-110 Sacramento County Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Sacramento County has a Storm Water Utility that serves to make improvements to the existing storm drainage systems. The Sacramento County Water Agency has trunk drainage developer impact fee programs that fund installation of drainage systems serving 30(+) acre watershed.
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas, or electric services	Y	
Impact fees for new development	Y	
Storm water utility fee		

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	Y	
Community Development Block Grant	Y	
Other federal funding programs	Y	DMA, have been used to mitigate flood risk through home elevations and acquisitions. These programs have been successful and will be applied in the future when available.
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

4.4.4. Mitigation Education, Outreach, and Partnerships

Table 4-111 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 4-111 Sacramento County Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Non-profits such as La Familia, WIC (Dept of Public Health) and food programs exist that could be used to implement mitigation activities or communicate hazard information. They currently are not being used in this capacity. Other groups such as the Environmental Justice Coalition for Water could assist.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes.	Non-profit organizations and government agencies Countywide do ongoing public education for preparedness on the topics of fire, flood and water use.
Natural disaster or safety related school programs		
StormReady certification	Yes	The County maintains a StormReady program and does public outreach regularly though radio, website, local events and the County's public counter.
Firewise Communities certification		

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Public-private partnership initiatives addressing disaster-related issues	Yes	Capital Region Climate Readiness Collaborative could be used to inform mitigation activities and communicate hazard-related information.
Other		
How can these capabilities be expanded and improved to reduce risk?		
Social media to connect with most vulnerable populations in various languages (some rural areas don't have broadband, many do not watch tv/cable to get messages) Coordinate with public and mental health departments, service providers and organizations in providing information and utilizing their communication tools to connect with clients 2-1-1 is an effective resource in some areas but not all. Need to make it more robust so people know to use it and that it has reliable and timely information. Utilize neighborhood associations, schools, community watch groups to distribute information. Utilize "NextDoor" site to convey information		

Sacramento County works cooperatively and has many mutual aid agreements in place with various federal, state, and local agencies, groups, and districts. Examples include the U.S. Forest Service, Cal Fire, the California Department of Water Resources, Bureau of Reclamation, National Weather Service, the State Regional Board, CALFED, and the Delta Planning Commission.

Delta Planning Commission

The Delta Planning Commission is charged with the protection of the Delta, both in areas inside and outside of Sacramento County. The mission of the Delta Protection Commission is to adaptively protect, maintain, and where possible, enhance and restore the overall quality of the Delta environment consistent with the Delta Protection Act, and the Land Use and Resource Management Plan for the Primary Zone. This includes, but is not limited to, agriculture, wildlife habitat, and recreational activities. The goal of the Commission is to ensure orderly, balanced conservation and development of Delta land resources and improved flood protection.

The Planning Commission has released many studies and plans related to protecting the people and property in the Delta. Examples of these include:

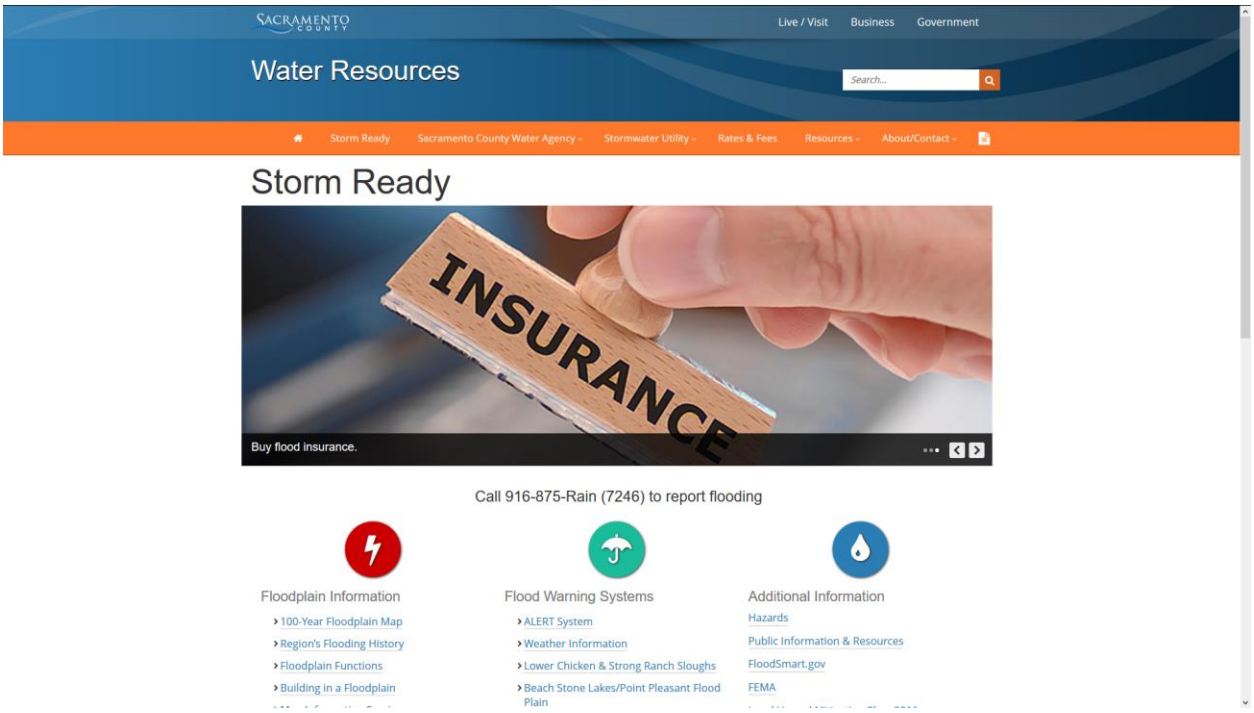
- The Economic Sustainability Plan
- Primary Zone Study
- Land Use and Resource Management for the Primary Zone of the Delta
- Strategic Plan 2006-2011
- Strategic Plan 2008-2009 Tasks
- Annual Reports

StormReady

Overview

Sacramento County Department of Water Resources' annual outreach program informs and educates residents within the unincorporated county and Rancho Cordova about being storm-ready. The homepage is shown in Figure 4-100.

Figure 4-100 StormReady Website



Source: http://www.msa.saccounty.net/waterresources/stormready/

Flood Maps

The County of Sacramento and the City of Sacramento have prepared various detailed maps showing hypothetical levee breaks, inundation levels and the time it would take for waters to rise in affected neighborhoods, and rescue and evacuation zones. The maps come in pairs.

- Flood Depth Maps: show where the water would flow over time and how deep it would get given the hypothetical flooding scenario.
- Rescue and Evacuation Route Maps: show rescue areas, evacuation areas, and potential evacuation routes.

In addition to augmenting the evacuation plan, the StormReady website shows evacuation and flood maps by area. Example maps are shown in Figure 4-101 and Figure 4-102. There are 18 areas in the County for which flood depth and evacuation maps are available:

- Arcade Creek 1

- Arcade Creek 2
- Arden
- Campus Commons 1
- Campus Commons 2
- CSU Sacramento
- Downtown 1
- Downtown 2
- Goethe
- Mayhew
- Natomas 1
- Natomas 2
- Natomas 3
- Natomas 4
- Natomas 5
- Pocket
- River Park
- South Sacramento

Figure 4-101 Arcade Creek 1 Flood Depth Map

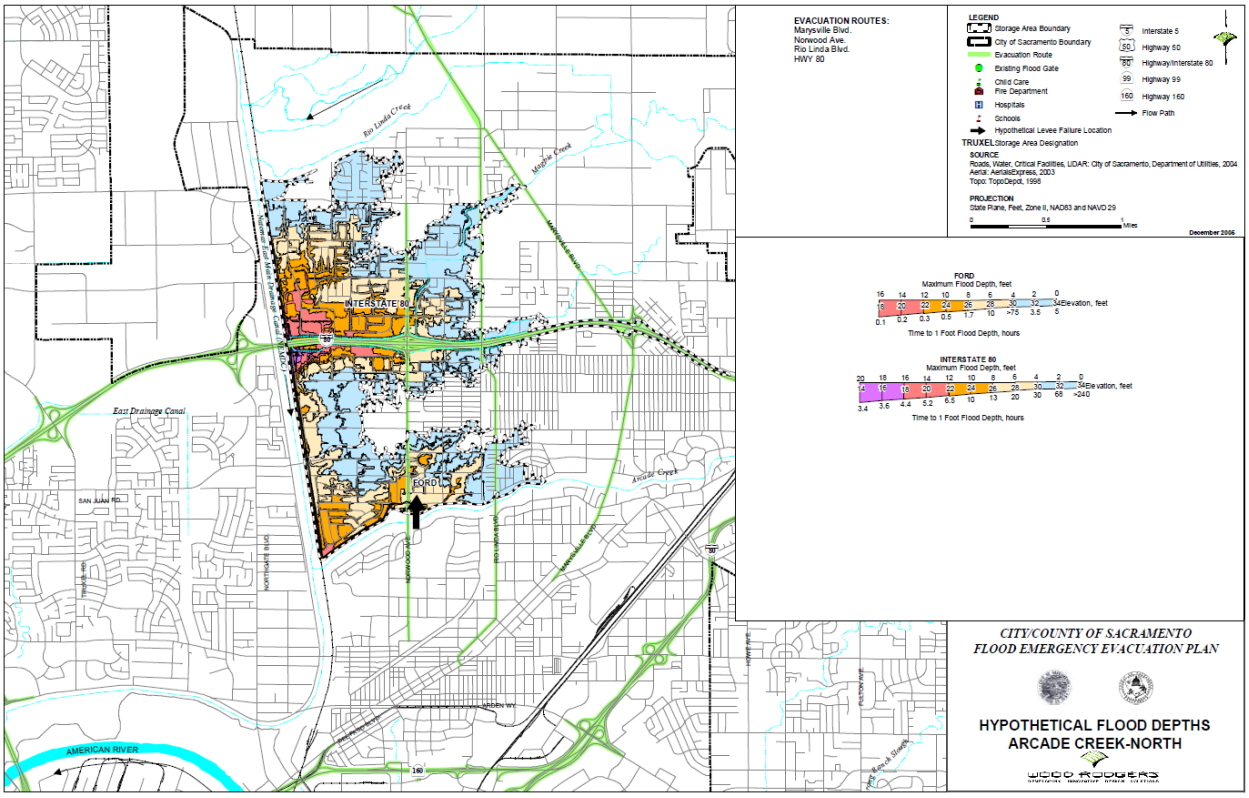
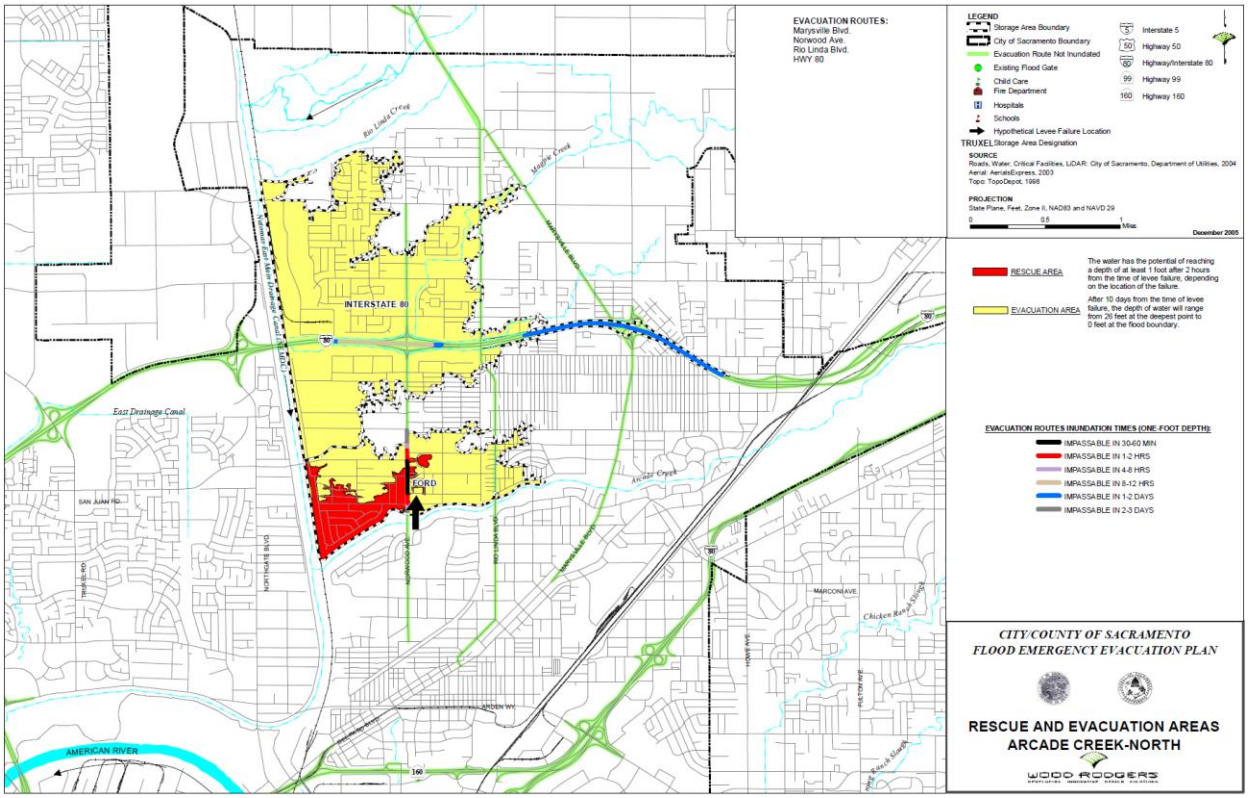


Figure 4-102 Arcade Creek 1 Flood Evacuation Map



4.4.5. Other Mitigation Efforts

Section 2 What's New details mitigation projects implemented since the 2011 plan. The County also has many planned and ongoing projects focused on minimizing future losses associated with identified hazards. Many of these projects are sponsored and implemented by one or more County departments and/or other state and local agencies and organizations. Current projects include those listed below in this section.

The County noted some flooding projects that have been completed since 2010:

- Bridge replacement on Vineyard Road at Laguna Creek – the bridge was raised by several feet over the creek.
- First phase of road improvements on El Camino Avenue – added larger storm drain pipes and extended drain inlets to better pick up neighborhood storm drain run off.
- Freedom Park Drive – this roadway reconstruction added drainage swales to absorb storm runoff into landscaped area before going into storm drain pipes with the goals of filtering waters to do run to creeks and reducing flows into creeks. The reduced runoff lessens flooding concerns.

Future County projects planned to improve flooding issues include:

- Bridge replacement on Elk Grove-Florin Road at Elder Creek – the bridge will be raised by several feet over the creek.

- Michigan Bar Bridge replacement at the Consumnes River – the bridge will be raised by about a foot over the river.
- Second phase of road improvements on El Camino Avenue – will add larger storm drain pipes and extended drain inlets to better pick up neighborhood storm drain run off.

SAFCA and the Sacramento County Airport System drained rice fields next to the Sacramento Airport. This was done to reduce the population of migrating waterfowl near the airport runways and in the Airport Runway Protection Zones.

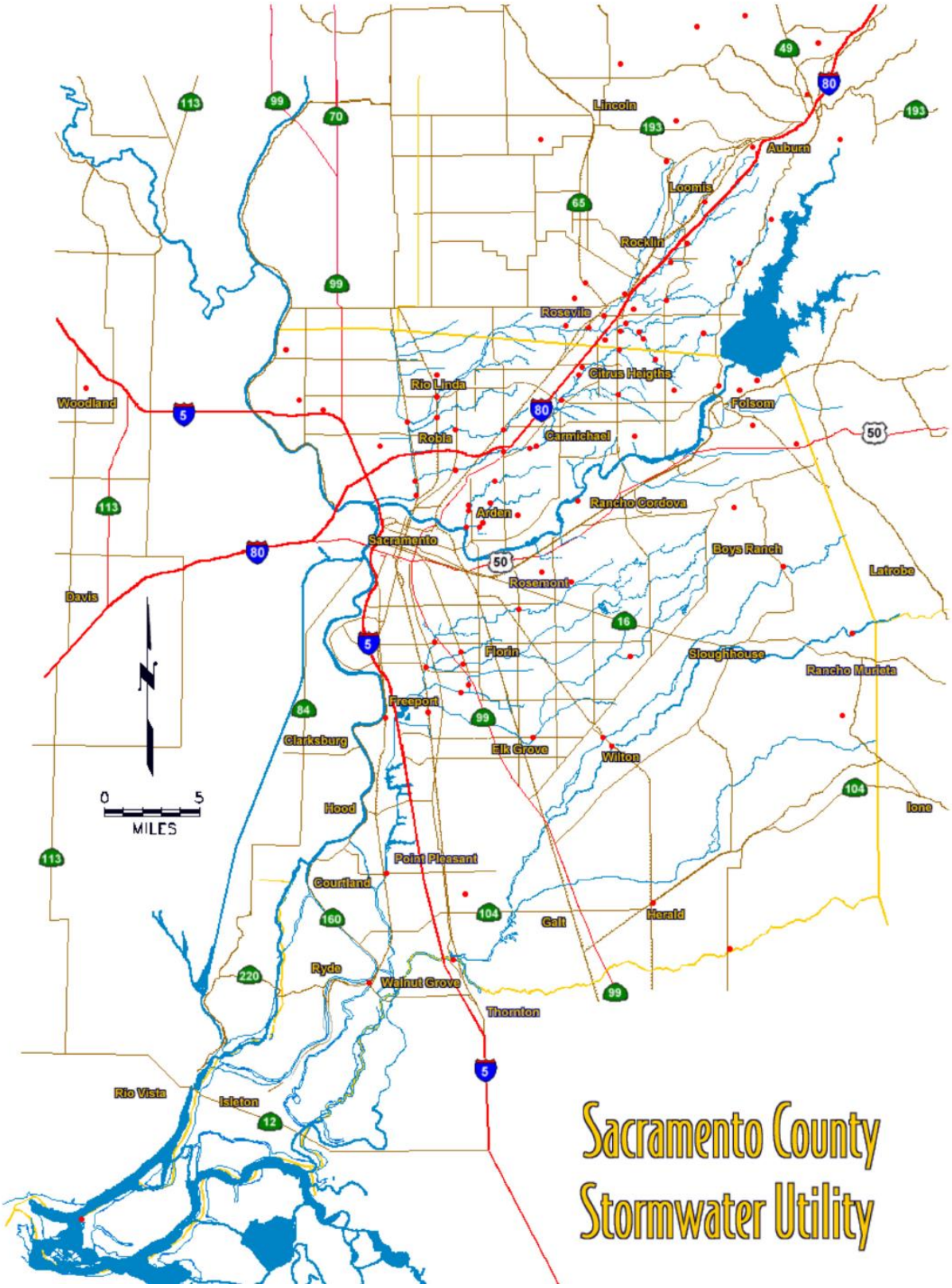
The Bureau of Reclamation, in cooperation with California State Parks, the Sacramento Metropolitan Fire District and the Sacramento Regional Conservation Corps (SRCC), recently began implementing a fire fuels reduction project along Lake Natoma's shoreline and adjacent to private property on Monday, May 23, 2011. The work is expected to continue through mid-June. The purpose of the project was to reduce flammable vegetation along Lake Natoma's boundary to help mitigate the risk of wildfire. The work will be accomplished by SRCC crews and was made possible by grant funding obtained by the SRCC. Crews removed dead vegetation and excessive foliage within 50 to 100 feet of property boundaries. The amount of vegetation removed varied based on its density in different areas. In some locations, minimal work was be needed, while other areas will require the removal of a noticeable amount of foliage. The project minimized the removal of mature native trees focused on removing non-native trees and shrubs.

The State of California has mitigation effort and actions undertaken as part of the California State Hazard Mitigation Plan that have direct impacts on mitigation efforts in Sacramento County. These programs include:

- The Delta Risk Management Strategy document
- Levee Evaluation and Repair (along the Sacramento and San Joaquin River valleys and the Delta)
- Initiation of the California Levee Database
- An Aerial Levee Survey Project
- Levee Flood Protection Zones (see Figure 4-47)

ALERT Gages–Sacramento County Department of Water Resources maintains many ALERT gages throughout the County. There are 50 stream gages and 59 rainfall gages that monitor flooding and potential flooding conditions throughout the County. These are shown on Figure 4-103.

Figure 4-103 Sacramento County ALERT Gage Locations



Chapter 5 Mitigation Strategy

Requirement §201.6(c)(3): [The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section describes the mitigation strategy process and mitigation action plan for the Sacramento County Local Hazard Mitigation Plan Update. It describes how the County and participating jurisdictions met the following requirements from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

5.1 Mitigation Strategy: Overview

The results of the planning process, the risk assessment, the goal setting, the identification of mitigation actions, and the hard work of the Hazard Mitigation Planning Committee (HMPC) led to the mitigation strategy and mitigation action plan for this Local Hazard Mitigation Plan (LHMP) Update, previously known as a Multi-Hazard Mitigation Plan. As part of the Plan Update process, a comprehensive review and update of the mitigation strategy portion of the plan was conducted by the HMPC. Some of the initial goals and objectives from the 2011 plan were refined and reaffirmed, some goals were deleted, and others were added. The end result was a new set of goals, reorganized to reflect the completion of 2011 actions, the updated risk assessment and the new priorities of this Plan Update. To support the new LHMP goals, the mitigation actions from 2011 were reviewed and assessed for their value in reducing risk and vulnerability to the planning area from identified hazards and evaluated for their inclusion in this Plan Update (See Chapter 2 What's New). Section 5.2 below identifies the new goals and objectives of this Plan Update and Section 5.4 details the new mitigation action plan.

Taking all of the above into consideration, the HMPC developed the following umbrella mitigation strategy for this LHMP Update:

- Communicate the hazard information collected and analyzed through this planning process as well as HMPC success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- Implement the action plan recommendations of this plan.
- Use existing rules, regulations, policies, and procedures already in existence.
- Monitor multi-objective management opportunities so that funding opportunities may be shared and packaged and broader constituent support may be garnered.

5.1.1. Continued Compliance with NFIP

Given the flood hazard in the planning area, an emphasis will be placed on continued compliance with the National Flood Insurance Program (NFIP) by all communities and participation by Sacramento County, the

City of Sacramento and others, as appropriate, in the Community Rating System (CRS). Detailed below is a description of Sacramento County's flood management program to ensure continued compliance with the NFIP. Also to be considered are the numerous flood mitigation actions contained in this LHMP that support the ongoing efforts by the county to minimize the risk and vulnerability of the community to the flood hazard and to enhance their overall floodplain management program. A summary of the flood management programs and continued compliance with the NFIP for the incorporated communities are detailed in their jurisdictional annexes.

Sacramento County's Flood Management Program

Sacramento County has participated in the Regular Phase of the NFIP since 1979. Since then, the County has administered floodplain management regulations that meet the minimum requirements of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country.

The County will continue to manage their floodplains in continued compliance with the NFIP. An overview of the County's NFIP status and floodplain management program are discussed on Table 5-1.

Table 5-1 Sacramento County NFIP Status

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	10,468 $5,542,955 $2,939,536,100
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	1,193 $22,391,339 95
How many structures are exposed to flood risk within the community?	3,862 (1% Annual Chance)) 21,778 (0.2% Annual Chance)
Describe any areas of flood risk with limited NFIP policy coverage	Undetermined
Is the Community Floodplain Administrator or NFIP Coordinator certified?	Yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Floodplain Management reviews and approves permit s,
What are the barriers to running an effective NFIP program in the community, if any?	Public acknowledgment of the hazards
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	October 2015
Is a CAV or CAC scheduled or needed?	No

NFIP Topic	Comments
Regulation	
When did the community enter the NFIP?	1979
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet and Exceed: See Appendix C for Details
Provide an explanation of the permitting process.	Clearly outlined in the floodplain ordinance. This process is strictly enforced.
Community Rating System (CRS)	
Does the community participate in CRS?	Yes
What is the community's CRS Class Ranking?	2
What categories and activities provide CRS points and how can the class be improved?	Sacramento County actively maintains programs that satisfy or surpass all CRS activities in the 300s, 400s, 500s and some 600s. These programs are regularly improved by staff for completeness. Two activities that have room for improvement are 610 and 620.
Does the plan include CRS planning requirements?	Yes, in accordance with the CRS Activity 510 requirements of the 2013 CRS Coordinator's Manual

Source: FEMA/Sacramento County

The Community Rating System (CRS) was created in 1990. Sacramento County has been in the CRS program since 1992. The program is designed to recognize floodplain management activities that are above and beyond the NFIP's minimum requirements. CRS is designed to reward a community for implementing public information, mapping, regulatory, loss reduction and/or flood preparedness activities. On a scale of 10 to 1, Sacramento County is currently ranked Class 2 community, which gives a 40% premium discount to individuals in the Sacramento County Special Flood Hazard Area (SFHA), and a 10% discount to policyholders outside the SFHA. Sacramento County is one of four only CRS Class 2 communities, ranking them in the top fifth in the nation (where there are three other Class 2's and one Class 1) and second in California of all CRS communities.

The activities credited by the CRS provide direct benefits to Sacramento County and its residents, including:

- Enhanced public safety;
- A reduction in damage to property and public infrastructure;
- Avoidance of economic disruption and losses;
- Reduction of human suffering; and
- Protection of the environment.

The activities that Sacramento County implements and receives CRS credits include:

- **Activity 310** – Elevation Certificates: The Water Resources Department maintains elevation certificates for new and substantially improved buildings. Copies of elevation certificates are made

available upon request. Elevation Certificates are also kept for post-FIRM and pre-FIRM buildings. (67 points)

- **Activity 320** – Map Information Service: Credit is provided for furnishing inquirers with basic flood zone information from the community's latest Flood Insurance Rate Map (FIRM). Credit is also provided for the community furnishing additional FIRM information, information about problems not shown on the FIRM, and historical flood information. The service is publicized annually and records are maintained. (90 points)
- **Activity 330** – Outreach Projects: Credit is provided for informational outreach projects that include brochures in public buildings, general outreach projects that include mailer to the entire community, posts on social media and community events, and targeted outreach projects that include letters to repetitive loss areas and flood prone properties. These projects are disseminated annually. Credit is also provided for having a pre-flood plan for public information. Credit is enhanced by having a Program for Public Information (PPI), and by having the information disseminated by stakeholders outside the local government. (350 points)
- **Activity 340** – Hazard Disclosure: Credit is provided for the local real estate agents disclosure of flood hazards to prospective buyers. Credit is also provided for state regulations requiring disclosure of flood hazards. Real estate agents provide a brochure advising prospective buyers about insurance and checking property flood hazards. (56 points)
- **Activity 350** – Flood Protection Information: Documents relating to floodplain management are available in the reference section of the Sacramento Public Library. Credit is also provided for floodplain information displayed on the community's website. Credit is enhanced by having a PPI. (101 points)
- **Activity 360** – Flood Protection Assistance: Credit is provided for offering one-onone advice regarding property protection and making site visits before providing advice. Credit is enhanced by having a PPI. (85 points)
- **Activity 370** – Flood Insurance Promotion: Credit is provided for assessing the community's current level of flood insurance coverage and assessing shortcomings. Credit is also provided for development and implementation of a coverage improvement plan, and providing technical advice regarding flood insurance. Credit for implementing a coverage improvement plan is enhanced by having a PPI and stakeholder involvement. (90 points)
- **Activity 410** – Floodplain Mapping: Credit is provided for conducting and adopting flood studies for areas not included on the FIRM and that exceed minimum mapping standards. (30 points)
- **Activity 420** – Open Space Preservation: Credit is provided for preserving approximately 35 percent of the Special Flood Hazard Area (SFHA) as open space, protecting open space land with deed restrictions, and preserving open space land in a natural state. Credit is also provided for regulations and incentives that minimize development in the SFHA. Credit is enhanced by having a PPI. (1020 points)
- **Activity 430** – Higher Regulatory Standards: Credit is provided for enforcing regulations that require development limitations, freeboard for new and substantial improvement construction, foundation protection, cumulative substantial improvement, enclosure limits and local drainage protection. Credit is also provided for the enforcement of building codes, a BCEGS Classification of 3/3, other higher standards, state mandated regulatory standards, and regulations administration. (571 points)
- **Activity 440** – Flood Data Maintenance: Credit is provided for maintaining and using digitized maps in the day to day management of the floodplain. Credit is also provided for establishing and maintaining a system of benchmarks and maintaining copies of all previous FIRMs and Flood Insurance Study Reports. (227 points)
- **Activity 450** – Stormwater Management: The community enforces regulations for stormwater management, low impact development, soil and erosion control, and water quality. Credit is also provided for watershed master planning. (261 points)
- **Section 502** – Repetitive Loss Category: Based on the updates made to the NFIP Report of Repetitive Losses as of December 11, 2011, Sacramento County, CA has 100 repetitive loss properties and is a

Category C community for CRS purposes. The community is required to submit either a Repetitive Loss Area Analysis or Floodplain Management Plan. (No credit points are applicable to this section)

- **Activity 510** – Floodplain Management Planning: Credit is provided for the adoption and implementation of the Sacramento County Local Hazard Mitigation Plan adopted on December 6, 2011. A progress report must be submitted on an annual basis. An update to the credited plan will be due by October 1, 2016. Credit is also provided for conducting a repetitive loss area analyses. (404 points)
- **Activity 520** – Acquisition and Relocation: Credit is provided for acquiring and relocating 19 buildings from the community's regulatory floodplain. (74 points)
- **Activity 530** – Flood Protection: Credit is provided for 81 buildings that have been elevated to protect them from flood damage. (160 points)
- **Activity 540** – Drainage System Maintenance: A portion of the community's drainage system is inspected regularly throughout the year and maintenance is performed as needed. Credit is also provided for listing problem sites that are inspected more frequently, and for implementing an ongoing Capital Improvements Program. The community enforces a regulation prohibiting dumping in the drainage system, and annually publicizes the regulation. Credit is enhanced by having a PPI. (201 points)
- **Activity 610** – Flood Warning and Response: Credit is provided for a program that provides timely identification of impending flood threats, disseminates warnings to appropriate floodplain residents, and coordinates flood response activities. Credit is also provided for the designation as a Storm Ready Community by the National Weather Service. (241 points)
- **Activity 630** – Dams: Credit is provided for a State Dam Safety Program. (37 points)
- **Activity 710** – County Growth Adjustment: All credit in the 400 series is multiplied by the growth rate of the county to account for growth pressures. The growth rate for Sacramento County, CA is 1.03.

5.1.2. Integration of Mitigation with Post Disaster Recovery and Mitigation Strategy Funding Opportunities

Hazard Mitigation actions are essential to weaving long-term resiliency into all community recovery efforts so that at-risk infrastructure, development, and other community assets are stronger and more resilient for the next severe storm event. Mitigation measures to reduce the risk and vulnerability of a community to future disaster losses can be implemented in advance of a disaster event and also as part of post-disaster recovery efforts.

Mitigation applied to recovery helps communities become more resilient and sustainable. It is often most efficient to fund all eligible infrastructure mitigation through FEMA's Public Assistance mitigation program if the asset was damaged in a storm event. Mitigation work can be added to project worksheets if they can be proven to be cost-beneficial.

Integration of mitigation into post disaster recovery efforts should be considered by all communities as part of their post disaster redevelopment and mitigation policies and procedures. As previously described in Section 4.4, the Capability Assessment for the Unincorporated County, the City of Sacramento's Annex, and Annex's for the other incorporated communities, post-disaster redevelopment and mitigation policies and procedures are being evaluated and updated as part of the Emergency Operations Plan (EOP) updates for each community and other community efforts.

These EOP's, through its policies and procedures, seek to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system in order to return the community to their

normal state of affairs. Mitigation is emphasized as a major component of recovery efforts. In addition, many of the individual mitigation actions identified for this LHMP Update in Table 5-2 below include additional measures for establishing and updating comprehensive post-disaster redevelopment and mitigation policies and procedures that fully integrate loss reduction activities into post disaster recovery efforts.

Mitigation Strategy Funding Opportunities

An understanding of the various funding streams and opportunities will enable the communities to match identified mitigation projects with the grant programs that are most likely to fund them. Additionally, some of the funding opportunities can be utilized together. Mitigation grant funding opportunities available pre- and post- disaster include the following.

FEMA HMA Grants

Cal OES administers three main types of HMA grants: (1) Hazard Mitigation Grant Program, (2) Pre-Disaster Mitigation Program, and (3) Flood Mitigation Assistance Program. Eligible applicants for the HMA include state and local governments, certain private non-profits, and federally recognized Indian tribal governments. While private citizens cannot apply directly for the grant programs, they can benefit from the programs if they are included in an application sponsored by an eligible applicant

FEMA Public Assistance Section 406 Mitigation

The Robert T. Stafford Disaster Relief and Emergency Assistance Act provides FEMA the authority to fund the restoration of eligible facilities that have sustained damage due to a presidentially declared disaster. The regulations contain a provision for the consideration of funding additional measures that will enhance a facility's ability to resist similar damage in future events.

Community Development Block Grants

The California Department of Housing and Community Development administers the State's Community Development Block Grant (CDBG) program with funding provided by the U.S. Department of Housing and Urban Development. The program is available to all non-entitlement communities that meet applicable threshold requirements. All projects must meet one of the national objectives of the program – projects must benefit 51 percent low- and moderate-income people, aid in the prevention or clearance of slum and blight, or meet an urgent need. Grant funds can generally be used in federally declared disaster areas for CDBG eligible activities including the replacement or repair of infrastructure and housing damaged during, or as a result of, the declared disaster.

Small Business Loans

SBA offers low-interest, fixed-rate loans to disaster victims, enabling them to repair or replace property damaged or destroyed in declared disasters. It also offers such loans to affected small businesses to help them recover from economic injury caused by such disasters. Loans may also be increased up to 20 percent of the total amount of disaster damage to real estate and/or leasehold improvements to make improvements that lessen the risk of property damage by possible future disasters of the same kind.

Increased Cost of Compliance

Increased Cost of Compliance (ICC) coverage is one of several resources for flood insurance policyholders who need additional help rebuilding after a flood. It provides up to $30,000 to help cover the cost of mitigation measures that will reduce flood risk. ICC coverage is a part of most standard flood insurance policies available under NFIP.

5.2 Goals and Objectives

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Up to this point in the planning process, the HMPC has organized resources, assessed hazards and risks, and documented mitigation capabilities. The resulting goals, objectives, and mitigation actions were developed based on these tasks. The HMPC held a series of meetings and exercises designed to achieve a collaborative mitigation strategy as described further throughout this section. Appendix C documents the information covered in these mitigation strategy meetings, including information on the goals development and the identification and prioritization of mitigation alternatives by the LHMP Update Steering Committee and HMPC working group.

During the initial goal-setting meeting, the HMPC reviewed the results of the hazard identification, vulnerability assessment, and capability assessment. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPC to formulate planning goals and objectives and to develop the mitigation strategy for the Sacramento County Planning Area.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community;
- Encompass all aspects of community, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- A time-independent, in that they are not scheduled events.

Goals are stated without regard to implementation. Implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used as means to achieve the goals. Objectives define strategies to attain the goals and are more specific and measurable.

HMPC members were provided with the list of goals from the 2011 plan as well as a list of other sample goals to consider. They were told that they could use, combine, or revise the statements provided or develop new ones, keeping the risk assessment in mind. Each member was given three index cards and asked to write a goal statement on each. Goal statements were collected and grouped into similar themes and displayed on the wall of the meeting room. The goal statements were then grouped into similar topics. New goals from the HMPC were discussed until the team came to consensus. Some of the statements were

determined to be better suited as objectives or actual mitigation actions and were set aside for later use. Next, the HMPC developed objectives that summarized strategies to achieve each goal.

Based on the risk assessment review and goal setting process, the HMPC identified the following mission statement, goals, and objectives, which provide the direction for reducing future hazard-related losses within the Sacramento County Planning Area.

Mission Statement: This Local Hazard Mitigation Plan assesses natural hazards of concern to the Sacramento community; evaluates risk to life safety, public health, property, and the environment; and evaluates mitigation measures to reduce these risks and vulnerabilities, minimize losses, and increase community resilience.

GOAL 1: Minimize risk and vulnerability of the Sacramento County community to the impacts of natural hazards and protect lives and reduce damages and losses to property, public health, economy, and the environment.

Objectives:

- Protect, preserve, and promote public health and safety, livability, and the environment
- Assure long term protection and resiliency of existing and future development (including infill areas) from natural hazards
- Protect critical facilities from natural hazards and minimize interruption of essential infrastructure, utilities, and services
- Protect natural resources; Protect and enhance water quality and supply, critical aquatic resources and habitat for beneficial uses.
- Maintain/enhance the flood mitigation program to provide 100/200/500-year flood protection
- Minimize risk of levee breach, overtopping or other failures
- Mitigate Repetitive Loss Properties
- Continued enhancement of CRS programs
- Address localized drainage issues
- Reduce the potential of wildfire in Sacramento County and protect the community
- from adverse effects of wildfire, including secondary impacts such as air quality
- Protect vulnerable populations from the threat of natural hazards
- Address climate change influence in project design and development
- Promote hazard mitigation as an integrated public policy and as a standard business practice

GOAL 2: Improve public outreach, awareness, education, and preparedness for all hazards to minimize hazard related losses

Objectives:

- Increase outreach, communication and awareness of natural hazards and reduce exposure to all hazard related losses, including climate change
- Improve the communities' understanding of natural hazards and how to effectively be prepared and take action to mitigate the impacts of hazard events
- Develop and target outreach and education for each hazard type and risk area
- Increase access to natural hazard information via enhanced web and mobile applications before, during, and after a disaster

- Enhance public outreach programs to target all vulnerable populations, including multi-language communications and multi-mode delivery
- Continued promotion of flood insurance

GOAL 3: Improve the capabilities of the community to mitigate losses and to be prepared for, respond to, and recover from a disaster event

Objectives:

- Promote interagency coordination of mitigation planning and implementation efforts
- Minimize hazard-related damage in order to maintain current service levels
- Continued enhancements to emergency services capabilities, integrating new technologies to reduce losses and save lives
- Promote intergovernmental and interagency coordination, planning, training, exercising and communication to ensure effective community preparedness, response, and recover
- Increase the use of coordinated, shared resources between agencies
- Promote public/private partnerships in hazard mitigation and preparedness programs
- Identify, coordinate, and implement countywide evacuation and shelter in place planning for all populations and increase community awareness of these activities

GOAL 4: Assure conformance to Federal and State Hazard Mitigation Initiatives and Maximize Potential for Mitigation Implementation

Objectives:

- Maintain FEMA Eligibility/Position Jurisdictions for Grant Funding
- Maintain good standing with FEMA and State hazard mitigation programs, regulations and requirements
- Develop an overall mitigation funding strategy to prioritize and pursue mitigation projects in an equitable manner to benefit all populations
- Maximize funding opportunities through identification and tracking of all types of Federal and state grant programs to implement identified mitigation projects

5.3 Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

In order to identify and select mitigation actions to support the mitigation goals, each hazard identified in Section 4.1 was evaluated. Only those hazards that were determined to be a priority hazard were considered further in the development of hazard-specific mitigation actions.

These priority hazards (in alphabetical order) are:

- Agricultural Hazards
- Bird Strike
- Climate Change

- Dam Failure
- Drought and Water Shortage
- Earthquake
- Earthquake: Liquefaction
- Flood: 100/200/500-year
- Flood: Localized/Stormwater Flooding
- Levee Failure
- River/Stream/Creek Bank Erosion
- Severe Weather: Extreme Temperatures – Heat
- Severe Weather: Heavy Rain and Storms
- Wildfire

The HMPC eliminated the hazards identified below from further consideration in the development of mitigation actions because the risk of a hazard event in the County is unlikely or nonexistent, the vulnerability of the County is low, or capabilities are already in place to mitigate negative impacts. The eliminated hazards are:

- Landslides
- Severe Weather: Extreme Temperatures – Cold/Freeze
- Severe Weather: Fog
- Severe Weather: Wind and Tornadoes
- Subsidence
- Volcano

It is important to note, however, that all the **Hazards Addressed** in this plan are included in the countywide multi-hazard public awareness mitigation action as well as in other multi-hazard, emergency management actions.

Once it was determined which hazards warranted the development of specific mitigation actions, the HMPC analyzed viable mitigation options that supported the identified goals and objectives. The HMPC was provided with the following list of categories of mitigation actions, which originate from the Community Rating System:

- Prevention (required to be evaluated)
- Property protection
- Structural projects
- Natural resource protection
- Emergency services
- Public information

The HMPC was provided with examples of potential mitigation actions for each of the above categories. The HMPC was also instructed to consider both future and existing buildings in considering possible mitigation actions. A facilitated discussion then took place to examine and analyze the options. Appendix C provides a detailed review and discussion of the six mitigation categories to assist in the review and identification of possible mitigation activities or projects. Also utilized in the review of possible mitigation measures is FEMA's publication on Mitigation Ideas, by hazard type. Prevention type mitigation

alternatives were discussed for each of the priority hazards. This was followed by a brainstorming session that generated a list of preferred mitigation actions by hazard.

5.3.1. Prioritization Process

Once the mitigation actions were identified, the HMPC was provided with several decision-making tools, including FEMA's recommended prioritization criteria, STAPLEE sustainable disaster recovery criteria; Smart Growth principles; and others, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- Social: Does the measure treat people fairly? (e.g., different groups, different generations)
- Technical: Is the action technically feasible? Does it solve the problem?
- Administrative: Are there adequate staffing, funding, and other capabilities to implement the project?
- Political: Who are the stakeholders? Will there be adequate political and public support for the project?
- Legal: Does the jurisdiction have the legal authority to implement the action? Is it legal?
- Economic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- Environmental: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. Other criteria used to assist in evaluating the benefit-cost of a mitigation action includes:

- Contribution of the action to save life or property
- Availability of funding and perceived cost-effectiveness
- Available resources for implementation
- Ability of the action to address the problem

In addition to reviewing and incorporating the actions from the 2011 plan, the committee also considered and defined several new actions. A comprehensive review of mitigation measures was performed using the criteria (alternatives and selection criteria) in Appendix C.

With these criteria in mind, HMPC members were each given a set of nine colored dots, three each of red, blue, and green. The dots were assigned red for high priority (worth five points), blue for medium priority (worth three points), and green for low priority (worth one point). The team was asked to use the dots to prioritize actions with the above criteria in mind. The point score for each action was totaled. Appendix C contains the total score given to each identified mitigation action.

The process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. The team agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support.

Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed below in Section 5.4. The cost-effectiveness of any mitigation alternative will be considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

Recognizing the limitations in prioritizing actions from multiple jurisdictions and departments and the regulatory requirement to prioritize by benefit-cost to ensure cost-effectiveness, the HMPC decided to pursue actions that contributed to saving lives and property as first and foremost, with additional consideration given to the benefit-cost aspect of a project. This process drove the development of a determination of a high, medium, or low priority for each mitigation action, and a comprehensive prioritized action plan for the Sacramento County Planning Area.

5.4 Mitigation Action Plan

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

This action plan was developed to present the recommendations developed by the HMPC for how the Sacramento County Planning Area can reduce the risk and vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. Emphasis was placed on both future and existing development. The action plan summarizes who is responsible for implementing each of the prioritized actions as well as when and how the actions will be implemented. Each action summary also includes a discussion of the benefit-cost review conducted to meet the regulatory requirements of the Disaster Mitigation Act.

Table 5-2 identifies the mitigation actions and lead jurisdiction for each action. Only those actions where the County is the lead jurisdiction are detailed further in this section. Actions specific to other participating jurisdictions, or where other jurisdictions are taking the lead, are detailed in each respective jurisdictional annex to this plan.

The action plan detailed below contains both new action items developed for this Plan Update as well as old actions that were yet to be completed from the 2011 plan. Table 5-2 indicates whether the action is new or from the 2011 plan and Chapter 2 contains the details for each 2011 mitigation action item indicating whether a given action item has been completed, deleted, or deferred.

Table 5-2 identifies all mitigation actions for all participating jurisdictions to this LHMP Update. For each mitigation action item included in Table 5-2, the section that follows includes a detailed mitigation implementation strategy by mitigation action. This Chapter includes the mitigation implementation strategy for all County actions; the jurisdictional Annexes (and Chapters) include the detailed mitigation implementation strategy for the projects where they are the lead jurisdiction.

It is important to note that Sacramento County and the participating jurisdictions have numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents, such as stormwater and drainage plans, community wildfire protection plans/fire plans, and capital improvement budgets and reports. These actions are considered to be part of this plan, and the details, to avoid duplication, should be referenced in their original source document. The HMPC also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this plan.

Further, it should be clarified that the actions included in this mitigation strategy are subject to further review and refinement; alternatives analyses; and reprioritization due to funding availability and/or other criteria. The participating communities are not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the community to mitigate the risks and vulnerabilities from identified hazards. The actual selection, prioritization, and implementation of these actions will also be further evaluated in accordance with the CRS mitigation categories and criteria contained in Appendix C.

It should be noted that many of the projects submitted by each jurisdiction in Table 5-2 benefit all jurisdictions whether or not they are the lead agency. Further, many of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. In addition, the public outreach action, as well as many of the emergency services actions, apply to all hazards regardless of hazard priority.

Table 5-2 Sacramento County Planning Area's Mitigation Actions

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Sacramento County						
Multi-Hazard Actions						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness	1, 2, 3, 4	2011 Action	X	X	X	Public Information Emergency Services
Increase pedestrian and bicycle evacuation routes by constructing regional bike/pedestrian trail infrastructure, and expanding connection to neighborhoods (particularly in vulnerable areas)	1, 2, 3, 4	New Action	X	X		Emergency Services
Community Rating System (CRS) Program for Public Information (PPI)	1, 2, 3, 4	2011 Action	X	X	X	Prevention Public Information
Flood Insurance Assessment, Awareness, and Promotion	1, 2, 3, 4	New Action	X	X	X	Prevention Public Information
Public Outreach Mailers	1, 2, 3, 4	2011 Action	X	X	X	Public Information
Toxic Substance Release	1, 2, 3, 4	New Action	X	X	X	Natural Resource Protection Property Protection
Climate Change Actions						
Increase average fuel efficiency and reduce GHG emissions from the County Fleet and Fuels	1, 2, 3, 4	New action	X	X		Prevention Natural Resource Protection
Reduce Sacramento County's vulnerability to Climate Change by reducing GHG emissions in the commercial and residential sectors by making energy efficiency a priority through building code improvements	1, 2, 3, 4	New action	X	X		Prevention Natural Resource Protection

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Mitigate Climate Change impacts by integrating climate change research and adaptation planning into County operations and services	1, 2, 3, 4	New action	X	X		Prevention
Reduce Sacramento County's vulnerability to extreme heat events and associated hazards by Increase tree planting/canopy preservation/enhancement	1, 2, 3, 4	New action	X	X		Prevention Natural Resource Protection
Drought Actions						
Implement Water Supply CIP	1, 2, 3, 4	New Action	X	X		Prevention Property Protection Natural Resource Protection Structural
Flood, Levee Failure, and Localized Flood Actions						
Keep the PPI current	1, 2, 3, 4	New action	X	X	X	Public Outreach
Alder Creek flood control	1, 2, 3, 4	New action	X	X	X	Property Protection Structural
Alder Creek flood mitigation (dam)	1, 2, 3, 4	New action	X	X	X	Structural
Alder Creek miners reservoir, property owned by the City of Folsom	1, 2, 3, 4	New action	X	X	X	Structural
Delta Small Communities flood protection - structural and nonstructural mitigation	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Gum Ranch flood control - joint use basin	1, 2, 3, 4	New action	X	X	X	Structural
Implement Storm Drain CIP	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Laguna Creek at Triangle Aggregate flood control -joint use basins	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Laguna Creek mitigate flood hazard south of Jackson Highway	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Model Sacramento River levee breach (LAMP) south of Freeport	1, 2, 3, 4	New action	X	X	X	Emergency Services Property Protection Natural Resource Protection Structural
Morrison Creek Miners Reach Flood Insurance Study	1, 2, 3, 4	New action	X	X	X	Prevention
Morrison Creek Miners Reach levee improvements	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Outreach stormwatch guide (ALERT, Stormready, weather radio)	1, 2, 3, 4	New action	X	X	X	Emergency Services Public Information
Peak flow floodplain mitigation Arcade Creek near Auburn Blvd	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Risk Map (flood frequency, depth, velocity)	1, 2, 3, 4	New action	X	X	X	Prevention Emergency Services
Elevation & Acquisition Projects (to Mitigate Flood Risk)	1, 2, 3, 4	2011 Action	X	X	X	Property Protection
Repetitive Loss Properties (to Mitigate Flood Risk)	1, 2, 3, 4	2011 action	X	X	X	Property Protection
Five-Year Capital Improvement Plan – Drainage Projects	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Arcade Creek Corridor Plan	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Elevate Homes on Long Island (Grand Island Road, Sacramento River)	1, 2, 3, 4	New action	X	X	X	Property Protection
Repetitive Loss Church Building on Dry Creek	1, 2, 3, 4	New action	X	X	X	Property Protection
South Branch Arcade Creek – Gum Ranch Basin (with Fair Oaks Park District) and Kenneth Avenue Bridge Improvements (with Sacramento County Department of Transportation)	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Dry Creek Flood Hazard Mitigation Acquisitions with County Regional Park Department	1, 2, 3, 4	New action	X	X	X	Property Protection
Arcade Creek at Evergreen Estates Floodwall Improvements	1, 2, 3, 4	New action	X	X	X	Structural
Linda Creek Peak Flow Mitigation	1, 2, 3, 4	New action	X	X	X	Property Protection Structural
Flood Preparation in the American River Parkway	1, 2, 3, 4	New action	X	X	X	Emergency Services Prevention
Improve County ALERT (Automated Local Evaluation in Real Time) System of Stream and Rain Gauges	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Update County Hydrology Standards	1, 2, 3, 4	New action	X	X	X	Prevention
Woodside Condominiums Repetitive Flood Loss Property	1, 2, 3, 4	New action	X	X	X	Property Protection Structural
Bridge Replacement on Elk Grove Florin Road at Elder Creek	1, 2, 3, 4	New action	X	X	X	Structural
Michigan Bar Bridge Replacement at the Cosumnes River	1, 2, 3, 4	New action	X	X	X	Structural
El Camino Avenue Phase 2 Road Improvements	1, 2, 3, 4	New action	X	X	X	Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Improve Flood Protection and/or Evacuation Planning for Mobile Home/RV Park at Manzanita/Auburn. Alternatively, the Park Should Establish Flood Warning and evacuation procedures.	1, 2, 3, 4	2011 action	X	X	X	Emergency Services Property Protection Structural
Hydromodification and Stormwater Quality Countywide	1, 2, 3, 4	2011 action	X	X	X	Property Protection Structural
Evacuation Mapping	1, 2, 3, 4	New Action	X	X	X	Emergency Services
Regional Flood Management Plan Projects	1, 2, 3, 4	New Action	X	X	X	Prevention Natural Resource Protection Property Protection Structural
River/Stream/Creek Bank Erosion						
Erosion Site Repairs	1, 2, 3	New action	X	X	X	Structural
Wildfire Actions						
Wildfire Suppression	1, 2, 3, 4	New Action	X	X		Property Protection
Wildfire Fighting - Support	1, 2, 3, 4	New Action	X	X		Emergency Services
Wildfire Suppression – Regional Parks and Open Space (urban interface)	1, 2, 3, 4	New Action	X	X		Property Protection Natural Resource Protection
City of Citrus Heights						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan, as well as other Local Planning Efforts	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Rinconada Flood Wall	1, 2, 3, 4	2011 Action	X	X	X	Structural
Drainage Project Implementation	1, 2, 3, 4	New Action	X	X	X	Property Protection Structural
City of Elk Grove						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan, as well as other Local Planning Efforts	1, 2, 3, 4	2011 Action	X	X	X	Prevention

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Mutual Aid Agreements	1, 2, 3, 4	New action	X	X		Prevention Emergency Sevices
Elk Grove Green Street Project: Repurposing Urban Runoff with Green Instructure Technologies	1, 2, 3	New action	X	X		Property Protection Structural
Hazard Education and Risk Awareness	1, 2, 3, 4	New action	X	X	X	Public Information
City of Elk Grove's Storm Drainage Master Plan (SDMP)	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
City of Folsom						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan, as well as other Local Planning Efforts	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Stormwater Basin Maintenance and Operation Project	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Alder Creek Watershed Council	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Drainage System Maintenance Tax Assessment	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Floodplain Mapping	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Redevelopment Area Drainage Improvements	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Stormwater Basin Maintenance and Operation Project	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Heating and Cooling Centers	1, 2, 3, 4	2011 Action	X	X		Emergency Services
Public Education/Outreach Extreme Weather	1, 2, 3, 4	2011 Action	X	X	X	Public Information
Weed Abatement Program	1, 2, 3, 4	New Action	X	X		Prevention

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Arson Prevention and Control Outreach	1, 2, 3, 4	2011 Action	X	X		Prevention
Wildfire Hazard Identification	1, 2, 3, 4	2011 Action	X	X		Prevention
Ignition Resistant Building Construction Upgrades	1, 2, 3, 4	2011 Action	X	X		Property Protection
Wildfire Prevention Outreach	1, 2, 3, 4	2011 Action	X	X		Public Information
City of Galt						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan, as well as other Local Planning Efforts	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Increase Redundancy/Functionality of Water Wells and Sewer Lift Stations	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Drain Inlet Retrofit Capital Improvement Plan (CIP)	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Creek/Streams Vegetation Management Plan	1, 2, 3, 4	2011 Action	X	X		Natural Resource Protection
Increase Data Capacity of Emergency Frequencies	1, 2, 3, 4	2011 Action	X	X		Emergency Services
City of Isleton*						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	New Action	X	X		Prevention
Storm Water Runoff Rehabilitation Project	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Wastewater Treatment Plant Pond Levee Elevation Raise to 200-year Flood Standard	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
City of Rancho Cordova						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Sunrise Boulevard Widening Kiefer to Jackson	1, 2, 3	2011 Action	X	X		Property Protection Natural Resource Protection Structural
City of Rancho Cordova Disaster Debris Management Plan	1, 2, 3, 4	New Action	X	X		Emergency Services
Transportation Interconnectivity	1, 2, 3, 4	New Action	X	X		Emergency Services
Intergovernmental Agreement between the County of Sacramento and the City of Rancho Cordova	1, 2, 3	New Action	X	X		Emergency Services
Land Use (Long range)	1, 2, 3, 4	New Action	X	X		Prevention
Post disaster training for staff	1, 2, 3, 4	New Action	X	X		Emergency Services
Update/Maintain Emergency Operation Plans (EOPs)	1, 2, 3, 4	New Action	X	X	X	Emergency Services
Increase Everbridge Enrollment	1, 2, 3, 4	New Action	X	X	X	Emergency Services Public Information
Developing and maintaining a database to track community vulnerability.	1, 2, 3, 4	New Action	X	X		Prevention Public Information
City Website HMP and City Website, Press Notification, and Social Media Emergency Information	1, 2, 3	New Action	X	X	X	Emergency Services Public Information
Building & Safety Division Disaster Inspector Training	1, 2, 3, 4	New Action	X	X		Prevention
Landscape and Irrigation Requirements/Retro	1, 2, 3, 4	New Action	X	X		Prevention
Landscape Ordinance	1, 2, 3	New Action	X	X		Prevention
Impervious surface	1, 3, 4	New Action	X	X	X	Property Protection
Porous pavement and vegetative buffers	1, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Storm Water Pump Station Infrastructure Upgrades	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
SB-5 Urban Level of Flood Protection	1, 2, 3, 4	New Action	X	X	X	Prevention Property Protection Structural
Channel Vegetation Management and Erosion Control	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection
Adoption of Hydromodification and Low Impact Development (LID) Standards	1, 2, 3, 4	New Action	X	X	X	Prevention Property Protection
Stormwater Capital Improvement Program Master Plan	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Sunrise Blvd. & Monier Circle Drainage Improvements	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Roundabouts	1, 2, 3, 4	New Action	X	X	X	Property Protection
City of Sacramento						
Multi-Hazard Actions						
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	2011 action	X	X	X	Prevention
Coordination with Relevant Organizations and Agencies to Consider the Impacts of Urbanization and Climate Change on Long-Term Natural Hazard Safety	1, 2, 3, 4	New action	X	X		Prevention
Maintain and Identify Changes in Critical Facilities GIS Layer to Support Emergency Management Efforts	1, 2, 3, 4	New action	X	X	X	Emergency Services

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Community Outreach on Multi-Hazard Preparation & Pre-mitigation	1, 2, 3, 4	New action	X	X	X	Public Information
Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Retrofit of Repetitive Loss Properties	1, 2, 3, 4	2011 Action	X	X	X	Property Protection
Safeguard Essential Communication Services	1, 2, 3, 4	New action	X	X		Emergency Services
Multi-lingual Disaster Education	1, 2, 3, 4	New action	X	X		Emergency Services Public Information
Cal OES Safety Assessment Program Evaluators	1, 2, 3, 4	New action	X	X		Emergency Services
National Flood Insurance Program & Community Rating System Continuation	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection Natural Resource Protection Structural Public Information
Coordinate with Sacramento Area Flood Control Agency on Completion of South Sacramento Streams Group Projects	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Develop a Master Generation Plan for Pump Stations	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection
Develop a Disaster Housing Plan	1, 2, 3, 4	New action	X	X	X	Emergency Services
Disaster Resistant Business Program	1, 2, 3, 4	New action	X	X	X	Prevention
Develop Enhanced Emergency Planning for Special Needs Populations in the City of Sacramento Emergency Operations Plan and Other Planning Documents	1, 2, 3, 4	New action	X	X	X	Emergency Services Public Information
Establish a Post-Disaster Action Plan	1, 2, 3, 4	New action	X	X	X	Emergency Services
Flood Recovery Plan	1, 2, 3, 4	New action	X	X	X	Emergency Services
Public Information Flood Response Plan	1, 2, 3, 4	New action	X	X	X	Public Information

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Construction of a new Emergency Operation Center (EOC)	1, 2, 3, 4	New action	X	X	X	Emergency Services
Emergency Operation Center (EOC) Expansion and Information Technology Upgrade	1, 2, 3, 4	New Action	X	X		Emergency Services
Protection of Transportation Infrastructure	1, 2, 3, 4	New action	X	X	X	Emergency Services Property Protection Structural
Public Education Campaign for Everbridge System	1, 2, 3, 4	New action	X	X	X	Emergency Services Public Information
Regional Emergency and Disaster Preparedness Exercises to Test Operational & Emergency Plans	1, 2, 3, 4	New action	X	X	X	Emergency Services
Special Needs and Critical Facilities Database and Advanced Warning System	1, 2, 3, 4	New action	X	X	X	Emergency Services Public Information
Assets Inventory	1, 2, 3, 4	New Action	X	X		Prevention Property Protection
Protection of City Assets from Cyber Terrorism	1, 2, 3	New Action	X	X		Property Protection
Protection of City Information Technology Infrastructure	1, 2, 3, 4	New Action	X	X		Property Protection
Cell Booster	1, 2, 3	New Action	X	X		Emergency Services
Travel Time Model for Lower American and Sacramento Rivers and their Major Tributaries	1, 2, 3	New Action	X	X		Emergency Services Prevention
Watershed Spill Contamination to Drinking Water Quality: Preparedness for Events and Recovery	1, 2, 3	New Action	X	X		Emergency Services Prevention
Purchase Drones for Use in Disaster Preparedness, Mitigation, and Response	1, 2, 3	New Action	X	X		Emergency Services Prevention
Climate Change Actions						
Map and Assess Vulnerability to Sea Level Rise	1, 2, 3, 4	New action	X	X	X	Prevention
Emission Study of City Sump and Pump Stations	1, 2, 3	New Action	X	X		Prevention
Climate Change Mitigation Actions/Climate Change Adaptation Plan for Drinking Water Quality	1, 2, 3	New Action	X	X		Prevention

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Harmful Algal Bloom (HAB) Surveillance and Response Planning	1, 2, 3	New Action	X	X		Prevention
Drought and Water Shortage Actions						
Aquifer Storage	1, 2, 3, 4	New action	X	X	X	Structural
Perform a Groundwater Recharge Feasibility Study	1, 2, 3, 4	New action	X	X	X	Prevention
Earthquake Actions						
Map and Assess Community Vulnerability to Earthquakes	1, 2, 3, 4	New action	X	X	X	Prevention
Seismic Vulnerability Assessment on Sacramento Levees, Infrastructure & Buildings	1, 2, 3, 4	New action	X	X	X	Property Protection Structural
Retrofit Historical Buildings	1, 2, 3, 4	New action	X	X		Property Protection
Extreme Cold and Heat Actions						
Heating Centers in High Priority Locations	1, 2, 3, 4	New action	X	X		Prevention Emergency Services
Cooling Centers in High Priority Locations	1, 2, 3, 4	New action	X	X		Prevention Emergency Services
Extreme Weather Outreach Strategy	1, 2, 3, 4	New action	X	X	X	Prevention
Severe Weather Action Plan	1, 2, 3, 4	New Action	X	X		Prevention Emergency Services
Flood, Localized Flood, and Levee Failure Actions						
Coordinate with Stakeholder on Proposed Flood Control Project on Magpie Creek	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural Public Information
Adopt Additional Floodplain Development Standards	1, 2, 3, 4	2011 action	X	X	X	Prevention
Drainage Projects for Repetitive Loss Properties	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Emergency Notification and Evacuation Planning	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Historic Magpie Creek	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Natomas Internal Drainage Canals/Levees	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Drainage Projects from the City's Priority Drainage Project List	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection Structural
Projects Identified in the Combined Sewer System Improvement Plan Update	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Easements for Open Land Along Levees	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection Natural Resource Protection
Emergency Management Planning and Levee Security	1, 2, 3, 4	New action	X	X	X	Emergency Services
Flood Fighting Equipment	1, 2, 3, 4	New Action	X	X	X	Emergency Services
Flood Management Land Use Planning and Development	1, 2, 3, 4	New Action	X	X	X	Prevention Property Protection Natural Resource Protection
Florin Creek Pump at Pomegranate Avenue	1, 2, 3, 4	New Action	X	X	X	Property Protection
Internal Drainage System Improvements	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Levee and Structural Flood Management Improvements	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Master planning to identify facilities needed to prevent 10-year event street flooding and 100-year event structure flooding	1, 2, 3, 4	New Action	X	X	X	Prevention Property Protection Natural Resource Protection Structural
Retrofit Pumping Plants with Discharge Monitoring Devices	1, 2, 3, 4	New Action	X	X	X	Property Protection
Risk Communication and NFIP/CRS Projects	1, 2, 3, 4	New Action	X	X	X	Public Information
Steamers and Rio City Café Floodwalls	1, 2, 3, 4	New Action	X	X	X	Structural
Trash Racks and Debris Cages	1, 2, 3, 4	New Action	X	X	X	Property Protection
Multi-Jurisdictional Modeling for Drainage Watersheds Greater Than 10 Square Miles	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection
Post-Flood Water Treatment Facility Recovery	1, 2, 3, 4	New action	X	X	X	Prevention Property Protection
Wind and Tornado Actions						
Tree Trimming & Debris Removal	1, 2, 3, 4	New action	X	X		Property Protection
Upgrading Overhead Utility Lines & Burying Critical Power Lines	1, 2, 3, 4	New action	X	X		Property Protection
Install Redundancies and Loop Feeds for Power Lines & Infrastructure	1, 2, 3, 4	New Action	X	X		Property Protection
Erosion Actions						
Stabilization of Erosion Hazard Areas	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Wildfire Actions						

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Implement a Fire Education and Information Program	1, 2, 3, 4	New action	X	X		Public Information
Fuels Reduction on the American River Parkway	1, 2, 3, 4	2011 Action	X	X		Property Protection Natural Resource Protection
Outreach on the Effects of Smoke on Air Quality	1, 2, 3, 4	New Action	X	X		Public Information
Cosumnes Community Services District						
Flood Response Equipment	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Flood Response Training	1, 2, 3, 4	2011 Action	X	X	X	Emergency Services
Los Rios Community College						
District Wide Roofing Renovations	1, 2, 3	2011 Action	X	X		Property Protection
ARC Drainage at Arcade Creek	1, 2, 3	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Protect District Property	1, 2, 3	New Action	X	X		Property Protection
Metro Fire District						
Relocate the essential facilities in the 200-year flood plain	1, 2, 3, 4	New Action	X	X	X	Emergency Services Property Protection Structural
Perform seismic study of all district facilities and identify those facilities at greatest risk for earthquake damage.	1, 3, 4	New Action	X	X		Prevention
Implement a Wildland Urban Interface (WUI) Building/Fire Code	1, 3, 4	New Action	X	X		Prevention
Develop and Implement a comprehensive WUI fuels management program.	1, 2, 3, 4	New Action	X	X		Prevention Property Protection Natural Resource Protection
Deploy 2 remote automated weather stations (RAWS) in Metro Fire jurisdiction	1, 2, 3, 4	New Action	X	X		Emergency Services

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Defensible space ordinance	1, 2, 3, 4	New Action	X	X		Prevention
Brannan Andrus Levee Maintenance District						
Implement Bioengineered Bank Stabilization techniques	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Development of Dredge Stockpile Site	1, 2, 3, 4	New Action	X	X		Property Protection Natural Resource Protection
Georgiana Slough Waterside Erosion Repair	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Hydrographic surveys and data collection	1, 2, 3, 4	New Action	X	X	X	Prevention
Mokelumne River Crown Raising	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
San Joaquin River Waterside Erosion Repair	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Sevenmile Slough French Drain and Seepage Berm	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Reclamation District #3*						
Levee Improvements	1, 3	New Action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Reclamation District #341*						
San Joaquin River Setback Levee/Habitat Bench Multi-Benefit Project, Phase 1	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Complete Projects from Regional Flood Management Plan	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
RD 551*						
Levee Improvements	1, 3	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Reclamation District #554*						
Apply for a Letter of Map Revision (LOMR) to bring the District back into Zone X. (outside of the 100-year flood zone)	1, 2, 3, 4	New Action	X	X	X	Prevention
Fill Abandoned Slough	1, 2, 3, 4	New Action	X	X		Property Protection Natural Resource Protection
Geotechnical Investigation	1, 2, 3, 4	New Action	X	X	X	Prevention
Snodgrass Slough Levee Improvements	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Reclamation District #556*						
Flood Response Activities, Georgiana Slough Weir	1, 2, 3, 4	New Action	X	X	X	Emergency Services
Georgiana Slough Vegetation Management	1, 2, 3	New Action	X	X	X	Natural Resource Protection

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Georgiana Slough Waterside Erosion Repair	1, 2, 3, 4	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Topographic and Hydrographic Surveys and Data Collection	1, 2, 3, 4	New Action	X	X	X	Prevetnion
Reclamation District #563*						
Rock Slope Protection Project	1, 3	New action	X	X		Property Protection Structural projects Natural resource protection
HMP and PL-8499 Levee Improvement Projects	1, 3	New action	X	X	X	Property Protection Structural projects Natural resource protection
Reclamation District #800						
Erosion Repair	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Emergency Supplies	1, 2, 3, 4	New action	X	X		Emergency Services
Reclamation District #1000						
River Berm and Levee Erosion	1, 2, 3, 4	2011 action	X	X	X	Property Protection Natural Resource Protection Structural
Erosion Protection Canal Banks	1, 2, 3, 4	2011 action	X	X	X	Property Protection Natural Resource Protection Structural
Implement Security Measures at Key Facilities	1, 2, 3, 4	2011 action	X	X	X	Emergency Services

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
2014 Capital Improvement Plan	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Implement Supervisory Control and Acquisition Data system (SCADA) on District canals and pump stations	1, 2, 3	New Action	X	X	X	Prevention
Public Outreach and Education	1, 2, 3, 4	New action	X	X	X	Public Information
Stockpile and pre-stage flood emergency response materials	1, 2, 3, 4	New action	X	X	X	Emergency Services
Emergency response improvements including radios for communications	1, 2, 3, 4	New action	X	X	X	Emergency Services
Emergency Back-up Generator for pump stations	1, 2, 3, 4	New action	X	X	X	Emergency Services
Reclamation District #1002*						
Geotechnical Investigation	1, 2, 3	New Action	X	X		Prevention
Snodgrass Slough Levee Improvements	1, 2, 3	New Action	X	X	X	Property Protection Natural Resource Protection Structural
Snodgrass Slough Vegetation Management	1, 2, 3	New Action	X	X	X	Property Protection Natural Resource Protection
Reclamation District #1601*						
Levee Improvement Project	1, 3	New action	X	X	X	Property Protection Structural projects Natural resource protection
Reclamation District #2111*						
Rock Slope Protection Project	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
HMP and PL-8499 Levee Improvement Projects	1, 2, 3, 4	New action	X	X	X	Property Protection Natural Resource Protection Structural
Sacramento Regional County Sanitation District						
South River Pump Station Flood Protection Project	1, 2, 3, 4	2011 action	X	X	X	Property Protection Protection Structural
Reduction of Fire Hazard SRCSD Bufferlands	1, 2, 3, 4	2011 action	X	X		Property Protection
Sacramento Area Sewer District						
MOU for Dedicated Cell Phone Tower and Cell Phone Pack	1, 2, 3	New Action	X	X		Emergency Services
Southgate Recreation and Park District						
Drought Mitigation Actions/Drought Contingency Plan	1, 2, 3, 4	2011 Action	X	X		Prevention
Flood Mitigation Actions/Land Acquisition	1, 2, 3, 4	2011 Action	X	X	X	Prevention Property Protection Natural Resource Protection Structural
Conservation Easements	1, 2, 3, 4	2011 Action	X	X		Prevention
Multi-jurisdictional Cooperation within Watersheds	1, 2, 3, 4	2011 Action	X	X	X	Prevention
Storm Water Management Practices – Implement Storm Water Management Practices as identified in Stormwater Quality Design Manual	1, 2, 3, 4	2011 Action	X	X	X	Property Protection Natural Resource Protection
Severe Weather: Heavy Rains and Storms Mitigation Actions/Tree Management	1, 2, 3, 4	2011 Action	X	X		Property Protection Natural Resource Protection

Action Title	Goals Addressed	New Action/ 2011 Action	Address Current Development	Address Future Development	Continued Compliance with NFIP	CRS Category
Twin Rivers School District						
New drainage plans to sites within the flood areas including, site drainage, storm drain upgrades and re-grading fields to shed water (on-site) away from buildings	1, 2, 3, 4	2011 action	X	X	X	Property Protection Natural Resource Protection Structural
Work with City/County/Water departments to create defensible spaces at sites where nearby creeks are prone to flooding. Build-up earthen berms (off-site) to shed water away from critically located schools.	1, 2, 3, 4	2011 action	X	X	X	Prevention Property Protection
Working with the Department of the State Architect (DSA) on Earthquake Retrofit Plan on all sites.	1, 2, 3, 4	2011 action	X	X		Property Protection
Revise and update district-wide Storm Water Prevention Plan	1, 2, 3, 4	2011 action	X	X	X	Prevention Property Protection Natural Resource Protection Structural
Create defensible perimeter space – for fire areas. Trees trimmed and vegetation removed to minimize impact during fire season.	1, 2, 3, 4	2011 action	X	X		Property Protection Natural Resource Protection

* These jurisdictions are included in the Delta Annex to this plan

Multi-Hazard Actions

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: All hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: Sacramento County Planning Department

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Enhance Public Education and Awareness of Natural Hazards and Public Understanding of Disaster Preparedness

Hazards Addressed: All (priority and non-priority) hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Sacramento County, its incorporated jurisdictions, and special districts are participating jurisdictions to the Sacramento County Local Hazard Mitigation Plan Update. Each jurisdiction plays a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of natural hazards. A comprehensive multi-hazard public education program will better inform the community of natural hazards of concern and actions the public can take to be better prepared for the next natural disaster event.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The County, cities, and special districts will work with other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of natural hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms, will include elements to meet the objectives of Goal 3 of this LHMP Update, and will consider:

- Using a variety of information outlets, including websites, local radio stations, news media, schools, and local, public sponsored events;
- Creating and distributing (where applicable) brochures, leaflets, water bill inserts, websites, and public service announcements;
- Displaying public outreach information in County and City office buildings, libraries, and other public places and events;
- Developing public-private partnerships and incentives to support public education activities.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing County, City, and other special district outreach programs will be reviewed for effectiveness and leveraged and expanded upon to reach the broader region.

Responsible Office: Sacramento County, Cities, and all other participating jurisdictions

Priority (H, M, L): High

Cost Estimate: Annual costs to be determined, and will depend on the scope and frequency of activities and events as well as volunteer participation

Benefits (Losses Avoided): Increase residents' knowledge of potential hazards and activities required to mitigate hazards and be better prepared. Protect lives and reduce damages, relatively low cost to implement.

Potential Funding: Local budgets, grant funds

Schedule: Ongoing/Annual public awareness campaign

Action 3. Increase pedestrian and bicycle evacuation routes by constructing regional bike/pedestrian trail infrastructure, and expanding connection to neighborhoods (particularly in vulnerable areas)

Hazards Addressed: Multi-Hazard – Climate Change, Flood, Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: During extreme weather events and other emergencies, the public may frequently have to walk or bicycle out of areas to seek safety. In the event of an evacuation, pedestrian and bicycle trails can be used and have often served as the secondary transportation backbone.

Filling gaps in trail segments and connections and maintaining important trail infrastructure is not only an important measure for evacuation, but can also provide additional access for emergency vehicles and workers, and provide access for other mitigation work such as fuel reduction.

Project Description: Maintain existing regional and local trail systems and infrastructure. Design and construct new trail segments to better connect neighborhoods and communities. Coordinate with cities throughout the county in comprehensive planning of a well-design trail network. Coordinate with Sac Metro Fire, SMUD and others in designing trails.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

- Coordinate with County Dept of Transportation in expanding trail network and connecting with public roads, easements and points of access.
- Coordinate with County Dept of Transportation in prioritizing bicycle and pedestrian facilities and improvements, on and off street.
- Coordinate with other partners in trail planning and construction
- Include trails and construction in Specific Plans, Subdivisions and new projects

Responsible Office/Partners:

- Department of Regional Parks
- Department of Transportation
- Community Development-Planning

Project Priority: Medium-High

Cost Estimate: $20,000,000

Benefits (Losses Avoided): Increase evacuation options and provide a secondary transportation network

Potential Funding:

- Measure A Bond Funding-Trails
- State Grants
- Projects with partners
- New Development – included in project

Timeline: On-going and new activities

Action 4. Community Rating System (CRS) Program for Public Information (PPI)

Hazards Addressed: Flood, Dam Failure, Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: Well-informed people make better decisions and they take steps to protect themselves from flooding by retrofitting their homes, buying flood insurance, and planning the actions they will take

during the next flood. They are also more likely to support local floodplain management efforts and measures to protect the natural functions of their community's floodplain.

The CRS provides credit for a full range of public information activities that inform people about flooding and ways to address potential flood damage to their property, including map information, outreach projects, real estate disclosure, libraries, websites, and providing technical advice and assistance. Research shows that when public information efforts are planned and coordinated, people will take steps to protect themselves from flood damage. The CRS provides additional credit for public outreach efforts that are coordinated through an adopted program for public information.

Project Description: A program for public information (PPI) is an ongoing local effort to identify, prepare, implement, and monitor a range of public information activities that meet specific local needs. The CRS credits the implementation of public outreach PROJECTS identified in a PPI. Through the PPI planning process, projects are monitored, evaluated, and revised to improve their effectiveness. The PPI will be reviewed annually and updated if needed.

Other Alternatives: Continue designing and carrying out public outreach projects without a PPI.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Resolution #2015-0864 approves Sacramento County Department of Water Resources' (DWR) efforts to continue participation in the CRS. The PPI was identified as a document that direct continued progress in an important floodplain management activity.

Responsible Office/Partners: Sacramento County Department of Water Resources

Project Priority: High

Cost Estimate: Public outreach and planning activities within the PPI and additional programs, estimated to be $50,000 annually, are included in the Fiscal Year 2015-16 Sacramento County Water Agency Zone 13 Adopted Budget.

Benefits (Losses Avoided): Research has found that floodplain residents in communities with outreach projects know more about their flood risk and are more likely to take protection measures such as buying flood insurance.

Potential Funding: None identified

Timeline: Ongoing

Action 5. Flood Insurance Assessment, Awareness, and Promotion

Hazards Addressed: Flood, Dam Failure, Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: A flood insurance assessment (FIA) is an analysis of a community's level of flood insurance coverage that identifies where increased coverage would be beneficial. It is the first step toward

developing a flood insurance coverage improvement plan in the community. In the case of Sacramento County, the FIA was done within the Program for Public Information (PPI).

Project Description: There are five steps in the FIA assessment process: 1) Collect flood insurance information, 2) Determine the level of flood insurance coverage, 3) Prepare the document, 4) Submit to the governing body, and 5) Reassess. This process was conducted with the PPI process and is within the PPI document. The PPI will be reviewed annually and updated if needed.

Other Alternatives: Continue flood insurance awareness and promotion without the assessment

Existing Planning Mechanism(s) through which Action Will Be Implemented: Resolution #2015-0864 approves Sacramento DWR's efforts to continue participation in the CRS. The PPI was identified as a document that direct continued progress in an important floodplain management activity. The FIA is within the PPI.

Responsible Office/Partners: Sacramento County Department of Water Resources

Project Priority: High

Cost Estimate: Public outreach and planning activities within the PPI and additional programs, estimated to be $50,000 annually, are included in the Fiscal Year 2015-16 Sacramento County Water Agency Zone 13 Adopted Budget.

Benefits (Losses Avoided): Research has found that floodplain residents in communities with outreach projects know more about their flood risk and are more likely to take protection measures such as buying flood insurance.

Potential Funding: None identified

Timeline: Ongoing

Action 6. Public Outreach Mailers

Hazards Addressed: Flood, Dam Failure, Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: A program for public information (PPI) is an ongoing local effort to identify, prepare, implement, and monitor a range of public information activities that meet specific local needs. The CRS credits the implementation of public outreach PROJECTS identified in a PPI. The PPI identified mailers as one of the projects.

Project Description: Every year a mailer communicating, Sacramento County's 10 messages identified in the PPI, is developed for inclusion in the Sacramento County utility bill (CUBS bill) which is mailed directly to each resident. In addition to the 10 message points, the following topics for other activity requirements, are included in the CUBS mailer:

- Activity 320 – Publicize Availability of Elevation Certificates
- Activity 360 – Publicize Flood Protection Assistance
- Activity 540 – Publicize Stream Dumping Regulations
- Activity 610 – Publicize Flood Warnings and Safety Measures

Other Alternatives: Develop another project that is distributed yearly with the 10 messages

Existing Planning Mechanism(s) through which Action Will Be Implemented: Resolution #2015-0864 approves DWR's efforts to continue participation in the CRS. The PPI was identified as a document that direct continued progress in an important floodplain management activity.

Responsible Office/Partners: Sacramento County Department of Water Resources

Project Priority: High

Cost Estimate: Public outreach and planning activities within the PPI and additional programs, estimated to be $50,000 annually, are included in the Fiscal Year 2015-16 Sacramento County Water Agency Zone 13 Adopted Budget.

Benefits (Losses Avoided): Research has found that floodplain residents in communities with outreach projects know more about their flood risk and are more likely to take protection measures such as buying flood insurance.

Potential Funding: None identified

Timeline: Ongoing

Action 7. Toxic Substance Release

Hazard Addressed: Flood, Localized Flood, Levee Failure

Goals Addressed: 1, 2, 3, 4

Issues/Background: In Sacramento County, farming occurs in the large floodplain areas. It is common to store large quantities of various chemicals near these agriculture activities. The chance of floodwater dislodging the chemical tanks is a risk of concern. Facilities storing chemical products within flood prone areas would benefit from mitigation measures such as elevation, flood proofing, and/or ring levees.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office: The business owners under the counsel of the Sacramento County floodplain manager.

Cost Estimate: Dependent on the scale and location of each individual business and the type of mitigation measure employed.

Priority: Medium

Benefits (Losses Avoided): Mitigating the potential for a toxic chemical spill would avoid substantial impacts to local water resources. A large-scale chemical spill could impact drinking water to millions of people and have harmful, disruptive effects to other biological resource systems in surface and ground water. These water bodies also support major fishing and recreation industries that could be economically impacted. Impacts may include health effects to people and wildlife from contamination of drinking water, large financial losses from disruption in water supply and the recreation industry along with the costs of cleanup after a spill. Floodwater is often quite contaminated; however, taking measures to mitigate against a release of chemicals that can have such a large impact on water resources is proactive and practical.

Potential Funding: To be determined.

Timeline: As soon as possible.

Climate Change Actions

Action 8. Increase average fuel efficiency and reduce GHG emissions from the County Fleet and Fuels.

Hazards Addressed: Climate Change

Goals Addressed: 1, 2, 3, 4

Issue/Background: Greenhouse gases (GHG) trap heat and make the planet warmer. The largest source of greenhouse gas emissions in the United States is from burning fossil fuels for electricity, heat, and transportation. According to the US EPA, over 26% of GHG emissions in the US comes from transportation primarily come from burning fossil fuel for cars, trucks, ships, trains, and planes. Over 90 percent of the fuel used for transportation is petroleum based, which includes gasoline and diesel. Reducing GHG emissions in the transportation sector can help reduce the continued warning of the planet and our environment.

Project Description: Increase the average fuel efficiency and reduce GHG emissions of municipal fleet vehicles by progressively converting fleet to zero emission vehicles; reduce reliance on fossil fuels utilizing electricity, water, renewable fuels and gas; launch an employee education program on: ZEV's, driving practices that improve fuel efficiency including anti-idling messages; utilize renewable diesel fuel in diesel vehicles; utilize renewable CNG in CNG vehicles as available. Procure and install PEV chargers as needed as well as other infrastructure to support this action.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation has been occurring for several years and this is an on-going action. Existing fleet is regularly turned over and new purchases made. Current practices have been to replace fleet with cleaner and more environmentally-friendly vehicles and fuels. This is evidenced through the new CNG fueling station constructed by the county and the conversion of the Waste Management Fleet to CNG. Existing fleet also includes electric, hybrid and hydrogen fuel vehicles. Existing fuel contracts include renewable diesel.

Responsible Office/Partners:

- Department of General Services (DGS), Fleets Division
- Sacramento Metropolitan Utility District (SMUD)
- Sacramento Metropolitan Air Quality Management District (SMAQMD)
- Clean Cities
- State and National Departments of Energy
- State Air Resources Board

Project Priority: Medium-High

Cost Estimate: $12,000,000

Benefits (Losses Avoided): Reduce Sacramento County's vulnerability to extreme heat events and associated hazards

Potential Funding:

- County DGS Fleet and Fuels Budget
- State and Federal Grants
- Funding partnerships with others including SMUD, SMAQMD
- Other funding sources (i.e. Volkswagen Settlement Fund)

Timeline: On-going and new activities

Action 9. Reduce Sacramento County's vulnerability to Climate Change by reducing GHG emissions in the commercial and residential sectors by making energy efficiency a priority through building code improvements

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Hazards Addressed: Climate Change

Goals Addressed: 1, 2, 3, 4

Issue/Background: Greenhouse gases (GHG) trap heat and make the planet warmer. According to the US EPA, over 12% of GHG emissions in the US come from commercial and residential. GHG emissions. Emissions from businesses and homes arise primarily from fossil fuels burned for heat, the use of certain products that contain greenhouse gases, and the handling of waste. The greatest contributor of GHG emissions is Electricity production. In 2014 approximately 67% of our electricity comes from burning fossil fuels, mostly coal and natural gas Reducing GHG emissions in the transportation sector can help reduce the continued warning of the planet and our environment.

Project Description: Make energy efficiency a priority through building code improvements. Encourage Developers, Businesses, Architects and Engineers to incorporate Tier 1 or 2 of the Ca Green Building Code into their projects. Include these Tiers as negotiating points in Development Agreements.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

- Developer Agreements
- Incentive funding for projects

Responsible Office/Partners:

- County Office of Sustainability
- Sacramento Metropolitan Utility District (SMUD)
- Sacramento Metropolitan Air Quality Management District (SMAQMD)
- Clean Cities
- State and National Departments of Energy
- State Air Resources Board

Cost Estimate: $8,000,000

Benefits (Losses Avoided): Reduce Sacramento County's vulnerability to Climate Change and associated hazards

Potential Funding:

- State and Federal Grants
- Funding partnerships with others including SMUD, SMAQMD
- Other funding sources

Timeline: On-going and new activities

Project Priority: Medium-High

Action 10. Mitigate Climate Change impacts by integrating climate change research and adaptation planning into County operations and services

Hazards Addressed: Climate Change, Extreme Heat, Flooding, Drought

Goals Addressed: 1, 2, 3, 4

Issue/Background: The County Vulnerability Assessment provides an overview of the primary and secondary threats associated with climate change, and identifies the ones most likely to affect Sacramento County. Climate adaptation strategies are supported by mitigation activities to address and reduce these threats. Adverse effects on natural resources and the human population include: rising sea levels and increased local/regional flooding; changes in rainfall and snowpack leading to changes in water supply, flood and drought; increased stress to vegetation, agriculture, biological resources and sensitive species; changes in frequency and duration of heat events and drought; and increased wildfire hazards.

Project Description: Integrate climate adaptation into county operations and services. Working with departments, and utilizing the established County Green Team, integrate adaptation planning and actions into county projects, programs, policies and community development. Various departments have already started climate change integration (DOT-complete and sustainable streets, bike/ped projects; Water Resources-Green Street, River friendly landscape design guidelines, creek naturalization; Planning-Tree Shading/Greenprint policies, open space preservation, design guidelines; etc. Provide increased education and training on climate mitigation and sustainable projects and program development.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

- Education and training with support from the Capital Region Climate Readiness Collaborative, State Departments (OPR, Natural Resources, Air Resources Board, etc).
- Other training and education on Green Infrastructure

- On-going implementation of Zoning Codes and Design Guidelines, particularly those directed at sustainability, energy efficiency, urban greening, active design, detention and groundwater recharge basins.
- Provide training on the basic science and impacts of climate change and on climate adaptation strategies.
- Integrate climate change adaptation considerations, with particular attention on how the public's health will be impacted, into templates for staff reports to the Planning Commission and Board of Supervisors.

Responsible Office/Partners:

- Each respective County Department
- Support and assistance provided by the Sustainability Manager
- County Green Team Members

Project Priority: Medium-High

Cost Estimate: $750,000

Benefits (Losses Avoided): Reduce the potential for loss of life, injury and economic damage to Sacramento County residents and businesses from: extreme heat events, flooding, drought, wildland-urban interface fire/smoke, climate change and the cascading impacts of these hazards.

Potential Funding:

- Existing County Departmental Operational Budgets
- State & Federal Grants
- Utilization of education services provided at no charge by others

Timeline: On-going and new activities

Action 11. Reduce Sacramento County's vulnerability to extreme heat events and associated hazards by Increase tree planting/canopy preservation/enhancement

Hazards Addressed: Climate Change, Extreme Heat

Goals Addressed: 1, 2, 3, 4

Issue/Background: Trees have many benefits, of particular importance during extreme heat events is that trees create cooler environments through the process of evapotranspiration. Evapotranspiration occurs when trees transpire, and trees transpire water to cool themselves. When the transpired water evaporates, the area surrounding the tree cools as well. The EPA notes that evapotranspiration and shade can help to lessen peak summer temperatures by 2 to 9 degrees. Planting and maintaining trees is one of the best ways to combat harmful environmental effects. Introducing more vegetation, like trees, into urban environments helps with everything from basic shade refuge to cleaner air to the reduction of energy costs. Trees and the related shading will help mitigate climate impacts particularly during extreme heat events.

Project Description: Maintain healthy urban forests; restore trees and tree canopy in commercial parking lots. Promote and increase tree planting to increase shading and to absorb CO2, PM to improve air quality, reduce urban heat islands and associated hazards.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Tree Preservation Ordinance (existing) and planned update. Code enforcement efforts with commercial property owners to replace lost trees in parking lots (enforcement of parking lot tree canopy requirements).

Additional mechanisms:

- Through support from the Capital Region Climate Readiness Collaborative; monitor and support regional and State-level efforts to forecast the impact of climate change on temperatures and incidence of extreme heat events in Sacramento and the region.
- Create and maintain shading by sustaining municipal tree planting efforts and continuing to maintain the health of existing trees.
- On-going implementation of Zoning Code and Design Guideline Tree Planting requirements and recommendations.
- (New) In collaboration with the Sacramento Tree Foundation, Implementation of a Neighborhood Forest Certification (NFC) program that offers guidelines and educational services on how to optimize the performance of trees in the design and build-out of new neighborhoods.

Responsible Office/Partners:

- Planning & Environmental Review Division staff, Tree Coordinator
- Sacramento Tree Foundation

Cost Estimate: $8,000,000

Benefits (Losses Avoided): Reduce Sacramento County's vulnerability to extreme heat events and associated hazards

Potential Funding:

- Tree planting: Tree Mitigation Fund, State grants, SMUD, PG & E
- PG & E Mitigation Funding
- Collaboration with Sacramento Tree Foundation

Timeline: On-going and new activities

Drought Actions

Action 12. Implement Water Supply CIP

Hazards Addressed: Drought

Goals Addressed: 1, 2, 3, 4

Issue/Background: Water supply is an ongoing issue within the planning area. The Water Supply CIP contains a variety of actions to protect and provide for a sustainable water supply.

Project Description: Implement projects under the Water Supply CIP.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Supply CIP

Responsible Office/Partners: Sacramento County DWR

Project Priority: high

Cost Estimate: Varies from project to project

Benefits (Losses Avoided): Maintain water supply to the Planning Area

Potential Funding: Local fees, development impact fees, state and federal grants

Timeline: To be determined from project to project

Flooding, Levee Failure, and Localized Flooding Actions

Action 13. Keep the PPI current

Hazards Addressed: Flooding and Localized Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Table 5-3 contains initiatives that are in place that support the goal and CRS messages that are conducted by organizations other than Sacramento County. The list was composed by County staff research and PPI Committee members' feedback.

Table 5-3 PPI Outreach Initiatives

OP#	Organization/Stakeholder	Project	Subject Matter	Frequency	Outreach Classification	Target Audience
16	Homeowner's Association	Association meeting	Message: 1-10	Once a year	General Outreach	All County Residents
17	SAFCA	website	Message: 1, 2, 4, 6	Year-round	Informational Material	All County Residents
18	Sacramento Stormwater Quality Partnership	website	Message: 6, 9, 10	Year-round	Informational Material	All County Residents
		Events	Message: 6, 9, 10	Year-round	General Outreach	All County Residents
19	Department of Water Resources' (DWR) FloodSAFE California Initiative	Levee Mailer	Message: 1, 2, 3, 5	Fall	Targeted Outreach	Areas Protected by Levees
20	Sacramento Association of Realtors	member newsletter	Message: 1,2,7	Year-round	Informational Material	All County Residents
21	Sacramento Area Creeks Council	Creek Week	Message: 9	April	General Outreach	All County Residents
		Tours	Message: 6	multiple	General Outreach	School-Aged Children
		Website	Message: 9	Year-round	Informational Material	All County Residents
22	U.S. Fish & Wildlife Service (Stone Lakes National Wildlife Refuge)	Website	Message: 6	Year-round	Informational Material	All County Residents
		Tours		All County Residents	Tours	General Outreach
23	Sacramento County Parks and Recreation District	Scoop the Poop	Message: 10	Year-round	General Outreach	All County Residents
24	Sacramento Valley Conservancy (Deer Creek Hills)	Website	Message: 6	Year-round	Informational Material	All County Residents
		tours			General Outreach	All County Residents

OP#	Organization/Stakeholder	Project	Subject Matter	Frequency	Outreach Classification	Target Audience
25	Cosumnes River Preserve	Website	Message: 6	Year-round	Informational Material	All County Residents
		Tours			General Outreach	All County Residents
26	Sacramento Splash	Website	Message: 6	Year-round	Informational Material	All County Residents
		tours			General Outreach	School-Aged Children
27	American River Flood Control District	levee maintenance	Message: 1, 2, 4, 6	Year-round	Informational Material	SFHA residents along American River
28	Water Education Foundation	tours, lectures	Message: 1, 4, 5, 6	Year-round	Informational Material	School-Aged Children
29	Sacramento Regional County Sanitation District	Environmental Protection	Message: 6, 9, 10	Year-round	General Outreach	All County Residents
		Walk on the Wild Side	Message: 6	May	General Outreach	All County Residents
30	American Red Cross Sierra-Delta Chapter	trainings, community events, social media messaging, website, telephone/tablet applications	Message: 1,2, 3	Year-round	General Outreach	All County Residents

Project Description: Implementation of the outreach projects detailed above and keep the PPI current.

Other Alternatives: Implement outreach projects outside of the PPI.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The PPI

Responsible Office: Sacramento County DWR

Priority (H, M, L): H

Cost Estimate: Staff time and other administrative costs to be determined

Benefits (Losses Avoided): Life Safety, property protection

Potential Funding: Local funding

Schedule: Annually

Action 14. Alder Creek flood control

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: The drainage study for the development plan at the AeroJet site includes flood control work on Alder Creek

Project Description: Bike/pedestrian crossing upstream and drainage structure at the Regional Transit crossing downstream. Additional work may be needed at the Ford dealership, Folsom Automall.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Glenborough at Easton development plan, Folsom also has land planning in the upper Alder Creek watershed

Responsible Office/Partners: Water Resources with the City of Folsom

Cost Estimate: To be determined

Project Priority: Medium

Benefits (Losses Avoided): Property protection, natural resource protection

Potential Funding: FEMA funding, CIP, others

Timeline: 2017-2022

Action 15. Alder Creek flood mitigation (dam)

Hazards Addressed: Flood and Miner's sediment containment

Goals Addressed: 1, 2, 3, 4

Issue/Background: Circa 1890, gold miners constructed a dam in Alder Creek. The reservoir is loaded with sediment and the dam is in a state of disrepair

Project Description: The City of Folsom happens to own the property which is surrounded by AeroJet. Folsom should investigate the stability of the dam and determine what repairs are needed.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: City of Folsom, with AeroJet and County Water Resources

Project Priority: high

Cost Estimate: $3,000,000 (?)

Benefits (Losses Avoided):

Potential Funding: Local, AeroJet, developers, state and federal grants

Timeline: 2017-2022

Action 16. Alder Creek miners reservoir, property owned by the City of Folsom

Hazards Addressed: Sediment behind the dam, water quality

Goals Addressed: 1, 2, 3, 4

Issue/Background: The gold miner beginning in about 1890 constructed a dam in Alder Creek. It is nearly full of sediment. The quality of the water and constituents in the sediment is a possible concern.

Project Description: Inspect water quality and sediment samples and assure that corrective actions, if necessary, are prosecuted

Other Alternatives: Remove the dam and reservoir sediment or assure that it is safe and secured in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Resources is working with the City of Folsom and AeroJet

Responsible Office/Partners: Sacramento County Department of Water Resources

Project Priority: Not known until the sampling is analyzed in 2017

Cost Estimate: $1,000,000

Benefits (Losses Avoided): The is much redevelopment planned for the AeroJet site. The miners reservoir will be an attraction for residents new to the Alder Creek area.

Potential Funding: AeroJet, the developer, the City of Folsom.

Timeline: 2016-2019

Action 17. Delta Small Communities flood protection - structural and nonstructural mitigation

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Sacramento County Delta communities of Pleasant Grove, Hood, Courtland, Walnut Grove (east and west), Locke, and Isleton, as well as, the mobile home and recreational vehicle resorts and small subdivisions are subject to potential catastrophic flooding should a levee breach occur.

Project Description: Levee fragility, Risk-map and Hazus analyses to determine flood hazard risk. Consider structural flood control improvements and non-structural measures to reduce the flood risk. This effort will be planning level, engaging the community.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: Sacramento County Department of Water Resources

Project Priority: High

Cost Estimate: The 2017-2020 planning cost is about $3,000,000 and the construction cost will be estimated as part of the Plan.

Benefits (Losses Avoided):

Potential Funding: CA DWR, FEMA hazard mitigation, the Army Corps of Engineers

Timeline: 2017-2020

Action 18. Gum Ranch flood control - joint use basin

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: There is an existing flood hazard, from South Branch of Arcade Creek, at Manana Way and Hoffman Way and upstream of Kenneth Avenue.

Project Description: South Branch Arcade Creek downstream of Kenneth Avenue, Gum Ranch Subdivision Map, there is an opportunity to mitigate peak flow, reduce downstream flooding, improve capacity under Kenneth Avenue, potential reduction in base flood elevation upstream, and there may be an opportunity for a joint use recreation property, working with Fair Oaks Park and Recreation.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Water Resources is working with the developer and his engineer and talking with Fair Oaks Park and Recreation.

Responsible Office/Partners: Sacramento County Department of Water Resources / Sacramento County Water Agency / Fair Oaks Park and Recreation

Project Priority: high

Cost Estimate: $2,500,000

Benefits (Losses Avoided): Flood control, park, open space

Potential Funding: Local funding with state or federal grants

Timeline: 2017-2020

Action 19. Implement Storm Drain CIP

Hazards Addressed: Local drainage and flooding hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Annually, the storm drain capital improvement plan (CIP) is updated looking forward several years. Many of these projects are will reduce flood risk to structures.

Project Description: The projects include creeks and channel improvement, basins, pump station upgrades, and pipes

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Storm Drain CIP

Responsible Office/Partners: Sacramento County Department of Water Resources / Sacramento County Water Agency

Project Priority: high

Cost Estimate: Varies from project to project

Benefits (Losses Avoided): property protection, natural resource protection

Potential Funding: Stormwater Utility, developer impact fees, state and federal grants

Timeline: Over the next 5 years

Action 20. Laguna Creek at Triangle Aggregate flood control - joint use basins

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: There is an interim detention basin on the north side of Florin Road west of Sunrise Blvd and there is more development planned in the City of Rancho Cordova. This is downstream of an existing flooding problem on Sunrise Blvd.

Project Description: Construct a weir on Laguna Creek at the area excavated by the Triangle miners, the project may include groundwater infiltration, a pump station, open space and active recreation

Other Alternatives: The proposed developments upstream could determine an alternate way to mitigate flood impacts

Existing Planning Mechanism(s) through which Action Will Be Implemented: Suncreek development plan in Rancho Cordova

Responsible Office/Partners: Water Resources and City of Rancho Cordova with Southgate Recreation and Park District

Project Priority: medium

Cost Estimate: $2,000,000

Benefits (Losses Avoided):

Potential Funding: Local developer impact fees, state and federal grants

Timeline: 2018-2025

Action 21. Laguna Creek mitigate flood hazard south of Jackson Highway

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: Existing condition flooding (about 1:20 year frequency) on Sunrise Blvd between Highway 16 and Grantline Road

Project Description: There is much planned development in the area (County and City of Rancho Cordova). SacDOT must determine if flooding on Sunrise is acceptable (there is alternate routing available) and the developers must mitigate their impacts. Ultimately, there should be a plan to reduce flooding on this roadway.

Other Alternatives: Status quo- allow this section of Sunrise to be flood prone

Existing Planning Mechanism(s) through which Action Will Be Implemented: Suncreek land development planning upstream in the City of Rancho Cordova

Responsible Office/Partners: Water Resources, Sacramento County Transportation, City of Rancho Cordova

Project Priority: medium

Cost Estimate: $3,000,000

Benefits (Losses Avoided): Life safety, property protection

Potential Funding: CA gas tax, development impact fees

Timeline: 2018-2025

Action 22. Model Sacramento River levee breach (LAMP) south of Freeport

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Sacramento River levees south of Freeport were de-accredited on the effective Flood Insurance Rate Map, dated August 16, 2012. An estimate of the levee breach base flood elevation was included on the map, but it did not include breach of the existing historic railroad embankment. Neither did it use the levee analysis mapping procedure (LAMP).

Project Description: Analyze the levee system south of Freeport, using LAMP

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: Sacramento County Department of Water Resources / Sacramento County Water Agency

Project Priority: medium

Cost Estimate: $300,000

Benefits (Losses Avoided): Better understanding of floodplain water surface elevation allows for better application of building standards.

Potential Funding: FEMA Cooperative Technical Partner Grant

Timeline: 2017-2021

Action 23. Morrison Creek Miners Reach Flood Insurance Study

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: Open pit aggregate miners, in the alignment of Morrison Creek (near Highway 16 and Bradshaw Road), relocated the stream and constructed a side channel weir.

Project Description: Analyze the existing condition floodplain.

Determine what constitutes high ground and what is a levee.

Develop a long-term plan to assure functionality.

Other Alternatives: Status quo, there is a weir maintenance agreement and FEMA mapped much of the mined area in Zone A.

Existing Planning Mechanism(s) through which Action Will Be Implemented: West Jackson development planning

Responsible Office/Partners: Sacramento County Department of Water Resources / Sacramento County Water Agency

Project Priority: medium

Cost Estimate: $200,000

Benefits (Losses Avoided): Life Safety, property protection

Potential Funding: The miners

Timeline: 2016-2018

Action 24. Morrison Creek miners reach levee improvements

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: Beginning 25 years ago, construction/mining companies removed aggregate from the Morrison Creek floodplain. They squeezed Morrison Creek into a constructed channel and constructed a weir to spill flood peak flow into the mined area.

Project Description: Improve the constructed flood system in a manner that will be sustainable and adequate for the necessary flood protection.

Other Alternatives: Status quo, the area is mapped Zone A

Existing Planning Mechanism(s) through which Action Will Be Implemented: West Jackson development proposal

Responsible Office/Partners: The aggregate miner and Water Resources, there will also be input from FEMA and the CA Central Valley Flood Protection Board

Project Priority: medium

Cost Estimate: $5,000,000 to $50,000,000

Benefits (Losses Avoided): Cost depends if anyone desires to construct structures that would be protected by the flood control system.

Potential Funding: Miners, developers, state or federal grants

Timeline: 2019-2030

Action 25. Outreach stormwatch guide (ALERT, Stormready, weather radio)

Hazards Addressed: Local flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: There is a system of stream and rain gages in Sacramento County, and various maps and analyses that have been prepared by staff over the years. How can a property owners know based on a weather forecast and real time rain and stream gage information whether to flood fight at his property?

Project Description: Seeking a system to help the public understand how to answer the above question.

Other Alternatives: Status quo is working okay, but this outreach plan could improve understanding

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: Sacramento County Department of Water Resources / Sacramento County Water Agency

Project Priority: medium

Cost Estimate: $100,000

Benefits (Losses Avoided):

Potential Funding: Federal or state grant

Timeline: 2017-19

Action 26. Peak flow floodplain mitigation Arcade Creek near Auburn Blvd

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Auburn Blvd bridge over Arcade Creek may be improve by the City of Sacramento, the County is asking for hydraulic improvement such as a larger opening to reduce overtopping and to mitigate existing upstream flood fighting measures.

Project Description: The floodwall at Evergreen Estates is de-accredited but it still serves as a significant flood fighting measure. The County desires to make that system even more flood resistant. This requires more flow capacity under Auburn Blvd and may require peak flow basin downstream of Auburn Blvd.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Sacramento County Department of Water Resources / Sacramento County Water Agency

Project Priority: high

Cost Estimate: $5,000,000

Benefits (Losses Avoided):

Potential Funding: State and federal grants, CA gas tax, local, developers

Timeline: 2017-20

Action 27. Risk Map (flood frequency, depth, velocity)

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: FEMA Flood Insurance Rate Maps only describe the water surface elevation and aerial extent of a floodplain in the 1:100-year storm event. It does not tell property owners the true risk of flooding.

Project Description: Additional information may be developed using FEMA Risk Map modeling and mapping thereby reporting the water surface elevation in a range of storm events, as well as depth and velocity.

Other Alternatives: Defer to the DFIRMs

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Sacramento County DWR

Project Priority: medium

Cost Estimate: $200,000

Benefits (Losses Avoided): Life safety, property protection

Potential Funding: FEMA Cooperating Technical Partner Grant, local and state funding

Timeline: 2018-2025

Action 28. Elevation & Acquisition Projects (to Mitigate Flood Risk)

Hazards Addressed: Structural Damage to Buildings and Property Loss from Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Many residential and business structures in Sacramento County are at risk of flooding from various sources. The County constructs many capital improvements to stormwater conveyances to improve drainage, yet many structures can only be protected by elevation or otherwise, acquisition and removal from the floodplain.

Project Description: Home elevation is a process that lifts the existing home from the foundation while a (engineered) foundation is built higher whereby the finished floor elevation is above the base flood elevation (BFE).

Home acquisition is a process whereby the jurisdictional agency purchases the home for the appraised value and, after the owner moves to another location, and the home is destroyed leaving the land unimproved. This is process is ideal for areas where multiple homes experience repeated flooding. When multiple homes are removed, it allows more capacity for floodwater while creating open space and habitat.

Other Alternatives: Flood-proofing (for lower flooding depths), create berms (for homes with acreage).

Existing Planning Mechanism(s) through which Action Will Be Implemented: Sacramento County has successfully completed over seventy home elevations to bring each structure 1' above the BFE. The County has a proven process to assist homeowners elevated their homes when funding is available through grants. County DWR staff make application for funding from FEMA grants to perform this work.

Responsible Office/Partners: Sacramento County Department of Water Resources/Office of Emergency Services & FEMA

Project Priority: Medium

Cost Estimate: Home elevation is approx. $100k per 1500 sf– Acquisition is market value of each home.

Benefits (Losses Avoided): Avoidance of property damage and (potentially) loss of life and avoidance of flood insurance claims.

Potential Funding: FEMA Grants, local share (match) and like-kind project management contribution

Timeline: Home elevations take approximately six – ten months to complete once funding is available

Action 29. Repetitive Loss Properties (to Mitigate Flood Risk)

Hazards Addressed: Damage to buildings and property loss from flooding, and health and safety of residents

Goals Addressed: 1, 2, 3, 4

Issue/Background: Over 100 homes in Sacramento County are Repetitive Loss structures, having flooded two or more times in a ten-year period with insurance claims over $1,000 after each event.

Project Description: Home elevation is a process that lifts the existing home from the foundation while a (engineered) foundation is built higher whereby the FFE is above the BFE by at least 1.5 feet.

Home acquisition is a process whereby the jurisdictional agency purchases the home for the appraised value and, after the owner moves to another location, the home is destroyed leaving the land unimproved. This process is ideal for areas where multiple homes experience repeated flooding. When multiple homes are removed, it allows more capacity for floodwater while creating open space and habitat.

Flood-proofing – where flood depths are low, use materials that impede water infiltration.

Other Alternatives: For homes with acreage, ring levees may work though this option is expensive, requires more land areas and extensive environmental review.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Sacramento County does annual outreach to owners of repetitive loss properties to educate them on flood risk, insurance and options to mitigate. When funds are available, DWR offers assistance with home elevation mitigation for to these homeowners.

Responsible Office/Partners: Sacramento County Department of Water Resources/

Office of Emergency Services and FEMA

Project Priority: Medium

Cost Estimate: Home elevation is approx. $100k per 1500 sf, acquisition is market value of each home, flood-proofing depends on house. Staff costs depends on how the homes and how lengthy the grant application.

Benefits (Losses Avoided): Avoidance of property damage and (potentially) loss of life and avoidance of flood insurance claims.

Potential Funding: FEMA Grants, local share (match) and like-kind project management contribution

Timeline: Grants are available annually. Elevations take approximately six – ten months to complete.

Action 30. Five-Year Capital Improvement Plan – Drainage Projects

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Sacramento County Board of Supervisors approved a Five-Year Capital Improvement Plan (CIP) that addresses improvements to drainage. The Department of Water Resources designs and oversees the construction of these improvements which mitigate flooding by replacing, rehabilitating, and upgrading existing facilities as well as installing new facilities. Drainage facilities include inlets, manholes, pipes, creeks/channels, pump stations, generators and basins.

Project Description: On June 14, 2016, the current Five-Year CIP was approved for Fiscal Years 2016-17 thru 2020-21. The Five-Year CIP includes 26 drainage improvement projects consisting of 12 pipe projects, eight pump station projects, three creek/channel projects, two maintenance projects, and one dam project. Individual projects are described in detail in Appendix I of the Five-Year CIP.

The following is a list of the 26 projects: Channel Lining Rehabilitation – Chicken Ranch Slough, Cordova Creek Naturalization Project, D01 Hagginbottom Storm Drain Pump Station Rehabilitation, D05 Howe Avenue Storm Drain Pump Station Rehabilitation, D06 North Mayhew Storm Drain Pump Station Rehabilitation, D10 Manlove Storm Drain Pump Station Generator Improvement, D24 North Lindale Storm Drain Pump Station Rehabilitation, D45 Franklin/Morrison Storm Drain Pump Station Rehabilitation, El Camino Transportation Project – Phase 1, Foster Way Storm Drain Improvement, I Street/32nd Street Storm Drain Improvement, Keeney Way Storm Drain Improvement, Kings Way/Verna Way Storm Drain Improvement, Mather Dam Improvement, Miramar Storm Drain Improvement, Ravenwood Avenue/Eastern Avenue Storm Drain Improvement, Rich Hill Drive Storm Drain Improvement, Silver Legends Storm Drain Improvement, Storm Drain Improvements – 2020, Storm Drain Improvements – 2021, Storm Drain Maintenance & Operations Equipment, Storm Drain Maintenance & Operations Projects – Various Locations, Storm Drain Pump Stations Rehabilitation – Phase 5, Storm Drain Pump Stations Rehabilitation – Phase 6, Storm Drain Rehabilitation – Job Order Contracts (JOCs), and Upper Gerber Creek Improvements.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Sacramento County Board of Supervisors approves the Five-Year CIP annually and each project individually when its design is finalized and it is ready to go out to bid for construction.

Responsible Office/Partners: Sacramento County Department of Water Resources

Project Priority: High

Cost Estimate: $41,649,227

Benefits (Losses Avoided):

Potential Funding: Sacramento County Stormwater Utility, Sacramento County Water Agency Zone 11, U.S. Air Force Cooperative Agreement, State of California Natural Resources Agency Grant

Timeline: 2016-2021

Action 31. Arcade Creek Corridor Plan

Hazards Addressed: Improve water quality, reduce flooding potential, provide recreational opportunities, improve habitat.

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Arcade Creek Watershed Group was formed in 2002 with initial support from the City of Sacramento and the US EPA. The group's mission is to improve water quality, reduce flood damage, enhance habitat, increase recreational opportunities, and encourage local participation in protection efforts. A CALFED grant administered by the State Water Resources Control Board was used to conduct studies and implement some projects within the City of Sacramento. Most of the Phase II projects and studies have been completed. Remaining is execution of the Arcade Creek Corridor Plan. This plan identifies numerous remedial and maintenance projects along Arcade Creek and Cripple Creek that will fulfill the goals of the Arcade Creek Watershed Group.

Project Description: The types of projects identified are as follows: remove debris jam and flow obstructions, remove invasive nonnative vegetation, stabilize banks, improve pipe outfalls, restore recreational trails, improve floodplain function, reconfigure the channel, control runoff from parking lots, stabilize swales, remove sediment and vegetation at creek crossings, remove concrete lined channel. Identified projects are located within the City of Sacramento, Sacramento County and the City of Citrus Heights.

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented: By inclusion in the LHMP, this project would be eligible for grant funding by FEMA through the HMGP, PDM, or potentially FMA grant programs.

Responsible Office/Partners: Sacramento County DWR in partnership with California State Office of Emergency Services, FEMA and/or the California State Department of Water Resources, Arcade Parks. and Recreation.

Project Priority: Medium

Cost Estimate: $2.5 to $4.5 million

Benefits (Losses Avoided): Improve water quality, reduce flood damage, enhance habitat, increase recreational opportunities, and encourage local participation in protection efforts.

Potential Funding: California State Office of Emergency Services, FEMA and/or the California State Department of Water Resources.

Timeline: 24-48 months after grant approval and environmental review

Action 32. Elevate Homes on Long Island (Grand Island Road, Sacramento River)

Hazards Addressed: Residential flooding.

Goals Addressed: 1, 2, 3, 4

Issue/Background: Long Island is located within the Sacramento River in the delta area of Sacramento County. The structures located there are pre-FIRM and have all been elevated except for the three remaining low structures. To prevent neighborhood checker-boarding and for the furtherance of good floodplain management, these two structures should be elevated. There are no structural project options available to provide flood protection at this location.

Project Description: The project would comprise removing the three structures from their foundations, hydraulically lifting them, supporting them with temporary cribbing, constructing new foundations beneath them at the elevation required by the floodplain management ordinance, then lowering the homes and attaching them to their new foundations.

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented: By inclusion in the LHMP, this project would be eligible for grant funding by FEMA through the HMGP, PDM, or potentially FMA grant programs.

Responsible Office/Partners: Sacramento County DWR in partnership with California State Office of Emergency Services and FEMA.

Project Priority: Medium

Cost Estimate: $300,000

Benefits (Losses Avoided): Prevent flooding of residences.

Potential Funding: FEMA through the HMGP, PDM, or FMA grant programs.

Timeline: 24-36 months from grant approval to project completion.

Action 33. Repetitive Loss Church Building on Dry Creek

Hazards Addressed: Structure flooding.

Goals Addressed: 1, 2, 3, 4

Issue/Background: Structure was built too low adjacent to a creek. Flood damage occurred in 1986, 1995, 1997, 1998, 2000, 2005.

Project Description: The structure should be elevated, flood proofed, or torn down and reconstructed in accordance with the Sacramento County Floodplain Management Ordinance.

Other Alternatives: Do nothing, insurance, flood proofing, mitigation after next flood

Existing Planning Mechanism(s) through which Action Will Be Implemented: By inclusion in the LHMP, this project would be eligible for grant funding by FEMA through the HMGP, PDM, or potentially FMA grant programs.

Responsible Office/Partners: Sacramento County DWR in partnership with California State Office of Emergency Services and FEMA.

Project Priority: Medium

Cost Estimate: $300,000 to $1,000,000 depending on form of mitigation.

Benefits (Losses Avoided): Prevent flooding of structure.

Potential Funding: FEMA through the HMGP, PDM, or FMA grant programs and local contributions from the church congregation.

Timeline: 24-36 months from grant approval to project completion and agreement by owner.

Action 34. South Branch Arcade Creek – Gum Ranch Basin (with Fair Oaks Park District) and Kenneth Avenue Bridge Improvements (with Sacramento County Department of Transportation)

Hazards Addressed: Reduce flooding potential, provide recreational opportunities, improve habitat.

Goals Addressed: 1, 2, 3, 4

Issue/Background: Gum Ranch is a large master planned project located within the South Arcade watershed. The extensive flooding that occurs downstream of the project location can be reduced with the installation of an oversized flood detention basin on the Gum Ranch project. In addition, by improving a bridge crossing on Kenneth Avenue upstream of the basin, upstream flooding could be reduced.

Project Description: The basin planned at Gum Ranch could be upsized to comprise greater flood capacity and in addition, recreational facilities for a dual use facility. The bridge crossing at Kenneth Avenue upstream of the basin currently is undersized and caused the flooding to backup upstream of the bridge. By opening up the structure, the backup could be reduced or prevented and the greater flows could be mitigated in the basin.

Other Alternatives: Do nothing.

Existing Planning Mechanism(s) through which Action Will Be Implemented: By inclusion in the LHMP, this project would be eligible for grant funding by FEMA through the HMGP, PDM, or potentially FMA grant programs.

Responsible Office/Partners: Sacramento County DWR in partnership with California State Office of Emergency Services, FEMA and/or the California State Department of Water Resources.

Project Priority: Medium

Cost Estimate: $0.5 to $1.5 million

Benefits (Losses Avoided): Improve water quality, reduce flood damage, increase recreational opportunities, and encourage local participation in protection efforts.

Potential Funding: California State Office of Emergency Services, FEMA and/or the California State Department of Water Resources.

Timeline: 24-48 months after grant approval and environmental review

Action 35. Dry Creek Flood Hazard Mitigation Acquisitions with County Regional Park Department

Hazards Addressed: Residential structure flooding and emergency access issues.

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Dry Creek Parkway project is a multi-agency project designed to return an area of Dry Creek floodway to a regional park site and open space. The floodway at this location is very broad compromising access during flood emergencies. The Parkway project goals and good floodplain management mandate the removal of the remaining residential structures located within the floodway. At this time, 17 residential structures are still remaining.

Project Description: The structures would be torn down and the land returned to open space under the ownership of the County of Sacramento.

Other Alternatives: Do nothing, insurance, flood proofing, mitigation after next flood

Existing Planning Mechanism(s) through which Action Will Be Implemented: By inclusion in the LHMP, this project would be eligible for grant funding by FEMA through the HMGP, PDM, or potentially FMA grant programs.

Responsible Office/Partners: Sacramento County DWR in partnership with California State Office of Emergency Service, FEMA, and the County of Sacramento Parks and Recreation Department.

Project Priority: Medium

Cost Estimate: Market value, approximately $3 million.

Benefits (Losses Avoided): Prevent flooding of structures; prevent emergency access issues in the Dry Creek floodway during flood events.

Potential Funding: FEMA through the HMGP, PDM, or FMA grant programs and local contributions from the church congregation.

Timeline: 24-36 months from grant approval and agreement by owner.to project completion

Action 36. Arcade Creek at Evergreen Estates Floodwall Improvements

Hazards Addressed: Residential structure flooding.

Goals Addressed: 1, 2, 3, 4

Issue/Background: Evergreen Estates is a low lying pre-FIRM development located next to Arcade Creek. It is currently protected to a maximum 25 year event by a de-accredited levee. Site improvements necessary to provide 100 year flood protection include raising the levee and also raising an adjacent street named Winding Way. These improvements have been identified in a feasibility level study.

Project Description: Enhance protection offered by levee/floodwall system on Arcade Creek. In addition, regrade surface streets in the vicinity of the area to cut off flood water.

Other Alternatives: Do nothing, insurance, flood proofing, mitigation after next flood

Existing Planning Mechanism(s) through which Action Will Be Implemented: By inclusion in the LHMP, this project would be eligible for grant funding by FEMA through the HMGP, PDM, or potentially FMA grant programs.

Responsible Office/Partners: Sacramento County DWR in partnership with California State Office of Emergency Service, FEMA.

Project Priority: Medium

Cost Estimate: $2.2 million.in 2008 dollars.

Benefits (Losses Avoided): Prevent flooding of structures.

Potential Funding: FEMA through the HMGP, PDM, or FMA grant programs and local contributions from the church congregation.

Timeline: 24-36 months from grant approval to project completion

Action 37. Linda Creek Peak Flow Mitigation

Hazards Addressed: Residential structure flooding.

Goals Addressed: 1, 2, 3, 4

Issue/Background: Linda Creek and its tributaries comprise a 3,580 acre watershed in Orangevale area draining to the City of Roseville, which is a tributary to Dry Creek, which ultimately drains back to Elverta and Rio Linda in Sacramento County. The Linda Creek watershed is 99.5% developed. Flooding impacts within Placer County can be mitigated with a detention basin project in Sacramento County.

Project Description: Construct a detention basin to mitigate flooding impacts in Placer County.

Other Alternatives: Do nothing, insurance, flood proofing, mitigation after next flood

Existing Planning Mechanism(s) through which Action Will Be Implemented: By inclusion in the LHMP, this project would be eligible for grant funding by FEMA through the HMGP, PDM, or potentially FMA grant programs.

Responsible Office/Partners: Sacramento County DWR in partnership with Placer County, California State Office of Emergency Service, and FEMA.

Project Priority: Medium

Cost Estimate: To be determined

Benefits (Losses Avoided): Prevent flooding of structures.

Potential Funding: FEMA through the HMGP, PDM, or FMA grant programs and local contributions from the church congregation.

Timeline: 24-36 months from grant approval to project completion

Action 38. Flood Preparation in the American River Parkway

Hazards Addressed: Mitigation flood impacts to park infrastructure.

Goals Addressed: 1, 2, 3, 4

Issue/Background: The American River Parkway is a Designated Floodway within the State of California. All of our park facilities may be exposed to flooding during high flow events.

Project Description: Evacuation Planning for park areas during various flood stages

Pre-flood preparation (such as) evacuation planning for park areas during various flood stages, pumping and sealing vault toilets, removing electrical panels, Removing trash cans, closing gates and setting out barricades, evacuating park areas, including homeless "camps", and securing bridge railings for flooding, and/or river bank erosion protection.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Coordination with local agencies including Sacramento County Sheriff and Office of Emergency Services and Metro Fire. Planned procedures on securing facilities with direction from Parks' Sr. Maintenance staff and evacuation by Parks' Rangers with assistance from Sacramento County Sheriff and Metro Fire.

Responsible Office/Partners: Sacramento County Department of Regional Parks, U.S. Bureau of Reclamation, Sacramento Area Flood Control Agency

Project Priority: High

Cost Estimate: Flexible, depending on size and scope of project

Benefits (Losses Avoided): Minimize damage to our park infrastructure, including restrooms, bridges, as well as keeping park visitor safe from by effectively evacuating park areas.

Potential Funding: Agency Funds and post disaster grant funds.

Timeline: Real Time

Action 39. Improve County ALERT (Automated Local Evaluation in Real Time) System of Stream and Rain Gauges

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The County's ALERT system has been in operation since 1985. The collection and dissemination of real time stream and rain data through the Internet provides County staff, as well as local agencies and the public, with real time rainfall amounts and stream levels. This information is used to warn of imminent and/or in progress flooding. Archived data is also used in support of studies on a variety of floodplain and watershed issues. Currently, the County's ALERT system is being upgraded to utilize a newer radio protocol called ALERT2. The newer protocol will improve data quality. Additionally, the County's FIRM maps were updated to use the North American Vertical Datum 1988 (NAVD88) datum in March 2012. And although the ALERT system reports in NAVD88, the staff gauges at the ALERT stream gauge locations need to be converted from National Geodetic Vertical Datum 1929 (NGVD29) to NAVD88 to allow for field verification of reported stream levels. Lastly, new ALERT stations are added to the system as gaps in the rain gauge network are identified or when stream levels need to be monitored in developing areas. One ALERT station was added to the system since 2011, a weather station located at the Vineyard Surface Water Treatment Plant in the Gerber/Elder Creeks watershed.

Project Description: 1. Finish upgrade to ALERT2 protocol. Six ALERT stations still require an upgrade pending approval of a CA DWR grant. 2. QA/QC, format and then upload archived ALERT data to the new data collection system. 3. Fix staff gages to be in NAVD88 vertical datum. 4. Add additional ALERT stations when identified to fill gaps in the rain gauge network or to provide warning of local flooding issues.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Maintenance of the ALERT system is required by the MOU between the County and the National Weather Service which allows the County to use the Federal hydrologic frequencies. Additionally, maintenance of the ALERT system is required in order to receive credit under the CRS program.

Responsible Office/Partners: Sacramento County DWR – Drainage Development Review/Hydrology

Project Priority: Medium

Cost Estimate: $150,000

Benefits (Losses Avoided): Life Safety, Property Protection

Potential Funding: Various grants and local cost share

Timeline: 3 – 5 years

Action 40. Update County Hydrology Standards

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: The effective Sacramento County Hydrology Standards were developed in the early/mid 1990's and might be due for updating.

If necessary, update County Hydrology Standards, consider climate change affect on Q100 and Q200 at local level

Project Description: Attain expert advice whether or not the hydrology standards should be updated.

In particular, look at the 1:200 year hydrology and consider climate change studies.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: Sacramento County Department of Water Resources / Sacramento County Water Agency

Responsible Office/Partners: Department of Water Resources

Project Priority: high

Cost Estimate: $150,000

Benefits (Losses Avoided): Allow better planning for local drainage and flood control

Potential Funding: Federal or state grant

Timeline: 2016-2018

Action 41. Woodside Condominiums Repetitive Flood Loss Property

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: This is a 700+ unit condominium development., 60+/- units flooded four times (in February 1986, twice in January 1997, and on December 31, 2005, many more flooded once (in 1986).

Project Description: Elevate the lowest buildings, dry flood-proof others

Other Alternatives: Prepare a plan to mitigate using NFIP Increased Cost of Compliance insurance to mitigate after next flood event

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: Partner: Water Resources

Project Priority: Depends on property owner willingness

Cost Estimate: $5,000,000

Benefits (Losses Avoided): When the flooded 12/31/2005, a 20 year storm event, they experienced about $3M damage, plus affected residents were displaced for ½ year.

Potential Funding: FEMA flood mitigation grant programs

Timeline: Depends on Woodside's willingness to apply for the grant

Action 42. Bridge Replacement on Elk Grove Florin Road at Elder Creek

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The existing Bridge is inundated in the 100-year flood and constricts the flow of Elder Creek, increasing the upstream 100-year water surface and related flooding.

Project Description: The bridge will be replaced. The replacement bridge soffit will be two feet above the 200-year storm water surface.

Other Alternatives: None.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital project. Implementation based on funding and the project priority list

Responsible Office/Partners: Sacramento County DOT

Project Priority: The project is considered a high priority project and so it is funded.

Cost Estimate: Construction cost is estimated to be $4,100,000

Benefits (Losses Avoided): The project raises the County roadway, with an average daily traffic volume of 23,000 vehicles, out of the 100-year flood zone and so improvement transportation in the region during flood events. The project also reduces upstream flooding.

Potential Funding: The project is funded by the federal Highway Bridge Program.

Timeline: Construction is planned for the summer of 2018.

Action 43. Michigan Bar Bridge Replacement at the Cosumnes River

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Existing bridge is structurally deficient and so replacement is necessary. In future flood conditions there is the possibility that the existing structure could fail and increase flooding.

Project Description: The new bridge will be constructed about a foot higher than the existing bridge is over the river, allow for better flow in flood conditions. The new bridnge will have only one supporting column in the river as compared with the two existing supports. With less supporting structures in the river, the river will be better able to convey flows. The new bridge will provide many decades of service without the current concern about failing in flood conditions.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: The project has been funded and is currently in design.

Responsible Office/Partners: Sacramento County DOT

Project Priority: The project's priority is high and so it is a funded.

Cost Estimate: $3,600,000

Benefits (Losses Avoided): Decreased flooding and a long lasting bridge that will provide decades of good service to replace a failing structure.

Potential Funding: The project is funded by federal Highway Bridge Program funds.

Timeline: Construction is planned for the summer of 2018.

Action 44. El Camino Avenue Phase 2 Road Improvements

Hazards Addressed: Flooding

Issue/Background: The Del Paso Mainor neighborhood to the north of El Camino had flooding issues and the Count's Water Resources Dept. has a project in design to resolve the problem, but that plan required

additional piped drainage capacity in El Camino Avenue. The current project on El Camino Avenue installed a new truck drainage pipe and resolved localized flooding issues. In addition, stub pipes from El Camino Avenue to Roslyn Way and Verra Way were installed for connections to the future drainage project.

Project Description: This project will add larger storm drain pipes and extended drain inlets to better pick up neighborhood storm drain runoff and upgrade existing drainage inlets to the current standard.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital project. Implementation based on funding and the project priority list

Responsible Office/Partners: Sacramento County DOT with cooperation from the Dept. of Water Resources

Cost Estimate: $2,020,000

Benefits (Losses Avoided): Improved storm drainage helps prevent further degradation of the roadway and damage to abutting private properties.

Potential Funding: Storm Water Utility Fees, Measure A Sales Tax and Federal ATP funds

Timeline: Project is currently under construction. Expected completion date is October 30, 2016

Project Priority: High

Action 45. Improve Flood Protection and/or Evacuation Planning for Mobile Home/RV Park at Manzanita/Auburn. Alternatively, the Park Should Establish Flood Warning and evacuation procedures.

Hazards Addressed: Flood overtopping creek and a floodwall that was not design reviewed by the County.

Goals Addressed: 1, 2, 3, 4

Issue/Background: The tributary of Arcade Creek tends to rise very rapidly. On 12/31/2005 this property flooded leaving may people without a place to live.

Project Description: Analyze, engineer and potentially reconstruct wall.

Other Alternatives: Do nothing, evacuation planning, insurance

Existing Planning Mechanism(s) through which Action Will Be Implemented: By inclusion in the LHMP, this project would be eligible for grant funding by FEMA through the HMGP, PDM, or potentially FMA grant programs.

Responsible Office/Partners: Property owner with assistance from County DWR.

Project Priority: Medium

Cost Estimate: To be determined

Benefits (Losses Avoided): Prevent damage to structures, health and safety of residents.

Potential Funding: FEMA through the HMGP, PDM, or FMA grant programs and local contributions.

Timeline: 24-36 months from grant approval to project completion

Action 46. Hydromodification and Stormwater Quality Countywide

Hazards Addressed: Levee failure, erosion and deposition in streambeds.

Goals Addressed: 1, 2, 3, 4

Issue/Background: The County of Sacramento stormwater group is working on a hydromodification plan to improve stormwater quality and reduce erosion and deposition in streambeds.

Project Description: Analyze priority sites for protection and design hydromodification standards.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: By inclusion in the LHMP, this project would be eligible for grant funding by FEMA through the HMGP, PDM, or potentially FMA grant programs.

Responsible Office/Partners: County DWR/ USCOE, SAFCA, US Reclamation Boards, Local Reclamation Districts

Project Priority: Medium

Cost Estimate: To be determined

Benefits (Losses Avoided): Manage degradation of flood conveyance and levee features.

Potential Funding: FEMA through the HMGP, PDM, or FMA grant programs and local contributions.

Timeline: 24-36 months from grant approval to project completion

Action 47. Evacuation Mapping

Hazards Addressed: Levee failures

Goals Addressed: 1, 2, 3, 4

Issue/Background: Evacuation route maps have been developed for the Delta Area and a separate evacuation route map was developed for Sacramento City, RD 1000 & American River Flood Control District.

Project Description: Develop one map that brings together both the Delta and non-delta evacuation route maps. This will assist in the movement of people if and when we have levee failures in either area. It will create a plan for evacautions of people but will also give responding agencies the ability to plan for movement of emergency workers, equipment and supplies into the affected area.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: Sacramento County OES & Sacramento County DWR

Cost Estimate: $50,000

Benefits (Losses Avoided): Increased life safety for those fleeing rising floodwaters.

Potential Funding: Possible funding from CA DWR

Timeline: 6 months

Project Priority: High

Action 48. Regional Flood Management Plan Projects

Hazards Addressed: Flood, Levee Failure, Erosion

Goals Addressed: 1, 2, 3, 4

Issue/Background: Levee and other flood management improvements need to be undertaken at various locations in the County, both in Urban areas and in Sacramento County Small Communities.

Project Description: The Regional Flood Management Plan contains many flood management improvement actions that the County, in conjunction with flood control agencies, reclamation districts, and other agencies can partake in that will work to improve levee integrity and otherwise manage the flood risk throughout the County to potential reduce flood related losses. These projects include but are not limited to the following project types: system-wide flood control projects, levee improvements, environmental enhancement projects, operation and maintenance improvements, structure raising, ring levees, fixing of perimeter levees, crown raising, Zone D designations, seepage repair and protection, erosion/bank/slope protection, vegetation maintenance and removal, encroachment modification, and others.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Regional Flood Management Plan; Small Communities Program

Responsible Office/Partners: County DWR and all Reclamation Districts; State DWR, SAFECA, USACE, others

Project Priority: High

Cost Estimate: Varies by nature and extent of each project

Benefits (Losses Avoided): Reduced risk to people, property, and environmental resources from a possible levee failure or other flood event.

Potential Funding: FEMA and Cal DWR grants, County, Reclamation Districts, Other

Timeline: Ongoing, subject to funding and interest

River/Stream/Creek Bank Erosion Projects

Action 49. Erosion Site Repairs

Hazards Addressed: Erosion

Goals Addressed: 1, 2, 3

Issue/Background: All areas of the County where water flows are at risk to erosion. The areas of greatest risk are the levees in the County.

Project Description: The County Department of Water Resources – Drainage Department tracks areas of erosion troubles and mitigates, to the extent possible, the root causes of erosion.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: County DWR – Drainage Department

Project Priority: High

Cost Estimate: Varies by year and water flow.

Benefits (Losses Avoided): If erosion sites are found and mitigated quickly, levee integrity remains high. This helps to protect all homes, businesses, and residents who reside in levee protected areas.

Potential Funding: County budget.

Timeline: Ongoing.

Wildfire Actions

Action 50. Wildfire Suppression

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Large areas of Sacramento County's rural areas and open space are susceptible to wildfire. Areas of concern include Regional Parks and Open Space areas, especially at the urban interface. The multi-year drought conditions have stressed trees and other vegetation, increasing flammability and lengthening the fire season. The County has recently experienced more and larger wildfires than in years past. Wildfire suppression is needed to reduce fire loads and to reduce response time to minimize wildfire size and intensity.

Project Description: Mitigation includes: Clearance for access roadways and firebreaks, adding fire access signage, new technology to report fires and share information on access routes, hydrants, sensitive habitat, and cultural resource areas. Providing areas for wildfire training (burns) for fire departments,

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: American River CWPP and other area fire plans and programs

Responsible Office/Partners: Sacramento County Department of Regional Parks, Sacramento Metropolitan Fire District, City of Sacramento Fire Department

Project Priority: High

Cost Estimate: Flexible, depending on size and scope of project

Benefits (Losses Avoided): Protecting park lands and facilities, adjacent neighborhoods, high priority forests, wildlife habitats, and cultural resources.

Potential Funding: FEMA grants, Fire grants, County Budgets

Timeline: Periodic scheduled work, at minimum implemented on an annual timetable.

Action 51. Wildfire Fighting - Support

Hazards Addressed: Wildfire risk within Sacramento County Regional Parks and in Open Space at the urban interface.

Goals Addressed: 1, 2, 3, 4

Issue/Background: Large areas of Sacramento County's rural areas and open space are susceptible to wildfire. The multi-year drought conditions have stressed trees and other vegetation, increasing

flammability and lengthening the fire season. The County has experienced more and larger wildfires than in years past. Wildfire suppression is needed to reduce fire loads

and reduce response time to minimize wildfire size and intensity.

Project Description: Mitigation includes: Clearance for access roadways and firebreaks, adding fire access signage, new technology to report fires and share information on access routes, hydrants, sensitive habitat, and cultural resource areas. Providing areas for wildfire training (burns) for fire departments,

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Parks has identified locations for road clearance and has evaluated new technology to report emergency events in real time. Planning with other agencies is ongoing to prioritize hazardous conditions and make efficient use of funds.

Responsible Office/Partners: Sacramento County Department of Regional Parks / Sacramento Metropolitan Fire District, City of Sacramento Fire Department

Project Priority: High

Cost Estimate: $40,000

Benefits (Losses Avoided): Protecting park lands, adjacent neighborhoods, high priority forests, wildlife habitats, and cultural resources.

Potential Funding: Agency funding, FEMA grants with local and like-kind match.

Timeline: Periodic scheduled work, at minimum on an annual timetable.

Action 52. Wildfire Suppression – Regional Parks and Open Space (urban interface)

Hazards Addressed: Hazard - Loss of residential and business structures and loss of habitat from wildfire. Post hazard results in sedimentation of creeks and rivers.

Goals Addressed: 1, 2, 3, 4

Issue/Background: Large areas of Sacramento County's rural areas and open space are susceptible to wildfire. The multi-year drought conditions have stressed trees and other vegetation, increasing flammability and lengthening the fire season. The County has experienced more and larger wildfires than in years past. Wildfire suppression is needed to reduce fire loads and reduce response time to minimize wildfire size and intensity.

Project Description: Mitigation includes: Fire fuel reduction and firebreaks maintenance. The method used depends on the terrain and type of fire fuel to remove (dry vegetation, limb ladders, etc), such as hand crews with manual tools, livestock grazing, prescribed burns, mechanical fuels removal, planting of fire resilient vegetation and/or invasive species removal.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Parks has a fire fuel reduction plan in place with prioritized areas based on the threat level and proximity to people and structures balanced against the available funding. Parks coordinates with other agencies for efficiencies in use of funds and man power.

Responsible Office/Partners: Sacramento County Department of Regional Parks / Sacramento Metropolitan Fire District, City of Sacramento Fire Department

Project Priority: High

Cost Estimate: $150,000

Benefits (Losses Avoided): Protecting park lands, adjacent neighborhoods, high priority forests, wildlife habitats, and cultural resources.

Potential Funding: Agency funding, FEMA grants with local and like-kind match.

Timeline: Periodic scheduled work, at minimum on an annual timetable.

Chapter 6 Plan Adoption

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in from Sacramento County and participating jurisdictions, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of the Disaster Mitigation Act (DMA) of 2000. For Sacramento County and the incorporated communities this adoption also establishes compliance with AB 2140 requiring adoption by reference or incorporation into the Safety Element of the General Plan. The governing board for each participating jurisdiction has adopted this 2016 Local Hazard Mitigation Plan by passing a resolution. A copy of the generic resolutions and the executed copies are included in Appendix D: Adoption Resolutions.

Chapter 7 Plan Implementation and Maintenance

Requirement §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This chapter provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

Chapter 3 Planning Process includes information on the implementation and maintenance process since the 2011 Plan was adopted. This section includes information on the implementation and maintenance process for this Plan Update.

7.1 Implementation

Once adopted, the plan faces the truest test of its worth: implementation. While this plan contains many worthwhile actions, the participating jurisdictions will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms, such as general plans, stormwater plans, Community Wildfire Protection Plans (CWPPs), Emergency Operations Plans (EOPS), evacuation plans, and other hazard and emergency management planning efforts for Sacramento County and participating jurisdictions. The County and participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. Implementation can be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the Sacramento County community and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This could include

creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the participating jurisdictions will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal programs and earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

Responsibility for Implementation of Goals and Activities

The elected officials and officials appointed to head each department within the County are charged with implementation of various activities in the plan. During the quarterly reviews as described later in this section, an assessment of progress on each of the goals and activities in the plan should be determined and noted. At that time, recommendations were made to modify timeframes for completion of activities, funding resources, and responsible entities. On a quarterly basis, the priority standing of various activities may also be changed. Some activities that are found not to be doable may be deleted from the plan entirely and activities addressing problems unforeseen during plan development may be added.

7.1.1. Role of Hazard Mitigation Planning Committee (HMPC) in Implementation and Maintenance

With adoption of this plan, the participating jurisdictions will be responsible for the plan implementation and maintenance. The HMPC Steering Committee identified in Appendix A (or a similar committee) will reconvene quarterly each year to ensure mitigation strategies are being implemented and the County and incorporated communities continue to maintain compliance with the NFIP. As such, Sacramento County with the City Sacramento will continue its relationship with each other, and with the Hazard Mitigation Planning Committee (HMPC)/Steering Committee, and:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure hazard mitigation remains a consideration for community decision makers;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended changes to the various governing boards or councils of all participating jurisdictions; and
- Inform and solicit input from the public.

The primary duty of the participating jurisdictions is to see the plan successfully carried out and to report to their community governing boards and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the County website (and others as appropriate).

7.2 Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

7.2.1. Maintenance Schedule

The Sacramento County Department of Water Resources (County DWR) is responsible for initiating plan reviews and consulting with the other participating jurisdictions. In order to monitor progress and update the mitigation strategies identified in the action plan, Sacramento County DWR and the individual jurisdictions will revisit this plan quarterly each year and following a hazard event. The HMPC will meet quarterly to review progress on plan implementation and each participating CRS community will provide annual evaluation reports for Activity 510. The HMPC will also submit a five-year written update to the State and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this plan update anticipated to be fully approved and adopted in early 2017, the next plan update for the Sacramento County Planning Area will occur in 2022.

7.2.2. Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or annexation).
- Increased vulnerability resulting from unforeseen or new circumstances.

Updates to this plan will:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to infrastructure inventories; and
- Incorporate new action recommendations or changes in action prioritization.

Changes will be made to the plan to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. All mitigation actions will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the HMPC deems appropriate and necessary, and as approved by the appropriate governing boards or councils of the other participating jurisdictions. In keeping with the five-year update process, the HMPC will convene public meetings to solicit public input on the plan and its routine maintenance and the final product will be adopted by the governing boards or councils.

Quarterly Plan Review Process

For the hazard mitigation plan update review process, Sacramento County DWR as lead along with the CRS Coordinator for each CRS community will be responsible for facilitating, coordinating, and scheduling reviews and maintenance of the plan. The LHMP is intended to be a living document. The review of the Hazard Mitigation Plan will normally occur on a quarterly basis each year and will be conducted by the HMPC/Steering Committee as follows:

- The Sacramento County DWR will place an advertisement in the local newspaper advising the public of the date, time, and place for each quarterly review of the plan and will be responsible for leading the meeting to review the plan.
- Notices will be mailed to the members of the Steering Committee, HMPC, federal, state, and local agencies, non-profit groups, local planning agencies, representatives of business interests, neighboring communities, and others advising them of the date, time, and place for the review.
- County/City/District officials will be noticed by email and telephone or personal visit and urged to participate.
- Members of the Communities' Planning Commission and other appointed commissions and groups will also be noticed by email and either by telephone or personal visit.
- Prior to the review, department heads and others tasked with implementation of the various activities will be queried concerning progress on each activity in their area of responsibility and asked to present a report at the review meeting.
- The local news media will be contacted and a copy of the current plan will be available for public comment at Sacramento County.
- After the review meeting, minutes of the meeting and a quarterly report will be prepared by the Steering Committee/HMPC and forwarded to the news media (public) and the ISO/CRS specialist for the CRS program. The report will also be presented to the County/City/participating jurisdictions' governing boards for review, and a request will be made that the Board take action to recognize and adopt any changes resulting from the review.
- A copy of the LHMP will be continually posted on the Internet as will the annual CRS Activity 510 report.

Criteria for Quarterly Reviews

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating the plan. More specifically, the reviews should include the following information:

- Community growth or change in the past quarter.
- The number of substantially damaged or substantially improved structures by flood zone.
- The renovations to public infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- Natural hazard occurrences that required activation of the Emergency Operations Center (EOC) and whether or not the event resulted in a presidential disaster declaration.
- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the community or closure of businesses, schools, or public services.
- The dates of hazard events descriptions.
- Documented damages due to the event.
- Closures of places of employment or schools and the number of days closed.

- Road or bridge closures due to the hazard and the length of time closed.
- Assessment of the number of private and public buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed. The assessment will include residences, mobile homes, commercial structures, industrial structures, and public buildings, such as schools and public safety buildings.
- Review of any changes in federal, state, and local policies to determine the impact of these policies on the community and how and if the policy changes can or should be incorporated into the Hazard Mitigation Plan. Review of the status of implementation of projects (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.

7.2.3. Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other County and City plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. As previously stated in Section 7.1 of this plan, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. The point is re-emphasized here. As described in this plan's capability assessment, the County and participating jurisdictions already implement policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- County, City, and District general and master plans
- County and City Emergency Operations Plans and other emergency management efforts
- County and City ordinances
- Flood/stormwater management/master plans
- Community Wildfire Protection plans
- Capital improvement plans and budgets
- Other plans and policies outlined in the capability assessments in the jurisdictional annexes
- Other plans, regulations, and practices with a mitigation focus

HMPC members involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, etc, as appropriate. As described in Section 7.1 Implementation, incorporation into existing planning mechanisms will be done through the routine actions of:

- monitoring other planning/program agendas;
- attending other planning/program meetings;
- participating in other planning processes; and
- monitoring community budget meetings for other community program opportunities.

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community.

Examples of incorporation of the LHMP into existing planning mechanisms include:

1. As recommended by Assembly Bill 2140, each community should adopt (by reference or incorporation) this LHMP into the Safety Element of their General Plan(s). Evidence of such adoption (by formal, certified resolution) shall be provided to CAL OES and FEMA.
2. Integration of wildfire actions identified in this mitigation strategy and those established in existing CWPPs, such as the American River CWPP. Key people responsible for development of the American River CWPP participated on the HMPC. Key projects were identified and integrated into the this LHMP. Actual implementation of these e projects will likely occur through the CWPP process.
3. Integration of flood actions identified in this mitigation strategy with implementation priorities in existing Watershed and Stormwater Drainage Plans. Key people responsible for development of the County's Watershed Master Plan, various jurisdictional watershed plans and stormwater drainage plans participated on the HMPC. Key projects were identified and integrated into this LHMP. Actual implementation of these projects will likely occur through the watershed and stormwater plans' process through the efforts of each responsible jurisdictions.
4. Integration of this LHMP Update into the County's Climate Adaptation Plan (CAP). This LHMP is currently being used in the development of the CAP and conversely Risk and vulnerability data and climate adaptation strategies developed for the CAP were integrated into this 2016 LHMP Update.
5. Use of risk assessment information to update the hazard analysis in the Sacramento County Emergency Operations Plans, currently being updated.

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this hazard mitigation plan.

7.2.4. Continued Public Involvement

Continued public involvement is imperative to the overall success of the plan's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stores from the plan implementation and seek additional public comment. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public hearings.

Public Involvement Process for Quarterly Reviews

The public will be noticed by placing an advertisement in the newspaper specifying the date and time for the review and inviting public participation. The HMPC, Steering Committee, local, state, and regional agencies will be notified and invited to attend and participate.

Public Involvement for Five-year Update

When the HMPC reconvenes for the update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the plan. In reconvening, the Steering Committee and HMPC plan to identify a public outreach subcommittee, which will be responsible for coordinating the activities necessary to involve the greater public. The subcommittee will develop a plan for public involvement and will be responsible for disseminating information through a variety of media channels detailing the plan update process. As part

of this effort, public meetings will be held and public comments will be solicited on the plan update draft. The subcommittee will also coordinate this public outreach process with the public information program established pursuant to the 2013 guidelines from the Community Rating System (CRS).

Prelude to Jurisdictional Annexes

For this 2016 Sacramento County LHMP Update, the **Jurisdictional Annexes**, working in conjunction with the Base Plan, detail the hazard mitigation planning elements specific to participating jurisdictions. Each Annex is not intended to be a standalone document, but appends to, supplements, and incorporates by reference the information contained in the Base Plan, as the umbrella document for this planning effort. As such, all Chapters 1- 7 of the Base Plan and associated appendices, including the planning process and other procedural requirements and planning elements apply to and were met by each participating jurisdiction.

These Jurisdictional Annexes provide additional information specific to each participating jurisdiction, with a focus on providing additional details on the risk assessment and mitigation strategy beyond that provided in the Base Plan. As part of these Jurisdictional Annexes, a **Delta Annex** was also created which provides an umbrella base document specific to the Delta Area, which then contains the Annexes (or Chapters) for the participating jurisdictions (City of Isleton and Delta Reclamation Districts) located within the Delta Region.

Annex A City of Citrus Heights

A.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Citrus Heights, a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to the City of Citrus Heights, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this community.

A.2 Planning Process

As described above, the City of Citrus Heights followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC) and Steering Committee, the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table A-1. Additional details on plan participation and City representatives are included in Appendix A.

Table A-1 City of Citrus Heights Planning Team

Name	Position/Title	How Participated
Kevin Becker	Principal CE	Attended meetings, Coordinated development projects, Floodplain coordination efforts, EOC coordination efforts
Ardelyn Flores	Associate CE	Development Engineer; provided input to Annex, reviewed drafts
Chris Fallbeck	Principal CE	Drainage Engineer- CIPs for drainage; provided input on projects

A.2.1. Coordination with Other Community Planning Efforts

Coordination with other community planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the City integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table A-2.

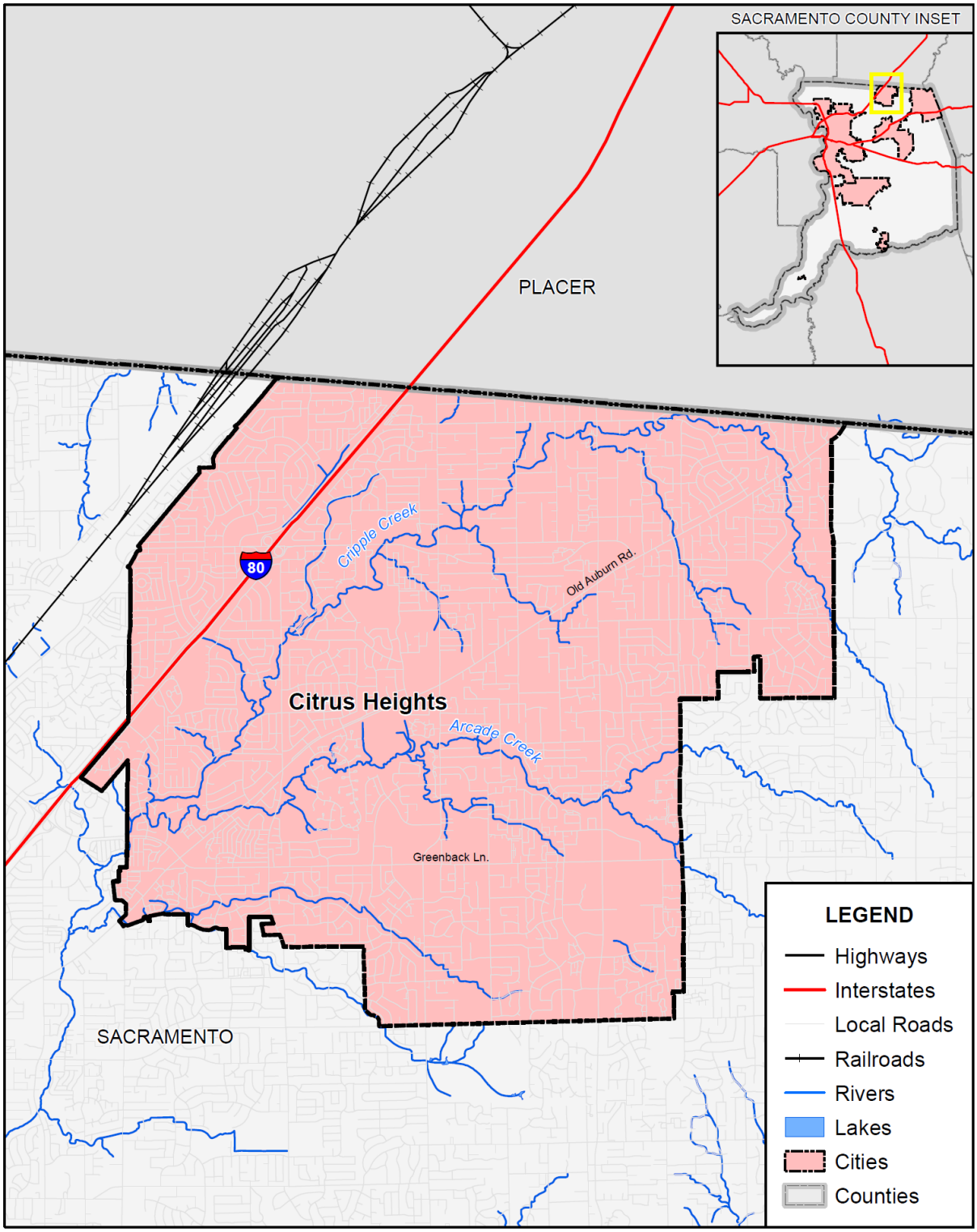
Table A-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
Zoning Code Update	New codes for Creekside Developments & setback requirements to a creek. No development of FEMA recognized 100-year flood hazards.
General Plan Update	New codes for floodplain development and updated flood map in the General Plan.
FEMA Elev. Certificates CIP	Hired a survey team to survey all the habitable structures in the City and completed the LOMRs & Elevation Certificates for each property. (Completed 1104 certificates). Made these available through the City GIS and mailed to each property owner. Conducted a meeting with all affected property owners with FEMA representative presenter at the meeting.
Included the new flood hazard maps in our GIS	The City received new, more geographically correct polygons of the flood hazard. These are now in the base mapping for the City's intranet mapping.
Initiated Neighborhood Drainage Masterplans	The City has established 11 neighborhood boundaries for representing themselves in the City. The City has completed drainage studies in 6 of the neighborhoods at a cost of over $500,000 and completed over $3 million in construction projects based on the results of the studies.
General Services Emergency Operations Plan & Organization	Established new procedures and organization for storm operations including animal control, Community Center operations and sandbag site operations.

A.3 Community Profile

The community profile for the City of Citrus Heights is detailed in the following sections. Figure A-1 displays a map and the location of the City of Citrus Heights within Sacramento County.

Figure A-1 City of Citrus Heights



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

A.3.1. Geography and Climate

Citrus Heights is located in a relatively flat area bordered by the north Coast Ranges to the west and the northern Sierra Nevada to the east. Air flows into the area through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento–San Joaquin Delta (Delta) from the San Francisco Bay area. The Mediterranean climate type of the City is characterized by hot, dry summers and cool, rainy winters.

During the summer, daily temperatures range from 50°F to more than 100°F. The inland location and surrounding mountains shelter the area from much of the ocean breezes that keep the coastal regions moderate in temperature.

Most precipitation in the area results from air masses that move in from the Pacific Ocean, usually from the west or northwest, during the winter months. More than half the total annual precipitation falls during the winter rainy season (November through February). Average winter temperatures are 49°F. Also characteristic of winters are periods of dense and persistent low-level fog, which are most prevalent between storms. The prevailing winds are moderate in speed and vary from moisture-laden breezes from the south to dry land flows from the north.

Citrus Heights is centrally located between the region's major freeways and highways. Interstate 80, Interstate 5, U.S. Highway 50, and U.S. Highway 99 are all located from three to 11 miles from the city. The Sacramento International Airport is located approximately 20 miles from the city, while rail transportation (Amtrak) is accessible in Roseville (about 10 miles from the City).

A.3.2. History

Throughout most of the Spanish-Mexican period of the growth of California (1542-1848), settlement was limited to a narrow coastal strip along El Camino Real with only a few isolated frontier outposts of civilization. One of these outposts was the vast estate of John Augustus Sutter, a German-Swiss immigrant, who was granted 11-square leagues of land in the Sacramento Valley under the condition that he settle 12 other families on the land. One of these Mexican land sub-grants was the Ranch Del San Juan, an approximately 20,000-acre tract of rich farm land originally granted in 1844. This sub-grant included present-day Citrus Heights.

A schoolhouse was built in 1862, spurred on by W.A. Thomas' conviction that Citrus Heights housed enough children to justify a school district. Mr. Thomas donated five acres of land on the northwest corner of Sylvan corners, and deemed it Sylvan School. Once completed, it became the educational, civic, social, and religious center of the community. Community parties and church services were held in the small, one-room building, as well as daily classes.

Adolph Van Maren, successor to his father Peter Van Maren, played a leading role in community development for many years. He served on the San Juan School Board, and contributed to the development of the San Juan High School in 1915. The present site of the Citrus Heights Community Club House on Sylvan Road is on land donated by Van Maren, while the actual building is the old Sylvan School House moved after a new school facility was built in 1927.

In 1970, ground was broken for the giant Sunrise Mall, spurring a great deal of new growth in the Sunrise Boulevard-Greenback Lane area. By 1975, 101 shops, anchored by four department stores, employed 2,500 people within Sunrise Mall. Then in 1976, across Sunrise Boulevard from the Mall, rose Birdcage Walk, a collection of shops and businesses laid out along a park-like walkway. The two shopping centers spurred the construction of hundreds of businesses in the surrounding area.

In 1994, after agreement with the County was reached, the effort gained momentum and took on the challenge to raise funds to pay for the mandated Environmental Impact Report (EIR). Once accomplished, the County Board of Supervisors approved the measure for the November 1996 ballot and a full campaign was initiated. Finally, after a 12-year battle with the County of Sacramento, the Citrus Heights residents voted on the issue. The voters approved the measure to incorporate the City on November 5, 1996, effective January 1, 1997. The measure won handily, with 62.5% of the votes.

A.3.3. Economy and Tax Base

Citrus Heights has established itself as an important suburb in the Sacramento region with its solid base of small businesses, retail chains, and food service establishments. With an ongoing commitment to providing high-quality, economical, responsive services to the local community, the City is well-positioned for future commercial redevelopment, neighborhood enhancements, and positive changes.

US Census estimates show economic characteristics for the City of Citrus Heights. These are shown in Table A-3 and Table A-8. Mean household income in the City was $62,402. Median household income in the City was $51,150.

Table A-3 City of Citrus Heights Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	221	0.6%
Construction	2,662	6.9%
Manufacturing	1,826	4.8%
Wholesale trade	1,096	2.9%
Retail trade	5,800	15.1%
Transportation and warehousing, and utilities	1,576	4.1%
Information	772	2.0%
Finance and insurance, and real estate and rental and leasing	3,328	8.7%
Professional, scientific, and management, and administrative and waste management services	4,523	11.8%
Educational services, and health care and social assistance	7,928	20.6%
Arts, entertainment, and recreation, and accommodation and food services	4,134	10.8%
Other services, except public administration	2,054	5.3%
Public administration	2,475	6.4%

Source: US Census Bureau American Community Survey 2010-2014 Estimates

Table A-4 City of Citrus Heights Income and Benefits

Income Bracket	Population	Percent
>$10,000	1,557	4.7%
$10,000 – $14,999	1,513	4.6%
$15,000 - $24,9999	3,492	10.6%
$25,000 – $34,999	3,702	11.3%
$35,000 – $49,999	5,726	17.4%
$50,000 – $74,999	6,882	20.9%
$75,000 – $99,999	4,541	13.8%
$100,000 – $149,999	3,842	11.7%
$150,000 – $199,999	1,199	3.6%
$200,000 or more	435	1.3%

Source: US Census Bureau, 2010

Top 10 Citrus Heights Employers (Alphabetical order)

- City of Citrus Heights
- Costco
- JC Penny
- Lowe's
- Macy's
- Sam's Club
- Stone's Casino
- Sears
- Target
- Wal-Mart

The City has a wide and varied tax base. Tax base information is tracked and maintained by the Sacramento County Assessor's Office. Table A-5 shows the secured real property value for the City of Citrus Heights. Table A-6 breaks out the City of Citrus Heights by land use.

Table A-5 City of Citrus Heights – Tax Roll Totals

Jurisdiction	2015-16 Value ($)	2016-17 Value ($)	Current Year Change	Percent of Current Roll*
Citrus Heights	6,172,005,395	6,451, 760,362	4%	4

Source: Sacramento County Assessor's Office

*Percentages rounded to the nearest whole number

Table A-6 City of Citrus Heights – Summary of Property Types

Jurisdiction	Single Family with HEX*	Single Family Without HEX*	Multi-Family Residential	Vacant Land	Commercial	Agricultural	Mobile Homes	Other	Total
Citrus Heights	12,849	9,741	1,428	472	622	0	1,918	355	27,835

Source: Sacramento County Assessor's Office
*Homeowners' Exemption

A.3.4. Population

The California Department of Finance estimated the January 1, 2015 total population for the City of Citrus Heights was 85,147.

Select demographic information from the 2014 US Census American Community Survey (the most recent data available) is shown in Table A-7.

Table A-7 City of Citrus Heights Demographic Information

Demographic Characteristic	Number	Percent
Race		
White	69,303	81.8%
Black or African American	2,545	3.0%
American Indian or Alaska Native	1,088	1.3%
Asian	2,488	2.9%
Hawaiian or Pacific Islander	211	0.2%
Two or more races	4,253	5.0%
Households*		
Total Households	32,686	–
Average Household Size	2.53	–

Source: US Census Bureau American Community Survey 2010-2014 Estimates; *US Census Bureau, 2010

A.4 Hazard Identification

Citrus Heights's planning team identified the hazards that affect the City and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to Citrus Heights (see Table A-8).

Table A-8 City of Citrus Heights—Hazard Identification Assessment

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Occasional	Negligible	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change				
Dam Failure	Limited	Unlikely	Limited	Low
Drought and Water Shortage	Extensive	Occasional	Critical	Low
Earthquake	Extensive	Unlikely	Critical	Low
Earthquake: Liquefaction	Limited	Unlikely	Negligible	Low
Flood: 100/200/500-year	Significant	Occasional/Unlikely	Negligible	Medium
Flood: Localized Stormwater Flooding	Significant	Likely	Limited	Medium
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Limited	Unlikely	Negligible	Low
River/Stream/Creek Bank Erosion	Limited	Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Critical	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Likely	Critical	Low
Severe Weather: Fog	Extensive	Likely	Critical	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Likely	Critical	Low
Severe Weather: Wind and Tornadoes	Limited	Unlikely	Negligible	Low
Subsidence	Limited	Unlikely	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Unlikely	Negligible	Low

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

A.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Citrus Heights's hazards and assess the City's vulnerability separate from that of the planning area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the planning area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City of Citrus Heights is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City of Citrus Heights and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

A.5.1. Hazard Profile

Each hazard vulnerability assessment in Section A.5.3, includes a hazard profile/problem description as to how each medium or high significant hazard affects the City and includes information on past hazard occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the planning area.

A.5.2. Vulnerability Assessment and Total Assets at Risk

This section presents the vulnerability assessment for Citrus Heights and identifies Citrus Heights' total assets at risk, including values at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Sacramento County Assessor's Office is based on the 2015 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the base plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table A-9 shows the 2015 Assessor's values (e.g., the values at risk) broken down by property use for the City of Citrus Heights.

Table A-9 City of Citrus Heights – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	0	0	$0	$0	$0
Care / Health	44	37	$14,251,163	$48,532,045	$62,783,208
Church / Welfare	46	39	$7,897,930	$40,707,034	$48,604,964
Industrial	20	17	$9,990,370	$14,997,579	$24,987,949
Miscellaneous	190	-	$226,685	$0	$226,685
Office	103	97	$43,862,589	$90,491,761	$134,354,350
Public / Utilities	210	1	$453,785	$3,494	$457,279
Recreational	6	6	$3,048,646	$9,682,591	$12,731,237
Residential	23,230	22,958	$1,447,033,788	$3,429,670,199	$4,876,703,987
Retail / Commercial	355	338	$271,684,879	$413,138,518	$684,823,397
Vacant	274	11	$23,216,927	$1,230,433	$24,447,360
No Data	1	1	$34,780	$74,974	$109,754
Total	**24,479**	**23,505**	**$1,821,701,542**	**$4,048,528,628**	**$5,870,230,170**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facilities and Infrastructure

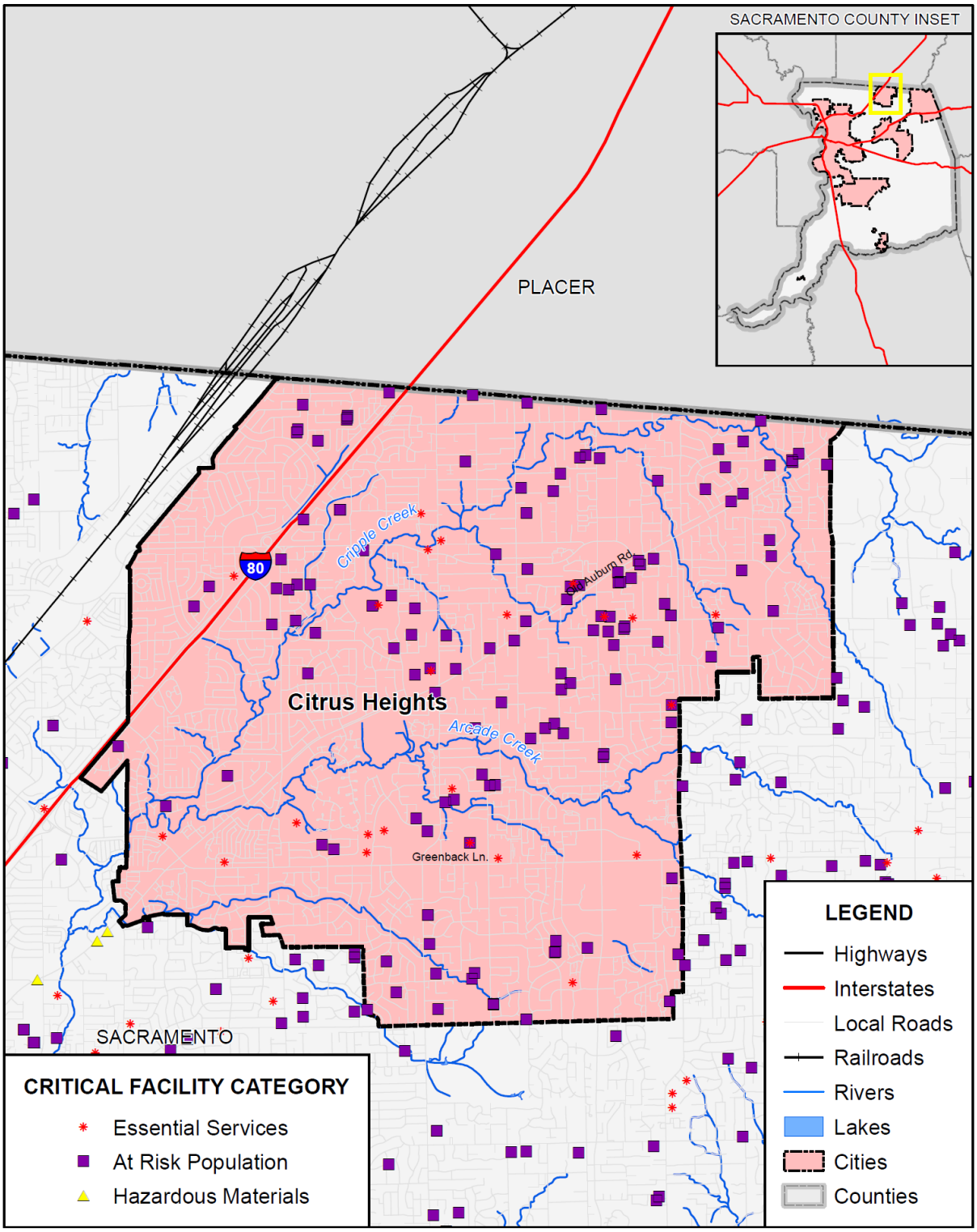
For purposes of this plan, a critical facility is defined as:

> *Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.*

This definition was refined by separating out three classes of critical facilities, that include Essential Services Facilities, At Risk Population Facilities, and Hazardous Materials Facilities, as further described in Section 4.3.1 of the base plan.

An inventory of critical facilities in the City of Citrus Heights from Sacramento County GIS is shown on Figure A-2 and detailed in Table A-10. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix E. Although not included in the analysis below, the Planning Team for the City noted that City Hall was just completed in July of 2016 and the City have moved into the new facility at 6360 Fountain Square Drive.

Figure A-2 City of Citrus Heights – Critical Facilities



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

Table A-10 City of Citrus Heights – Critical Facilities Inventory

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Bus Terminal	1
	Emergency Evacuation Shelter	9
	Fire Station	4
	Government Facilities	2
	Medical Health Facility	6
	Police	1
	Total	**23**
At Risk Population Facilities	Adult Day Care	1
	Adult Education School	1
	Adult Residential	16
	Day Care Center	24
	Group Home	9
	Infant Center	2
	Private Elementary School	10
	Private High School	3
	Private K-12 School	3
	Public Continuation High School	1
	Public Elementary School	10
	Public High School	2
	Public Middle School	1
	Residential Care/Elderly	59
	Social Rehabilitation Facility	1
	Total	**143**
Grand Total		**166**

Source: Sacramento County GIS

Natural Resources

The City of Citrus Heights has a variety of natural resources of value to the community. Table A-11 and Table A-12 depict special status plant and animal species in the City. Figure A-3 shows the location of each of the species.

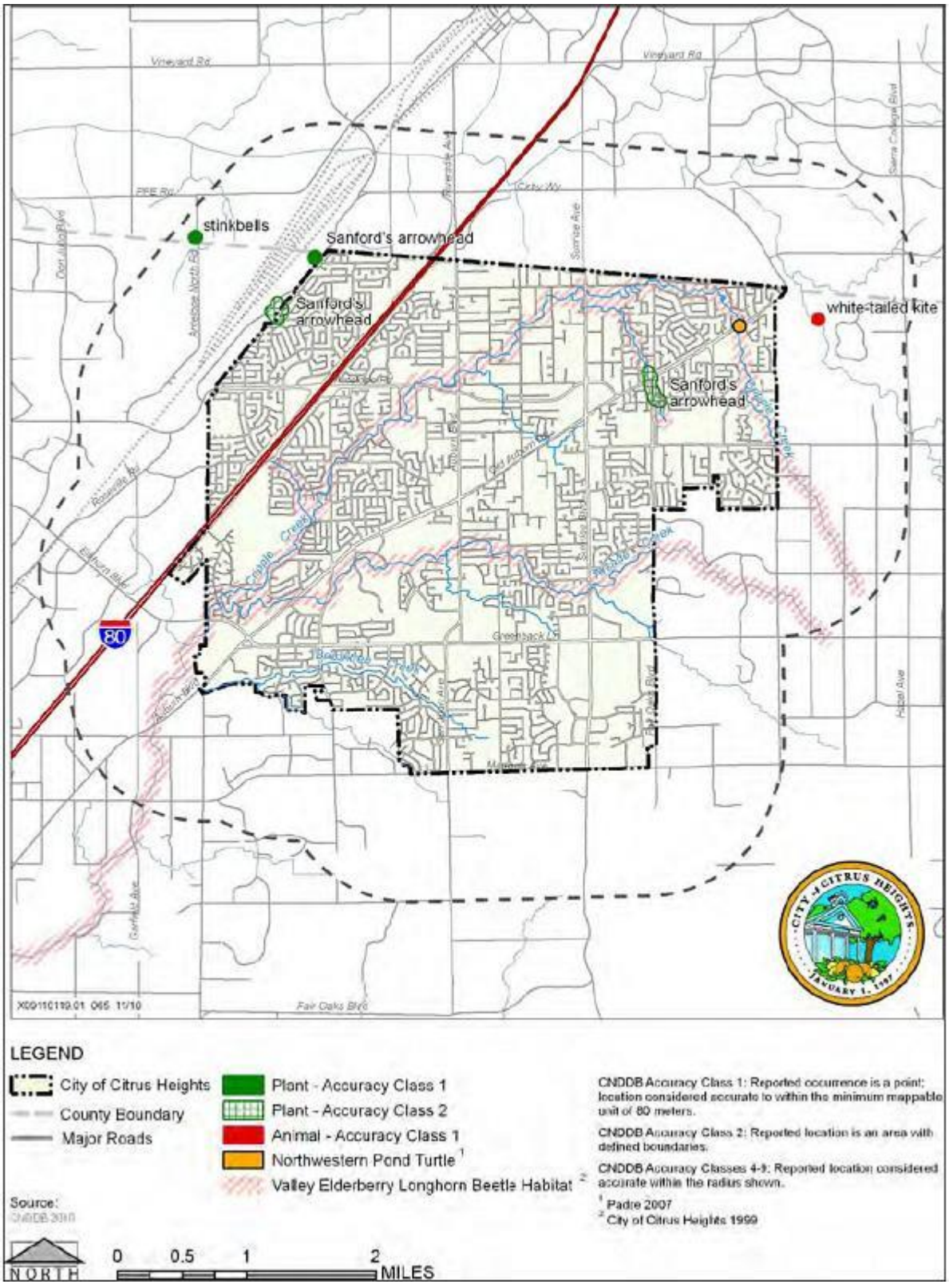
Table A-11 Special-Status Plant Species Known to Occur or Potentially Occurring in Citrus Heights

Species	Status[1]			Habitat
	USFWS	DFG	CNPS[1, 2]	
Bigscale balsam root *Balsamorhiza macrolepis var. macrolepis*	–	–	1B.2	Could occur; suitable habitat in open areas that support California annual grassland. The nearest known occurrence is approximately five miles away.
Stinkbells *Fritillaria agrestis*	–	–	4.2	Known to occur; suitable habitat in California annual grassland habitat
Sanford's arrowhead *Sagittaria sanfordii*	–	–	1B.2	Known to occur; suitable habitat in freshwater marsh along creeks and streams in valley foothill riparian habitat as well slow-moving drainages and ditches

Notes:
USFWS = US Fish and Wildlife Service, DFG = Department of Fish and Game, CNPS = California Native Plant Society
[1]CNPS Categories:
1B Plant species considered rare or endangered in California and elsewhere (protected under CEQA, but not legally protected under ESA or CESA)
4 Plants species of limited distribution or infrequent throughout a broader area in California (vulnerability or susceptibility to threat appears low). Uncommon enough that their status should be monitored regularly
[2]CNPS Extensions:
2 Fairly endangered in California (20% to 80% of occurrences are threatened).

Source: City of Citrus Heights General Plan Environmental Impact Report

Figure A-3 Special Status Species Location in Citrus Heights



Source: City of Citrus Heights General Plan Environmental Impact Report

Table A-12 Special-Status Wildlife Species Known or Potentially Occurring in Citrus Heights

Species	Status[1]		Habitat
	USFWS	DFG	
Invertebrates			
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	–	Could occur; elderberry shrubs are present in valley foothill riparian habitat along Arcade and Cripple creeks
Reptiles			
Northwestern pond turtle *Actinemys marmorata marmorata*	–	CSC	Known to occur; suitable habitat is present in freshwater marshes, rivers, streams, and irrigation ditches within valley foothill riparian habitat.
Birds			
White-tailed kite *Elanus leucrus*	–	FPS	Known to occur; suitable habitat is present for nesting in trees within the valley foothill riparian and interior live oak habitats and foraging in annual grassland habitat
Mammals			
Palid bat *Antrozous pallidus*	–	CSC	Could occur; suitable habitat for roosting and foraging is present in valley foothill riparian, interior live oak habitats and annual grassland habitats.
Notes: DFG = California Department of Fish and Game; USFWS = U.S. Fish and Wildlife Service [1]Legal Status Definitions			
Federal Listing Categories (USFWS) E Endangered T Threatened (legally protected) C Candidate		State Listing Categories (DFG) E Endangered T Threatened (legally protected) CSC Species of Special Concern FPS Fully Protected Species	

Source: City of Citrus Heights General Plan Environmental Impact Report

Historic and Cultural Resources

Euro-American settlement of Citrus Heights began in the mid 19th Century with a Mexican land grant of 11 square leagues of land in the Sacramento Valley to John Sutter, including the Rancho Del San Juan subgrant. This subgrant area occupied 20,000 acres, including the modern-day Citrus Heights area. The area developed as an agricultural community consisting of families settling small farms surrounding the Sylvan Corners area, located at the present-day intersection of Sylvan Road, Auburn Boulevard, and Old Auburn Road. The 20th Century saw a boom in urbanization of the area, particularly after World War II, when subdivisions began springing up to accommodate an influx of new residents to the area. The area continued to grow, in part as the rocket manufacturing plant at Aerojet in nearby Rancho Cordova attracted employees and their families to the region. As this new development occurred, many older structures throughout the community were demolished and replaced by tract housing and new commercial development to serve the booming population. As this shift occurred, Citrus Heights saw its historical character change to a more urbanized, suburban community, losing its character as a rural agricultural community.

Despite the urbanization of the community, several historic buildings remain intact today. However, many have been altered in such ways as to possibly lose their historic integrity. Some of these structures may no

longer qualify for protection under historic preservation regulations. Table A-13 shows registered federal historic sites the in the City of Citrus Heights.

Table A-13 Registered Historic Sites in the City of Citrus Heights

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
Rusch Home (P737)				X	2/11/1991

Source: California Office of Historical Preservation

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) document America's architectural and engineering heritage. There are no HABS and HAER structures in the City of Citrus Heights.

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

In addition to the registered sites, there are several assets within Citrus Heights that define the community and represent the City's history. Some of the historical sites of importance to Citrus Heights are listed below and shown in Figure A-4.

14 Mile/Van Maren House

In 1851, the original 14 Mile House was constructed as a roadhouse and way station for teamsters hauling supplies to country mining camps. It is located on Auburn Boulevard approximately halfway between Greenback Lane and Van Maren Lane. The property is surrounded by a modern apartment complex on three sides. The roadhouse was acquired by the Van Maren family and renovated in 1920 to serve as a family residence. An historic survey evaluation completed in 2002 suggests that this may be the oldest wood frame building in Sacramento County. The house is potentially eligible for listing in the California Register of Historical Resources and in the National Register of Historic Places for its potential to yield information as an historic archeological site. The house itself has an information potential regarding early construction in California. The area in the immediate vicinity of the house has potential for deposits associated with the 1850s roadhouse.

Rusch Home

The Rusch Home, built by Citrus Heights pioneers Fred and Julia Rusch, is located in the northwest section of Rusch Park, along Antelope Road. The existing structure was rebuilt in 1914 following a fire that destroyed the original structure. The home and the surrounding land was donated to the community, which led to the establishment of Rusch Park, the City's largest and most prominent park, and the Sunrise Recreation and Park District offices. The home is listed with the State Office of Historic Preservation as a California Point of Historical Interest (SAC-012).

Dekay/Sunrise Ranch Home

The Dekay/Sunrise Ranch home was constructed in 1868 as part of the Sunrise Ranch property in the northern portion of the existing City, along current-day Sunrise Boulevard, named after the property. The home is currently used as a private residence and is one of the oldest residential structures in the area. However the building has been substantially altered and is not eligible for listing in the California Register of Historical Resources or the National Register of Historic Places due to a lack of historical integrity.

Sylvan School/Citrus Heights Community Club

The old Sylvan School, located south of Sylvan Corners, was initially constructed in 1862, and consisted of a single classroom and two small broom or hat halls. The school was also used as a civic, social, and religious center that supported church services, dancing parties, and local voting discussions. In 1927, the school was moved to another located on Sylvan Road, and the building remains in use as a community meeting hall. The building has been modified, which has resulted in a loss of historic integrity which makes listing in the California Register questionable. However the historic resources survey done by Rowland Nawi Associates in 2006 found that this property may be suitable for listed as a Point of Historic Interest.

Sylvan Cemetery

Sylvan Cemetery, located along Auburn Boulevard north of Sylvan Corners, was established on land donated in 1862, and first broke ground in 1864. The cemetery has been expanded over the years and currently occupies 18 acres. The site is not currently listed on the National or California Register of Historic Places, and further research would be necessary to determine its eligibility, particularly since cemeteries must meet special requirements for listing on the National Register.

San Juan High School

San Juan High School was the first secondary school established in Citrus Heights and the northeast part of Sacramento County. San Juan High School is eligible for listing in the National Register of Historic Places and the California Register of Historical Resources as a key institution representing the growth and development of the area of Citrus Heights and as the first high school in the northeast county. It is located at the intersection of Greenback Lane and Mariposa Avenue.

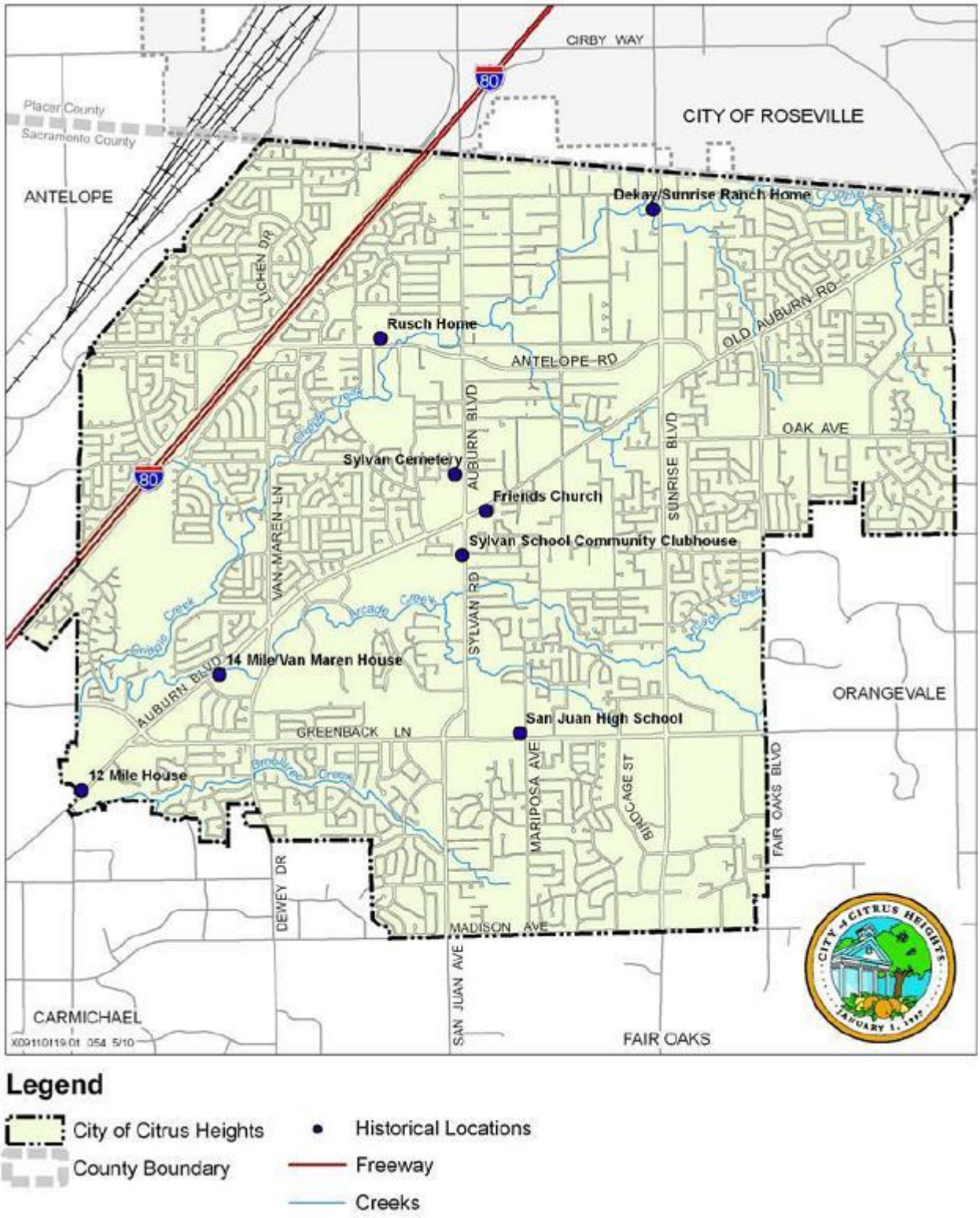
Friends Church

The Friends Church was constructed in 1921, just east of the intersection of Sylvan Road, Auburn Boulevard, and Old Auburn Road. It was the first church built within Citrus Heights. The church has been remodeled twice since its construction and looks different from its original appearance. However, both remodels took place more than 50 years ago, so it is eligible for listing in the California Register of Historical Resources.

12 Mile House

Like the 14 Mile House, the original 12 Mile House was also constructed in the 1800s as a teamster way station. It was located on the south bed of Cripple Creek near present-day DeVechi Road but was rebuilt in the 1920s to accommodate an expansion of Auburn Road. The new 12 Mile House, located at the extreme southwest corner of the planning area, was built and operated as a bar until 1998. The structure is one of the oldest commercial structures in Citrus Heights, and although it has been modified since its construction, this has not significantly compromised its architectural integrity. In addition, the building retains its historical associations to the late 1940s and so appears to be eligible for listing in the California Register of Historical Resources.

Figure A-4 Historic Resources in the City of Citrus Heights



Source: City of Citrus Heights General Plan Environmental Impact Report

Growth and Development Trends

Past growth within the City of Citrus Heights had been strong and steady until the last census in 2010. Current California Department of Finance estimates for July 1, 2015 were 85,147. Table A-14 shows past growth trends since 1970. However most recently, the City has experienced a slight drop in population as described later in this section.

Table A-14 Past Growth in the City of Citrus Heights

Year	Population	Change	Percent Change	Annual Percentage Change
1970	31,015	–	–	–
1980	63,848	32,833	105.9%	10.6%
1990	82,045	18,197	28.5%	2.9%
2000	85,071	3,026	3.7%	0.4%
2010	88,115	3,044	3.6%	0.4%

Source: State of California Department of Finance (1970-2000), US Census Bureau 2010

Land Use

Currently, Citrus Heights is about 97 percent built out, meaning not much vacant land remains to be developed. As shown in Table A-15, about three-quarters of the City's remaining vacant land is residential in nature.

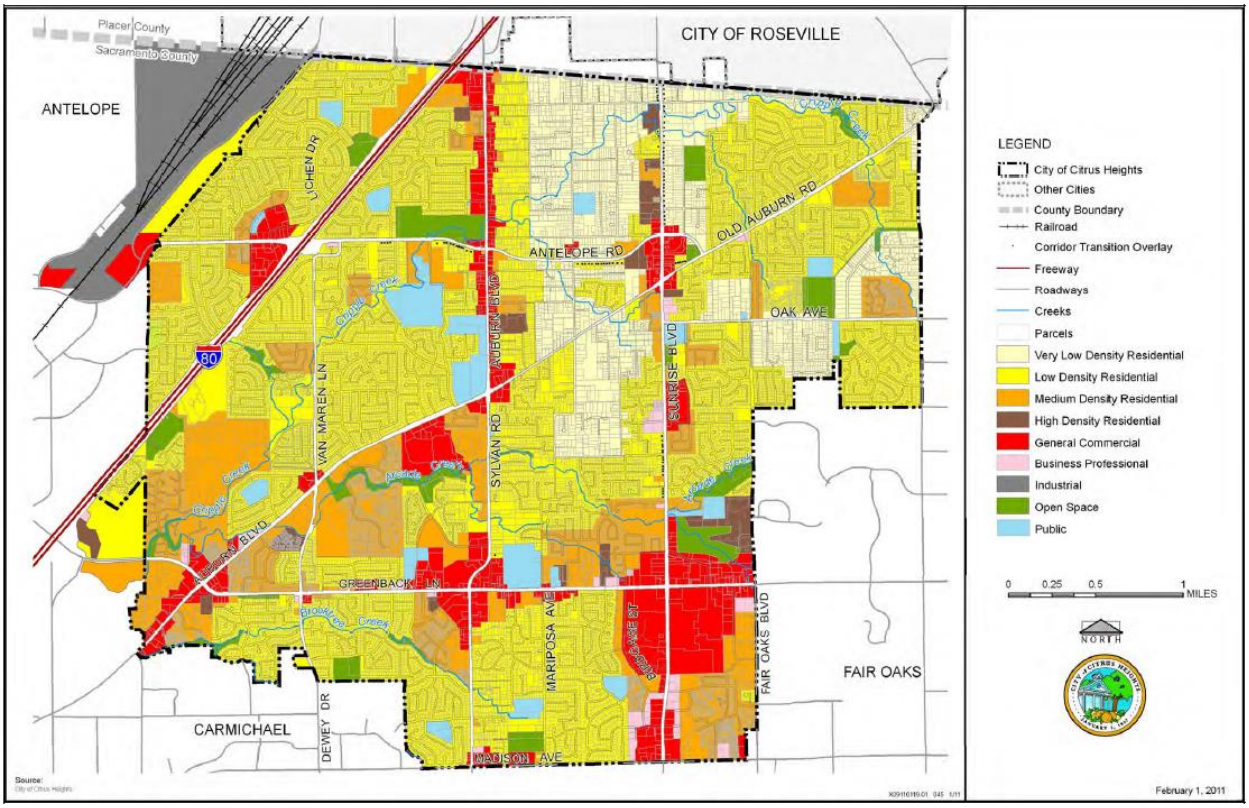
Table A-15 Vacant Land Inventory

Current Land Use/Zoning	Vacant Acres
Residential*	149
Commercial**	46
Total Land Area	195

Notes:
* Based on Vacant Land and Pending Development Inventory (2007), City of Citrus Heights
** Based on Sacramento County Assessor Data

Figure A-5 designates land uses for the Citrus Heights Area. The land use diagram employs a series of residential and nonresidential land use designations. The land use diagram identifies locations of the land use designations to indicate where certain types of land uses may occur.

Figure A-5 City of Citrus Heights Land Use



Source: City of Citrus Heights General Plan Environmental Impact Report

Development since 2011 Plan

As shown in Table A-16, Citrus Heights has seen a loss of 3.4% of population between 2010 and January 1, 2015.

Table A-16 City of Citrus Heights Population Changes Since 2011

Year	Population	Change	% Change
2010[1]	88,115	–	–
2015[2]	85,147	-2,968	-3.4%

Source: [1]US Census Bureau, [2]California Department of Finance

The Citrus Heights Building Department tracked total building permits issued since 2011 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table A-17 and Table A-18. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people living in the area potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the City to identified priority hazards.

Table A-17 City of Citrus Heights Total Development Since 2011

Property Use	2011	2012	2013	2014	2015
Residential	9	11	4	19	54
Commercial	1	2	3	0	12
Industrial	0	0	0	0	0
Other	0	0	0	0	0
Total	**10**	**13**	**7**	**19**	**66**

Source: City of Citrus Heights Building Department

Table A-18 City of Citrus Heights Development in Hazard Areas since 2011

Property Use	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Residential	0	0	0	0
Commercial	0	0	0	0
Industrial	0	0	0	0
Other	0	0	0	0
Total	**0**	**0**	**0**	**0**

Source: City of Citrus Heights Building Department

[1]Moderate or higher wildfire risk area

Future Development

The Sacramento Council on Governments (SACOG) modeled population projections for the City of Citrus Heights and other areas of the region in 2012 for a Metropolitan Transportation Plan/Sustainable Communities Strategy report. This forecast uses a 2008 base year estimate with projections to 2020 and 2035 for population, housing units, households and employment. SACOG estimated the City population in 2020 and 2035 to be 86,057 and 94,242 respectively.

Future Annexation

The City and County cannot agree on mutual terms for annexation and no further attempts at annexation are currently planned.

More general information on growth and development in Sacramento County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Sacramento County Vulnerability and Assets at Risk of the main plan.

A.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table A-8 as high or medium significance hazards and primary hazards to the State of California. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the base plan for more detailed information about

these hazards and their impacts on the Sacramento County planning area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the base plan. In general, the most vulnerable structures are those located within the flood risk areas, wildfire risk areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Depending on the hazard and availability of data for analysis, this hazard specific vulnerability assessment also includes information on values at risk, critical facilities and infrastructure, populations at risk, natural resources, historic and cultural resources, and future development.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

The City of Citrus Heights is traversed by several stream systems and is at risk to both riverine flooding and localized stormwater flooding. As previously described in Section 4.2.14 of the main plan, the Sacramento County Planning Area and the City of Citrus Heights have been subject to previous occurrences of flooding. Arcade and Cripple Creeks have relatively small hydrologic capacity and can be quickly overwhelmed during severe storm runoff events resulting in the overflowing of stream channel banks and the temporary inundation of floodplains and connected low lying areas.

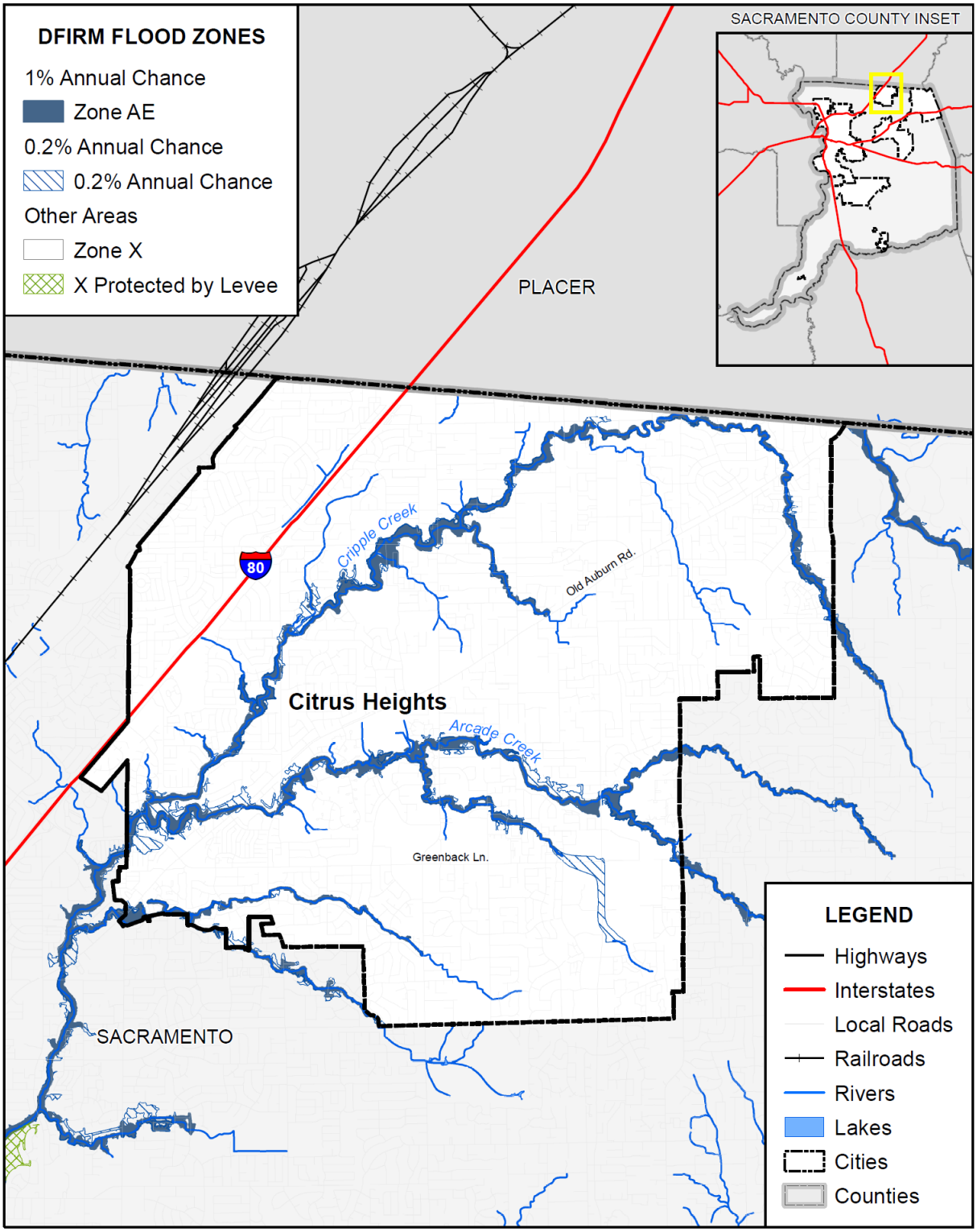
Past Occurrences

The HMPC noted no past occurrences of flood since the 2011 plan was completed.

Flood Zones

A small portion of the City is located inside of the 100 year flood zone as defined by the Federal Emergency Management Agency (FEMA). This is seen in Figure A-6.

Figure A-6 City of Citrus Heights – FEMA DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Vulnerability to Flood

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Citrus Heights. The methodology described in Section 4.3.10 of the base plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table A-19 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a floodplain in the City.

Table A-19 City of Citrus Heights – Count and Improved Value by Property Use and Detailed Flood Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value*
Zone A						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone AE						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	4	3	$298,316	$4,116,618	$298,316	$4,713,250
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	21	0	$10,614	$0	$10,614	$21,228
NO DATA	0	0	$0	$0	$0	$0
Office	1	1	$244,795	$224,497	$244,795	$714,087

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value*
Public / Utilities	41	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	163	146	$10,470,977	$21,440,987	$5,235,489	$37,147,453
Retail / Commercial	6	6	$2,189,823	$3,393,576	$2,189,823	$7,773,222
Vacant	14	0	$900,219	$0	$0	$900,219
Total	**250**	**156**	**$14,114,744**	**$29,175,678**	**$7,979,037**	**$51,269,459**
Zone AH						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone AO						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value*
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone A99						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Total 1%	**250**	**156**	**$14,114,744**	**$29,175,678**	**$18,455,185**	**$61,745,607**
0.2% Annual Chance Flood Zone*						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	7	0	$22,866	$0	$22,866	$45,732
NO DATA	0	0	$0	$0	$0	$0
Office	7	6	$932,463	$2,015,534	$932,463	$3,880,460
Public / Utilities	8	0	$4,334	$0	$4,334	$8,668
Recreational	0	0	$0	$0	$0	$0
Residential	268	262	$21,441,418	$43,661,184	$10,720,709	$75,823,311
Retail / Commercial	8	8	$4,217,865	$8,420,385	$4,217,865	$16,856,115

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value*
Vacant	5	0	$203,579	$0	$0	$203,579
Total	**303**	**276**	**$26,822,525**	**$54,097,103**	**$15,898,237**	**$96,817,865**
X Protected by Levee Zone						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone X						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	44	37	$14,251,163	$48,532,045	$14,251,163	$77,034,371
Church / Welfare	42	36	$7,599,614	$36,590,416	$7,599,614	$51,789,644
Industrial	20	17	$9,990,370	$14,997,579	$14,985,555	$39,973,504
Miscellaneous	162	0	$193,205	$0	$193,205	$386,410
NO DATA	1	1	$34,780	$74,974	$34,780	$144,534
Office	95	90	$42,685,331	$88,251,730	$42,685,331	$173,622,392
Public / Utilities	161	1	$449,451	$3,494	$449,451	$902,396
Recreational	6	6	$3,048,646	$9,682,591	$3,048,646	$15,779,883
Residential	22,799	22,550	$1,415,121,393	$3,364,568,028	$707,560,697	$5,487,250,118
Retail / Commercial	341	324	$265,277,191	$401,324,557	$265,277,191	$931,878,939
Vacant	255	11	$22,113,129	$1,230,433	$0	$23,343,562
Total	**23,926**	**23,073**	**$1,780,764,273**	**$3,965,255,847**	**$1,056,085,633**	**$6,802,105,753**

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Table A-20 summarizes Table A-19 above and shows City of Citrus Heights loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table A-20 City of Citrus Heights – Flood Loss Summary

Flood Zone	Improved Parcel Count	Total Improved Value	Estimated Contents Value	Total Improved/ Contents Value	Loss Estimate	Loss Ratio
1% Annual Chance	156	$29,175,678	$18,455,185	$47,630,863	$9,526,172.60	0.12%
0.2% Annual Chance*	276	$54,097,103	$32,266,511	$86,363,890	$17,272,778.00	0.21%

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

According to Table A-19 and Table A-20, the City of Citrus Heights has 156 improved parcels and $47,630,863 of structure and contents value in the 1% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the base plan, there is a 1% chance in any given year of a flood event causing roughly $9,526,172.60 in damage in the City of Citrus Heights. A loss ratio of 0.12% indicates that losses in Citrus Heights to flood would be relatively minor, as less than an eighth of a percent of the total values in the City would be damaged. The City of Citrus Heights has 276 improved parcels and $86,363,890 of structure and contents value in the 0.2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the base plan, there is a 0.2% chance in any given year of a flood event causing roughly $17,272,778.00 in damage in the City of Citrus Heights. A loss ratio of 0.21% indicates that losses in Citrus Heights to flood would be relatively minor, as less than a quarter of a percent of the total values in the City would be damaged.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology used for the Sacramento County Planning Area, as discussed in Section 4.3.10 of the base plan, was used for the City of Citrus Heights. Table A-21 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table A-21 City of Citrus Heights – Flooded Acres

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
A	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
AE	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	4.45	3.86	8.65%
	Industrial	0	0	0.00%
	Miscellaneous	14.28	0	0.00%
	No Data	0	0	0.00%
	Office	0.62	0.62	1.40%
	Public / Utilities	34.69	0	0.00%
	Recreational	0	0	0.00%
	Residential	41.20	35.33	79.20%
	Retail / Commercial	4.80	4.80	10.76%
	Vacant	5.71	0	0.00%
	Total	**105.75**	**44.61**	**100.00%**
AH	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Total	0	0	**0.00%**
AO	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
A99	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
Total 1%		**105.75**	**44.61**	**100.00%**
Shaded X (0.2% Annual Chance)*	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Miscellaneous	2.31	0	0.00%
	No Data	0	0	0.00%
	Office	2.69	1.95	3.42%
	Public / Utilities	3.02	0	0.00%
	Recreational	0	0	0.00%
	Residential	53.37	50.57	88.59%
	Retail / Commercial	4.56	4.56	7.99%
	Vacant	0.86	0	0.00%
	Total	**66.81**	**57.09**	**100.00%**
X Protected by Levee	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
X	Agricultural	0	0	0.00%
	Care / Health	111.12	92.33	1.54%
	Church / Welfare	107.43	97.47	1.63%
	Industrial	25.73	23.07	0.38%
	Miscellaneous	46.29	0	0.00%
	No Data	0.19	0.19	0.00%
	Office	89.39	86.66	1.45%
	Public / Utilities	350.31	0.11	0.00%
	Recreational	30.53	30.53	0.51%
	Residential	5,401.45	5,163.19	86.17%
	Retail / Commercial	504.88	494.15	8.25%
	Vacant	200.91	4.29	0.07%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Total	**6,868.22**	**5,992.00**	**100.00%**

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2010 Census Bureau average household factors for Citrus Heights. According to this analysis, there is a total population of 1,032 residents of the City at risk to flooding, 369 in the 1% annual chance floodplain and 663 in the 0.2%annual chance floodplain. This is shown in Table A-22.

Table A-22 City of Citrus Heights – Count of Improved Residential Parcels and Population by Flood Zone

Flood Zone	Improved Residential Parcels	Population*
1%Annual Chance	146	369
0.2% Annual Chance**	262	663
Total	**408**	**1,032**

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

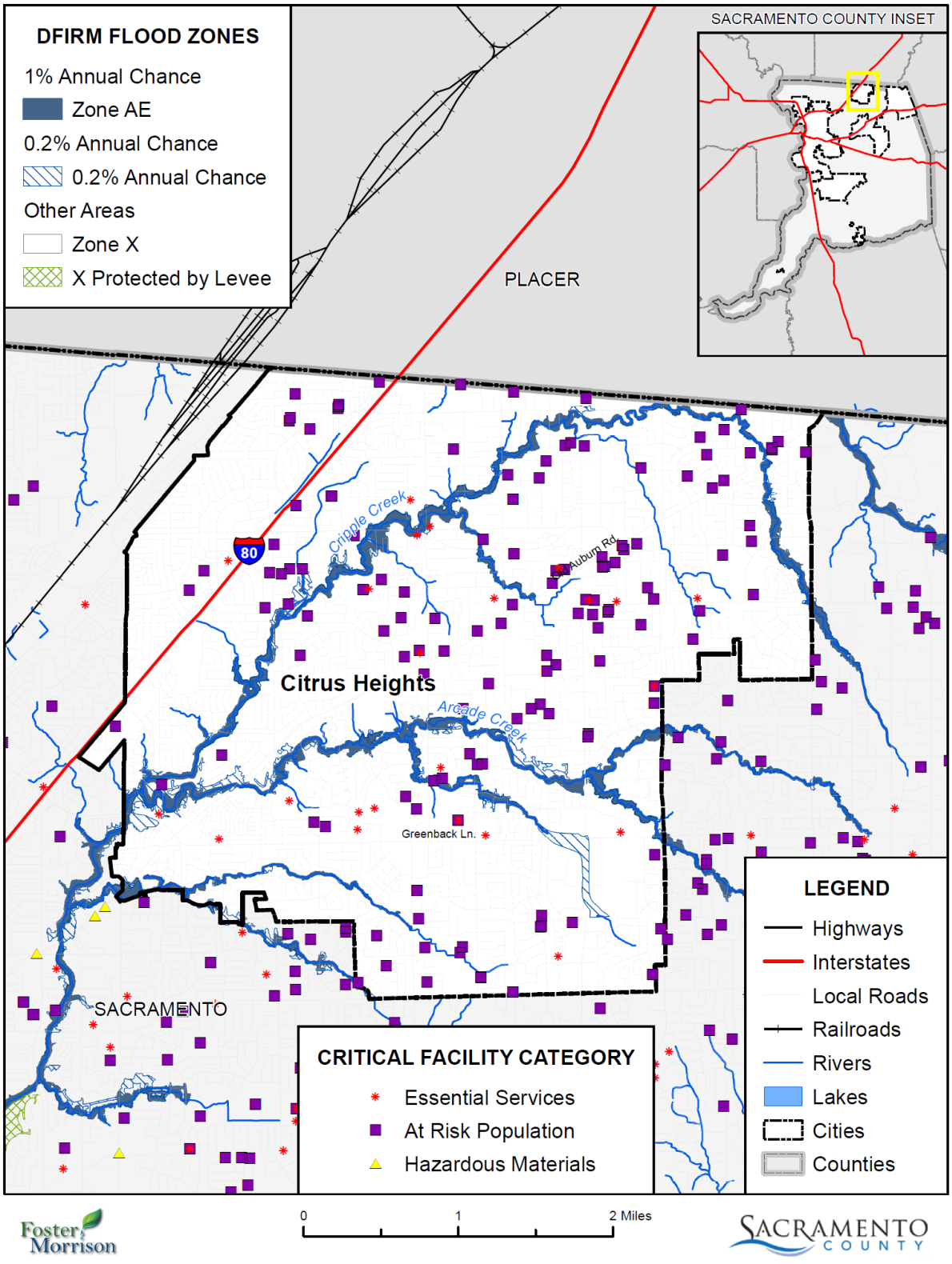
* Average household populations from the 2010 US Census were used: Citrus Heights– 2.53.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Citrus Heights in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersects a DFIRM flood hazard areas, and if so, which zone it intersects. Details of critical facilities in the floodplain in the City of Citrus Heights are shown in Figure A-7 and Table A-23. As shown on the table and figure, Citrus Heights has 2 critical facilities located in 1% annual chance and 3 critical facilities in the 0.2% annual chance DFIRM flood zones. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure A-7 City of Citrus Heights – Critical Facilities and Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table A-23 City of Citrus Heights – Critical Facilities and Flood Zones

Critical Facility Category	Facility Type	Facility Count
Zone AE		
Essential Services Facilities	Medical Health Facility	1
	Total	**1**
At Risk Population Facilities	Day Care Center	1
	Total	**1**
AE Total		**2**
0.2% Annual Chance*		
Essential Services Facilities	Emergency Evacuation Shelter	1
	Total	**1**
At Risk Population Facilities	Private Elementary School	1
	Private K-12 School	1
At Risk Population Facilities	**Total**	**2**
0.2% Annual Chance Total		**3**
Zone X		
Essential Services Facilities	Bus Terminal	1
	Emergency Evacuation Shelter	8
	Fire Station	4
	Government Facilities	2
	Medical Health Facility	5
	Police	1
	Total	**21**
At Risk Population Facilities	Adult Day Care	1
	Adult Education School	1
	Adult Residential	16
	Day Care Center	23
	Group Home	9
	Infant Center	2
	Private Elementary School	9
	Private High School	3
	Private K-12 School	2
	Public Continuation High School	1
	Public Elementary School	10
	Public High School	2
	Public Middle School	1
	Residential Care/Elderly	59

Critical Facility Category	Facility Type	Facility Count
	Social Rehabilitation Facility	1
	Total	**140**
X Total		**161**
Grand Total		**166**

Source: FEMA DFIRM June 16, 2015; Sacramento County GIS

*This count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all critical facilities in the 1% annual chance floodplain.

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Citrus Heights joined the National Flood Insurance Program (NFIP) on November 15, 1989. The City does not participate in the CRS program. NFIP data indicates that as of February 19, 2016, there were 458 flood insurance policies in force in the City with $126,282,200 of coverage. Of the 458 policies, 450 were residential (single-family homes) and 8 was non-residential; 67 of the policies were in A zones (the remaining 391 were in B, C, and X zones). The GIS parcel analysis detailed above identified 156 parcels in the 100-year flood zone. 67 policies for 156 parcels in the 100-year floodplain equates to insurance coverage of 42.9 percent. There have been no historical claims for flood losses in the City.

California Department of Water Resources Best Available Maps (BAM)

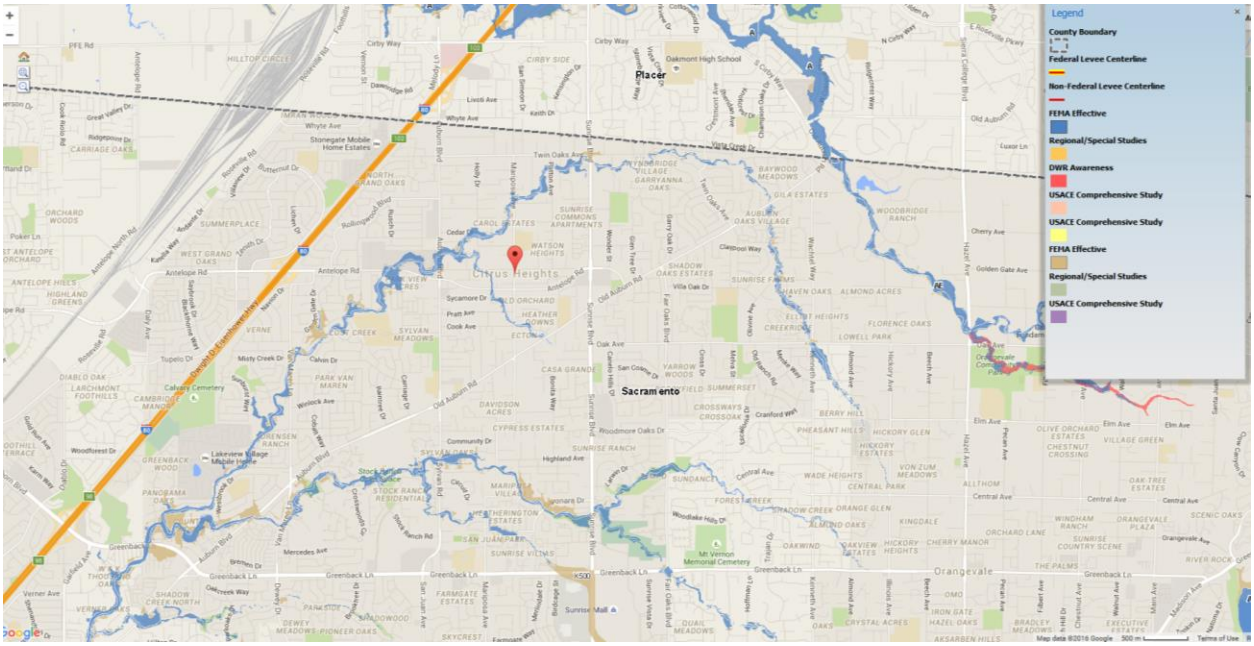
The FEMA regulatory maps provide just one perspective on flood risks in Sacramento County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency, however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance

needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. The BAM map for Citrus Heights is shown in Figure A-8.

Figure A-8 City of Citrus Heights Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 100-Year, Orange – Local 100-Year (developed from local agencies), Red – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), Pink – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), Purple – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Future Development

The City enforces the floodplain ordinance and, through the zoning code, has restricted building in the floodplain to only replacing existing structures with conforming structures. If any development is to occur in the floodplain, it would have to conform to the elevation standards of the floodplain ordinance. No development is expected in the floodplain in the future.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding and other issues caused by severe weather events, primarily heavy rains and thunderstorms, can often pose a risk to the community. Primary concerns include impacts to infrastructure that provides a means of ingress and egress throughout the community.

Past Occurrences

The City experiences recurring flooding problems in the months of November and December. Rain cells in one-hour duration with a hydraulically measured 30 year + occurrence will pick up leaves from the yards and push them into the street and plug up the inlets. Many times the rainwater will crown the road and enter different drainage basin areas to cause flooding. The severe rain cells will hit random areas of the city. As such, except for extra street sweeping of leaves in the leaf drop season, no drainage projects are contemplated to correct the problem.

In the past 5 years, the city has experienced 3 occurrences of severe localized flooding caused by a combination of a heavy rain cell and in 2 of the instances excessive tree leaves plugging inlets. In the 3 occurrences, anywhere from a half dozen to as many as 20+ homes flooded. The dates of the 3 events included February 24, 2011; December 12, 2012 and December 3, 2014.

House flooding in each of the events never exceeded a foot in depth within the home or business and in every case, the water receded within 45 minutes of flooding the home.

Vulnerability to Localized Flooding

The General Services Department maintains a citywide list of past chronic flooding within the City. This list includes flood complaints registered with the General Services Department using data from the past several years. Figure A-9 depicts known ponding and street flooding locations in the City. This map is an initial inventory of key problem areas and is not intended to be a complete inventory of all problems and locations associated with severe weather events and localized flooding in the City of Citrus Heights. Damage estimates due to flooding at these locations was unavailable.

Figure A-9 Localized Flooding Map for the City of Citrus Heights

Source: City of Citrus Heights General Plan Environmental Impact Report

Table A-24 identifies known and past occurrences of such areas and the associated problems encountered. This list is an initial inventory of key problem areas and is not intended to be a complete inventory of all problems and locations associated with severe weather events and localized flooding in the City of Citrus Heights.

Table A-24 City of Citrus Heights's Road List of Localized Flooding Problem Areas

Road Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Auburn Bl @ Grand Oaks Bl	X						
Brookdale Dr (7400)	X						
Greenbback Ln (6529)	X						
Greenback Ln (7548)	X						
Sunrise Bl (5406)	X						
Sunrise Bl (5900)	X						
Sylvan Oak Wy (7960)	X						
Tiara Wy (7856)	X						
Viscount Wy (6531)	X						

Source: City of Citrus Heights

Future Development

Changes in the regional approach for clean water and mitigation of flooding has set standards for future development in the City The standards include hydromodification to be put in place by the development. This usually translates into recessed landscape areas to pond the runoff and clean the runoff. Developments have also been using pervious pavements and street projects have added recessed landscape areas to collect and clean the runoff.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While

the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the City of Citrus Heights.

Past Occurrences

The City has had to implement a couple projects to protect and restore the creek bank that had encroached into the public infrastructure.

- Matheny Drainage Project
  - ✓ In 2003, the City released an emergency creek bank restoration project. Arcade Creek had eroded the bank next to Matheny Way and caused the street to crack open. Approximately 250' of gabion baskets were installed along the creek bank just outside the shoulder of the road.
- Stock Ranch Drainage Project
  - ✓ In 2011, the City had a contractor rock the banks along Arcade Creek at a major pedestrian bridge and restore an outfall for a sedimentation basin next to the bridge. Over 30' of bank had been eroded over a 5-year time span. The erosion had threatened the bridge piers and partially collapsed a concrete outfall.

Vulnerability to Erosion

The City has 26 miles of creeks within its 14 square miles. Cripple Creek, Arcade Creek, San Juan Creek, Mariposa Creek, Coyle Creek and Brooktree Creek traverse the City and are at risk to bank erosion All the creeks within the city suffer from suburban runoff causing deep incisions and erosion.

Future Development

The zoning code has been updated to keep structures out of harms way. The revised code requires structures to not only be outside a known special flood hazard, but also set back 50' plus twice the depth of the creek bank. Most of the banks are 8' high.

Wildfire

Likelihood of Future Occurrence–Unlikely
Vulnerability–Low

Hazard Profile and Problem Description

The creek corridors within the City have narrow buffers from the creek which does not leave a lot of exposure to fire hazards. Also, the creeks have a heavy concentration of berry bushes which stay green year round and are difficult to burn when still growing. However, due to the severity of wildfire in the State of California, wildfire vulnerability to the City is discussed here.

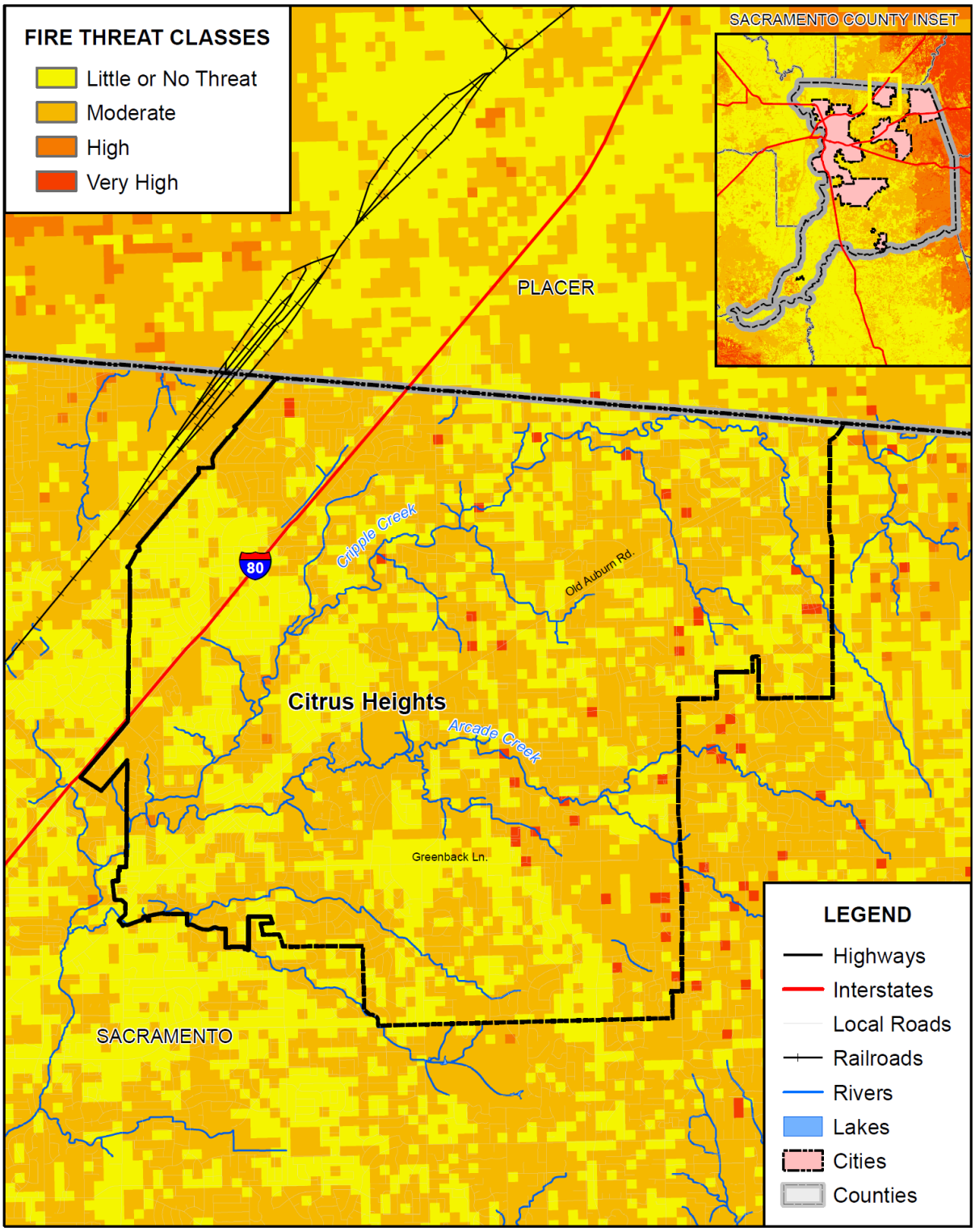
Past Occurrences

The Planning Team for the City noted no past occurrence of wildfires that have affected the City.

Vulnerability to Wildfire

Following the methodology described in Section 4.3.17 of the Base Plan, a wildfire map for the City of Citrus Heights was created (see Figure A-10). Wildfire threat within the City ranges from low to moderate, with small portions considered very high.

Figure A-10 City of Citrus Heights's Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Values at Risk

Analysis results for Citrus Heights are shown in Table A-25, which summarizes total parcel counts, improved parcel counts and their land and structure values by property use.

Table A-25 City of Citrus Heights – Count and Value of Parcels by Property Use and Fire Threat Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Little or No Threat					
Care / Health	12	$5,585,264	9	$11,853,041	$17,438,305
Church / Welfare	20	$2,249,220	18	$16,803,122	$19,052,342
Industrial	10	$6,884,040	9	$10,747,435	$17,631,475
Miscellaneous	69	$131,112	-	$0	$131,112
NO DATA	1	$34,780	1	$74,974	$109,754
Office	52	$17,104,732	47	$30,055,478	$47,160,210
Public / Utilities	82	$250,245	-	$0	$250,245
Recreational	4	$2,801,821	4	$8,866,959	$11,668,780
Residential	8,876	$550,893,425	8,778	$1,277,837,315	$1,828,730,740
Retail / Commercial	173	$106,754,326	159	$171,815,402	$278,569,728
Vacant	99	$7,680,168	2	$827,336	$8,507,504
Total	**9,398**	**$700,369,133**	**9,027**	**$1,528,881,062**	**$2,229,250,195**
Moderate					
Care / Health	32	$8,665,899	28	$36,679,004	$45,344,903
Church / Welfare	26	$5,648,710	21	$23,903,912	$29,552,622
Industrial	10	$3,106,330	8	$4,250,144	$7,356,474
Miscellaneous	120	$95,573	-	$0	$95,573
Office	48	$25,801,240	47	$59,087,256	$84,888,496
Public / Utilities	126	$203,540	1	$3,494	$207,034
Recreational	2	$246,825	2	$815,632	$1,062,457
Residential	14,173	$883,674,891	14,001	$2,113,693,090	$2,997,367,981
Retail / Commercial	182	$164,930,553	179	$241,323,116	$406,253,669
Vacant	173	$15,495,741	9	$403,097	$15,898,838
Total	**14,892**	**$1,107,869,302**	**14,296**	**$2,480,158,745**	**$3,588,028,047**
High					
Miscellaneous	1	$0	-	$0	$0
Public / Utilities	1	$0	-	$0	$0
Residential	19	$1,308,783	19	$3,556,445	$4,865,228

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Total	**21**	**$1,308,783**	**19**	**$3,556,445**	**$4,865,228**
Very High					
Office	3	$956,617	3	$1,349,027	$2,305,644
Public / Utilities	1	$0	-	$0	$0
Residential	162	$11,156,689	160	$34,583,349	$45,740,038
Vacant	2	$41,018	-	$0	$41,018
Very High Total	**168**	**$12,154,324**	**163**	**$35,932,376**	**$48,086,700**
Grand Total	**24,479**	**$1,821,701,542**	**23,505**	**$4,048,528,628**	**$5,870,230,170**

Source: Sacramento County 2015 Parcel/Assessor's Data, CAL FIRE

Population at Risk

The Fire Threat Zone dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction. According to this analysis, there is a total population of 35,876 residents of Citrus Heights at risk to moderate or higher wildfire risk. This is shown in Table A-26.

Table A-26 City of Citrus Heights – Count of Improved Residential Parcels and Population by Fire Threat Zone

Fire Threat Zone	Improved Residential Parcels	Population*
Low	8,778	22,208
Moderate	14,001	35,423
High	19	48
Very High	160	405
Total	**22,958**	**58,084**

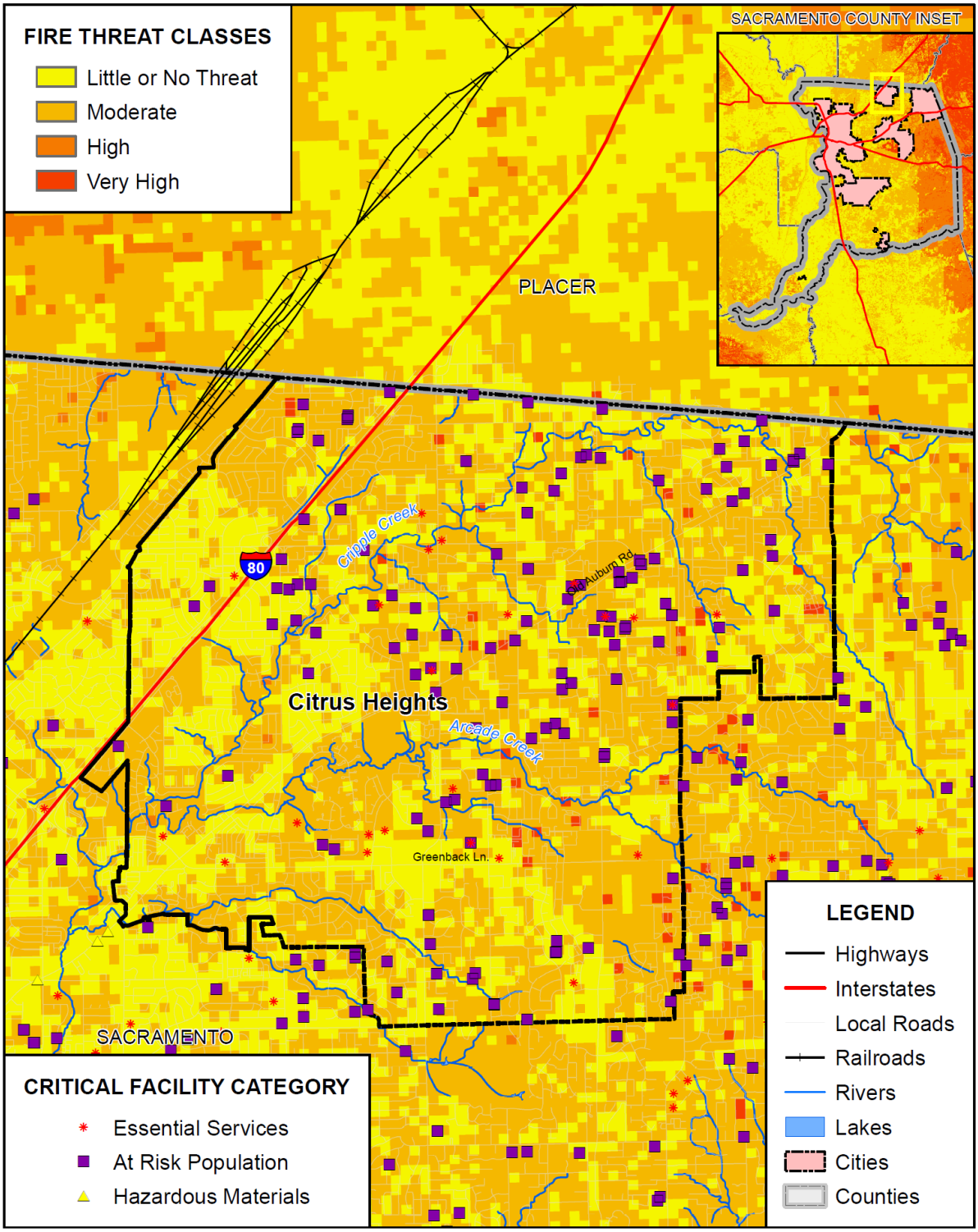
Source: Sacramento County 2016 Parcel/2015 Assessor's Data, CAL FIRE

* Average household populations for Citrus Heights (2.53) from the 2010 US Census were used

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect a fire threat zone provided by CAL FIRE, and if so, which zone it intersects. There are 102 facilities in the moderate or higher fire severity zone in the City. These are shown in Figure A-11 and detailed in Table A-27. Details of critical facility definition, type, name and address and jurisdiction by fire threat zone are listed in Appendix E.

Figure A-11 City of Citrus Heights – Critical Facilities in the Fire Threat Zone



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table A-27 City of Citrus Heights – Critical Facilities in the Fire Threat Zone

Critical Facility Category	Facility Type	Facility Count
Little or No Threat		
Essential Services Facilities	Emergency Evacuation Shelter	1
	Fire Station	2
	Government Facilities	1
	Medical Health Facility	3
	Total	**7**
At Risk Population Facilities	Adult Day Care	1
	Adult Education School	1
	Adult Residential	9
	Day Care Center	7
	Group Home	1
	Private Elementary School	3
	Private High School	1
	Public Continuation High School	1
	Public Elementary School	5
	Public High School	1
	Residential Care/Elderly	27
	Total	**57**
Little or No Threat Total		**64**
Moderate		
Essential Services Facilities	Bus Terminal	1
	Emergency Evacuation Shelter	8
	Fire Station	2
	Government Facilities	1
	Medical Health Facility	3
	Police	1
	Total	**16**
At Risk Population Facilities	Adult Residential	7
	Day Care Center	17
	Group Home	8
	Infant Center	2
	Private Elementary School	7
	Private High School	2
	Private K-12 School	3
	Public Elementary School	5

Critical Facility Category	Facility Type	Facility Count
	Public High School	1
	Public Middle School	1
	Residential Care/Elderly	32
	Social Rehabilitation Facility	1
	Total	**86**
Moderate Total		**102**
Grand Total		**166**

Source: CAL FIRE, Sacramento County GIS

Future Development

Development may occur in the moderate or higher wildfire threat areas; however, City ordinances for building in these areas are enforced.

A.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

A.6.1. Regulatory Mitigation Capabilities

Table A-28 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Citrus Heights.

Table A-28 City of Citrus Heights's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y 2008	
Capital Improvements Plan	Y 2016	
Economic Development Plan		
Local Emergency Operations Plan	Y 2005	
Continuity of Operations Plan		
Transportation Plan		

Stormwater Management Plan/Program	Y 2016	
Engineering Studies for Streams		
Community Wildfire Protection Plan		
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: 2013 CCR Title 24
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score: 2
Fire department ISO rating:		Rating:
Site plan review requirements	Y 2004	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	
Subdivision ordinance	Y	
Floodplain ordinance	Y	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)		
Flood insurance rate maps		
Elevation Certificates		
Acquisition of land for open space and public recreation uses		
Erosion or sediment control program	Y	
Other		

Source: City of Citrus Heights

The City of Citrus Heights General Plan, 2011

California Law requires that every City and County in the state have a General Plan. The Citrus Heights General Plan, adopted in 2000, was prepared over a two-year period that included an extensive public review process. Since that time there have been several minor amendments and a major amendment in 2011 to the General Plan. The 2011 update addressed Legislation requirements and added a Greenhouse Gas Reduction Plan.

The General Plan is the most important policy and planning document in the city, and is used by virtually every department. The General Plan is the city's statement of its vision for the future. The General Plan contains policies covering every aspect of the city: Land Use (how land can be developed), circulation, noise, air quality, housing, open space and conservation, and health and safety.

Ordinances

The City of Citrus Heights has many ordinances related to mitigation. These ordinances can be primarily or secondarily focused on mitigation.

Ordinances Primarily Focused on Mitigation

City of Citrus Heights Zoning Code (Chapter 106)

The City of Citrus Heights Zoning Code is the primary implementing mechanism of the General Plan. Unlike the General Plan, which provides long-range, comprehensive general policies for the general direction of land use in the City, the Zoning Code provides more specific descriptions of the types of uses that are allowed in certain areas, development standards (e.g., setbacks, building heights, lot coverage) and other detailed guidance for property development. The Zoning Code is required to be consistent with the General Plan.

The Citrus Heights Zoning Code prohibits new construction within the 100-year floodplain, except for specific landscaping and fences. The Zoning Code also includes minimum creek setbacks for development adjacent to creeks. For existing properties that are entirely in the floodplain and comply with the City's Drainage and Development Policy, development may occur, provided that each structure is designed to have the habitable finished floor elevation a minimum of two feet above the 100-year floodplain. Therefore, housing would not be placed in the 100-year flood hazard area that could put residents in danger, nor would any structures built in the 100-year flood hazard area impede or redirect flood flows.

In addition, Policy 49.2 in the Draft General Plan commits the City to continue to implement floodplain zoning and undertake actions required to comply with the flood-related regulations described in "Regulatory Setting." Policy 49.3 requires that potential flood hazards are analyzed before development is approved. Finally, Policy 49.7 directs the City to assist in the raising of existing residences above the 100-year base flood elevation and ensuring that new construction conforms to all applicable provisions of the National Flood Insurance Program.

Specific Plans and Special Planning Areas

A specific plan is a detailed plan for the development of a particular area in compliance with the city or county general plan. Specific plans are intended to provide predetermined specifications regarding the types of uses to be permitted, development standards (e.g., setbacks, height limits, landscape, architecture), and circulation and infrastructure improvements that are broadly defined by the general plan. Specific plans are often used to ensure that multiple property owners and developers adhere to a single common development plan, as well as to provide flexibility in development standards beyond those contained in the Zoning Code as a means of achieving superior design. There are two specific plans in Citrus Heights:

- Stock Ranch Guide for Development
- The Boulevard Plan – Reinventing the Auburn Boulevard Corridor

In addition to these specific plans, there are 12 Special Planning Areas (SPAs) within the City. Two of the SPAs correspond to the specific plans identified above.

Building Code (Section 16-88)

The California Building Code 2010 Edition, including the Appendix Chapter 1 Administration, is hereby adopted by reference based on the 2009 International Building Code. The chief building official of the city is designated to be the authority having jurisdiction of the Citrus Heights Building Code. The chief building official shall administer, enforce, and render interpretations of the provisions of the Citrus Heights Building Code, and shall, upon application and after receipt of proper documentation as required under this chapter, grant permits for the construction, alteration, maintenance, and moving of all buildings and structures within this jurisdiction.

Subdivision and Land Development Ordinance (Chapter 82)

This chapter derives from Sacramento County Code Title 22, Land Development. Information regarding this ordinance can be found in Section 4.4.1 of the base plan.

Flood Ordinance (Chapter 42)

It is the purpose of this chapter to promote the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood-control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains; electric, telephone and sewer lines; streets; and bridges located in areas of special flood hazard;
- Help maintain a stable tax base by providing for the second use and development of areas of special flood hazard to minimize future flood-blight areas;
- Ensure that potential buyers are notified that property is in an area of special flood hazard; and
- Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.
- In order to accomplish its purposes, this chapter includes methods and provisions for:
- Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards or which result in damaging increases in erosion or flood heights or velocities;
- Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Controlling the alteration of the natural floodplain, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Controlling fill, grading, dredging, and other development which may increase flood damage; and
- Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other area.

This chapter shall apply to all areas of special flood hazards, areas of flood-related erosion hazards and areas of mudslide (i.e., mudflow) hazards within the jurisdiction of the City. In all areas of special flood hazards, the following standards are required:

- Anchoring. Standards for anchoring shall be as follows:

- ✓ All new construction, substantial improvements, and other proposed new development shall be adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
- ✓ All manufactured homes shall meet the anchoring standards of section 42-18

➢ Construction materials and methods. Standards for construction materials and methods shall be as follows:

- ✓ All new construction, substantial improvement and other proposed new development shall be constructed with materials and utility equipment resistant to flood damage.
- ✓ All new construction, substantial improvement and other proposed new development shall be constructed using methods and practices that minimize flood damage.
- ✓ All new construction, substantial improvement and other proposed new development shall be constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located to prevent water from entering or accumulating within the components during conditions of flooding.
- ✓ Require within zone AH or AO that adequate drainage paths around structures on slopes guide floodwaters around and away from proposed structures.

➢ Elevation and floodproofing. Standards for elevation and floodproofing shall be as follows:

- ✓ New construction, substantial improvement and other proposed new development shall have the lowest floor, including basement, elevated to or above the base flood elevation. Nonresidential structures may meet the standards in subsection (3)c of this section. Upon the completion of the structure, the elevation of the lowest floor, including basement, shall be certified by a registered professional engineer or surveyor or verified to be properly elevated by the community building inspector. Such certification or verification shall be provided to the floodplain administrator.
- ✓ New construction, substantial improvement, and other proposed new development in zone AO shall have the lowest floor, including basement, elevated above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM or at least two feet if no depth number is specified. Nonresidential structures may meet the standards in subsection (3)c of this section. Upon the completion of the structure, the elevation of the lowest floor, including basement, shall be certified by a registered professional engineer or surveyor or verified to be properly elevated by the community building inspector. Such certification or verification shall be provided to the floodplain administrator.
- ✓ Nonresidential construction shall either be elevated to conform with the previous two subsections of this section or, together with attendant utility and sanitary facilities, shall:
  - Be floodproofed so that, below the base flood level, the structure is watertight with walls substantially impermeable to the passage of water;
  - Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
  - Be certified by a registered professional engineer or architect that the standards of this subsection are satisfied. Such certifications shall be provided to the floodplain administrator.
- ✓ Require, for all new construction, substantial improvement and other proposed new development, that fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the

entry and exit of floodwater. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria:

- Either a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided, the bottom of all openings shall be no higher than one foot above grade (openings may be equipped with screens, louvers, valves or other coverings or devices, provided that they permit the automatic entry and exit of floodwater); or
- Certification to comply with a local floodproofing standard approved by the Federal Insurance Administration of the Federal Emergency Management Agency.

✓ Manufactured homes shall also meet the standards in section 42-18

Fire Prevention (Chapter 38)

The City Council of the City of Citrus Heights, for the purpose of prescribing regulations governing conditions hazardous to life and property from fire or explosion, adopted the California Fire Code, Title 24, California Code of Regulations, Part 9, 2010 Edition incorporating the International Fire Code published by the International Code Council, being particularly the 2010 Edition, including the appendices thereof, and the International Fire Code Standards published by the International Code Council, being particularly the 2010 Edition, and the wholes thereof, save and except such portions as hereinafter deleted, modified or amended herein.

Sacramento County Stormwater and Grading Ordinances

This chapter derives from Sacramento County Code Title 15.12 and 16.44. Information regarding this ordinance can be found in Section 4.4.1 of the base plan.

Weed Control (Section 102, Article 3)

The Citrus Heights Municipal Code finds and declares that the uncontrolled growth and/or accumulation of grass, weeds or other materials or obstructions on sidewalks, streets, and on lands or lots is dangerous or injurious to neighboring property and the health or welfare of residents of the vicinity and is a public nuisance in that it creates a condition that reduces the value of private property, promotes blight and deterioration, invites plundering, creates fire hazards, constitutes an attractive nuisance creating a hazard to the health and safety of minors, creates a harbor for rodents and insects and is injurious to the health, safety and general welfare. To avoid wildfire, Section 102-161 states that "All dry grass, brush, vines or other dry vegetation shall be cleared for an area of not less than 30 feet from all structures, combustible fences, vehicles and combustible storage. The local fire authority may require additional clearances when topographical or geographical conditions warrant such action."

Ordinances Secondarily Focused on Mitigation

City of Citrus Heights Standards

City of Citrus Heights Municipal Code Chapter 106.30.040 "Creekside Development & Flood Hazard Mitigation" contains performance standards and requirements for development near creeks, setback areas to open spaces, and flood hazard mitigation.

Tree Preservation and Protection Ordinance

Chapter 106.39 of the Citrus Heights Zoning Code provides regulations for the protection, preservation, and maintenance of protected trees in the City. The ordinance protects native oak trees, oak woodlands, trees of historic or cultural significance, groves and stands of mature trees, and mature trees associated with development proposals.

A.6.2. Administrative/Technical Mitigation Capabilities

Table A-29 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Citrus Heights.

Table A-29 City of Citrus Heights's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	Approves conditions on development based on staff's recommendations
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Citrus Heights contracts out tree trimming, pipe cleaning, street maintenance and other public works services.
Mutual aid agreements	Y	Metro Fire and Citrus Heights Police have agreements in place with sister agencies.
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y	
Floodplain Administrator	Y	
Emergency Manager	Y	
Community Planner	Y	
Civil Engineer	Y	
GIS Coordinator	Y	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	
Hazard data and information	Y	
Grant writing	Y	
Hazus analysis	Y	
Other		

Source: City of Citrus Heights

Flood Control/Management

The City is provided flood control and management services from the Sacramento County Water Agency (SCWA). The SCWA, through its efforts at managing the flood control system under its jurisdiction, has created three Zones, which the City is covered under. These Zones include Zone 11, Zone 12, and Zone 13. Zone 11 is a drainage fee zone formed to provide funding for the construction of drainage facilities in Sacramento County. Fees are collected through Zone 11 from new development. Zone 12, now a separate utility, provides storm drain maintenance and improvements for Sacramento County, such as channel clearing and servicing pumping plants. Zone 13, an assessment district, provides funding for flood control and water supply planning, groundwater studies, and FEMA programs. Zone 13 collects fees from benefiting parties. Since July 2010, the City no longer contracts with Sacramento County for the operations and maintenance of drainage facilities. The City contracts with private contractors to provide these services.

A.6.3. Fiscal Mitigation Capabilities

Table A-30 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table A-30 City of Citrus Heights's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Drainage projects, erosion projects, street projects with upgrades to Storm drain system, master planning grants
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	Under Sac County drainage fee program
Storm water utility fee	Y	Collecting about $3.1 million per year to fund the drainage program
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	Y	
Community Development Block Grant	Y	
Other federal funding programs	N	
State funding programs	N	
Other		

Source: City of Citrus Heights

A.6.4. Mitigation Education, Outreach, and Partnerships

Table A-31 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information. More information can be found below the table.

Table A-31 City of Citrus Heights's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	CERT SSQP BERC Creek Week Green Planning Academy.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	City Franchisee for Solid Waste provides education in its billing, public relations work and other collection efforts.
Natural disaster or safety related school programs		
StormReady certification		
Firewise Communities certification		
Public-private partnership initiatives addressing disaster-related issues	N	
Other		

Regional Mutual Aid Plan

The California Office of Emergency Services' mutual aid plan for Region IV consists of the following counties: Nevada, Placer, Yolo, Sacramento, El Dorado, Alpine, Amador, San Joaquin, Calaveras, Tuolumne, and Stanislaus. The *Region IV Multi-Casualty Incident Plan* develops standard multiple casualty procedures so that jurisdictions can work together effectively in the case of a fire, explosion, chemical spill, or natural disaster that becomes a multiple casualty incident.

The purpose of the *Region IV Multi-Casualty Incident Plan* is to standardize emergency response procedures through the use of consistent response organization responsibilities, mobilization of resources, communications and documentation, patient dispersal and tracking, and regional hospital capabilities. The plan is designed to allow each agency to utilize the multiple casualty procedures both to enhance day-to-day medical response operations, and as a method to ensure that agencies efficiently share resources and communicate rapidly during multi-casualty incidents.

A.6.5. Other Mitigation Efforts

The City of Citrus Heights has many other ongoing mitigation efforts that include the following:

- Drainage Master Planning with follow up projects
- Contract creek cleaning
- Drainage pipe rehab program
- Contract Pipe Cleaning
- Floodplain building policy
- Zoning Code Changes
- Hydro-modification Policy - Pre and Post Development equivalent runoffs
- Streetscape Landscaping with depressed landscape areas to absorb & clean runoff
- City Provided FEMA Elevation Certs on all residential units within a flood hazard

A.7 Mitigation Strategy

A.7.1. Mitigation Goals and Objectives

The City of Citrus Heights adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

A.7.2. NFIP Mitigation Strategy

As a participant of the National Flood Insurance Program (NFIP), the City of Citrus Heights has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Citrus Heights will continue to comply with the requirements of the NFIP in the future.

The City's regulatory activities apply to existing and new development areas of the City; implementing flood protection measures for existing structures and maintaining drainage systems. The goal of our program is to enhance public safety, and reduce impacts and loses while protecting the environment.

The City of Citrus Heights General Services Department provides public outreach activities which include map information services, public awareness, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current and accurate flood mapping. In addition, the General Services Department provides information about our stormwater management program and up-to-date information related to the maintenance of our drainage system.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Citrus Heights is currently evaluating joining the CRS.

More information about the floodplain administration in the City of Citrus Heights can be found in Table A-32.

Table A-32 City of Citrus Heights Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	F458 $177,586 $126,282,200
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	0 $0 0
How many structures are exposed to flood risk within the community?	156 – 1% Annual Chance 276 – 0.2% Annual Chance
Describe any areas of flood risk with limited NFIP policy coverage	
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	No
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Review permits & development plans, maintain the GIS for flood hazards, provide information, conduct drainage master planning, maintain Elev. Certs.
What are the barriers to running an effective NFIP program in the community, if any?	Funding to license and move information to the web. Then property owners, real estate agents and others can get instant information
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	2014
Is a CAV or CAC scheduled or needed?	No
Regulation	
When did the community enter the NFIP?	November 15, 1989
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes, Citrus Heights exceeds the standard by not allowing development within a floodplain and making structures sit back from a creek.
Provide an explanation of the permitting process.	All permits are reviewed by engineering. Engineers use the GIS to check floodplain information
Community Rating System	
Does the community participate in CRS?	No
What is the community's CRS Class Ranking?	–
What categories and activities provide CRS points and how can the class be improved?	–

NFIP Topic	Comments
Does the plan include CRS planning requirements?	–

A.7.3. Mitigation Actions

The planning team for the City of Citrus Heights identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: All hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: City of Citrus Heights Planning Department

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Rinconada Flood Wall

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Major flooding during the 1986 and 1995 floods. Approximately 1,250 LF of flood wall are required to mitigate the potential for flooding.

Other Alternatives: No action.

Existing Planning Mechanisms through which Action will be Implemented:

Responsible Office: General Services Department

Priority (H, M, L): Medium

Cost Estimate: $400,000

Potential Funding: HMGP and Stormwater Utility Funds

Benefits (Losses Avoided): Life safety, reduction in property loss.

Schedule: 2017

Action 3. Drainage Project Implementation

Hazards Addressed: Flood, Localized Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: There are areas of the City which are in need of improvements to the local stormwater drainage system. These improvements have been already prioritized:

Figure A-12 Summary of Implementation Dates and Costs for Proposed Drainage Solutions

Problem Location Number	Solution Description	Figure Showing Proposed Improvements	Target Implementation Date	Total Estimated Improvements Cost, dollars[a]
High Priority				
3 and 4	Highland Avenue Pipe System and Rinconada Overland Release (Option 2)	7-5b	Spring 2017	878,000
6 and 10	Pipe Improvements along Mariposa Ave. from Glenacre Way to Arcade Creek (Option 2)	7-8b	Spring 2019	1,425,000
7	Overland Release Structure from Denton Way to Sun Hill Drive	7-9	Spring 2019	70,000
9	Underground Storage at Amsell Ct., Pipe Improvements at Blayden Ct., and Detention Basin in Power Line Corridor (Option 2)	7-12b	Spring 2018	417,000
11	Pipe Improvements along Maretha St., Bonita Way, and Old Auburn Rd. Curb and Gutter on Maretha St. and Dow Ave.	7-13	Spring 2018	1,060,000
12	Pipe Improvements between Minnesota Dr. and Anderson Ln. and near Canady Ln. Detention Basin near Anderson Ln. Underground Storage Pipe in Canady Ln. Overland Release Structure near Saginaw Way	7-14	Spring 2017	871,000
	Total Estimated Cost of High Priority Improvements			**4,721,000**
Medium Priority				
1	Ditch and Driveway Culvert on Auburn Blvd.	7-2	Summer 2016	8,000
5	Upsize Outfall on Chula Vista Drive	7-6	>Summer 2017	90,000
8	Upsize Pipe on Dana Butte Way and Canelo Hills Drive	7-11	Spring 2017	117,000
	Total Estimated Cost of Medium Priority Improvements			**215,000**
Low Priority				
2	Under Sidewalk Drain on Oak Ave.	7-3	Summer 2016	9,000
	Total Estimated Cost of Low Priority Improvements			**9,000**
	Total Estimated Cost of All Improvements			**4,945,000**
[a] The estimated costs for Problem Locations 9 and 12 solutions do not include the cost of easement acquisition.				

Source: Storm Drainage Master Plan

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Storm Drainage Master Plan

Responsible Office: City of Citrus Heights Public Works

Priority (H, M, L): High

Cost Estimate: $4,945,000

Potential Funding: Local budgets, grants

Benefits (avoided Losses): Reduced risk to flooding and localized flooding in the City. This would protect property, as well as work to ensure localized flooding does not disrupt emergency services.

Schedule: As soon as possible

Annex B City of Elk Grove

B.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Elk Grove, a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to the City of Elk Grove, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this community.

B.2 Planning Process

As described above, the City of Elk Grove followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC) and Steering Committee, the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table B-1. Additional details on plan participation and City representatives are included in Appendix A.

Table B-1 City of Elk Grove Planning Team

Name	Position/Title	How Participated
Rachael Brown	Economic Development Coordinator	Provided review and information on the economy section.
Eric White	Police Lieutenant	Provided review and input on identifying hazards, vulnerability assessments, mitigations, severe weather, fog, and critical facilities.
Paul Kent	Police Sergeant	Provided review and input on identifying hazards, vulnerability assessments, mitigations, severe weather, fog, and critical facilities.
Gerald Park	Senior Planner	Provided review and input on identifying hazards, vulnerability assessments, mitigations, natural resources/special status species, trees, historic and cultural resources, growth and development trends, land use, development since 2011, agriculture hazards: inspects/pests, General Plan, and municipal codes/policies.
Amittoj Thandi	Drainage Engineering Manager	Provided review and input on identifying hazards, vulnerability assessments, mitigations, critical facilities, development in a hazard area, flood:100/200/500, localized stormwater flooding, levees failures, heavy rains and storms, plans, municipal codes/policies.
Shane Diller	Assistant Director of Development Services	Provide review and input on building permits and municipal codes/policies.

Name	Position/Title	How Participated
Christopher Jordan	Assistant to the City Manager	Provided review and input on General Plan, growth and development trends, and municipal codes/policies. Provided review and input on wildfires
Connie Nelson	Project Manager	Facilitated LHMP update. Provided review and input on all sections of the plan. Attended HMPC meetings.

B.2.1. Coordination with Other Community Planning Efforts

Coordination with other community planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the City integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table B-2.

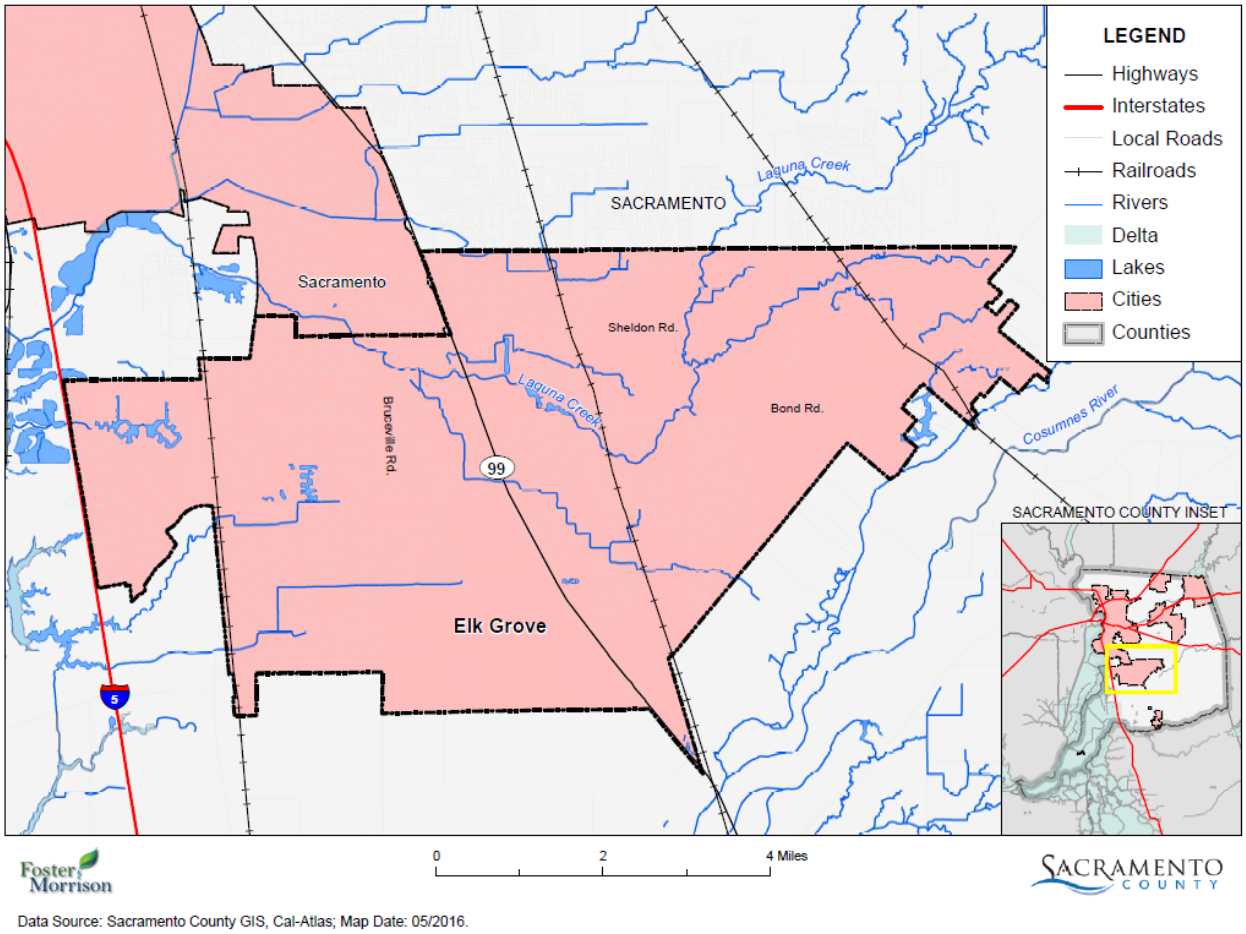
Table B-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details
Storm Drainage Master Plan	Adopted 2011
General Plan	The General Plan was adopted in November 2003. The Safety Element was updated in 2004 and is currently being updated to address 200-year floodplain requirements under SB 5. A comprehensive update to the General Plan is occurring now and planned for completion in summer 2017.
Emergency Operation Plan (EOP)	Planning to add in the next EOP update.
Capital Improvement Program	Constructed several projects identified in last LHMP.

B.3 Community Profile

The community profile for the City of Elk Grove is detailed in the following sections. Figure B-1 displays a map and the location of the City of Elk Grove within Sacramento County.

Figure B-1 City of Elk Grove



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

B.3.1. Geography and Climate

Elk Grove contains 42 square miles of land and sits at 46 ft. above mean sea level. The City is located within the Great Valley geomorphic province, which is primarily described as a relatively flat alluvial plain, about 50 miles wide and 400 miles long, with thick sequences of sedimentary deposits of Jurassic through Holocene age. Shielded by the Sierra Nevada Mountains to the east, the California Coast ranges to the west, and the Siskiyou Mountains to the north, the City enjoys a mild climate for most of the year. In the summer, however, "northerns" blow from the Siskiyou Mountains, bearing pollens and heat. This is mitigated by the City's extremely low humidity and the cool delta breezes. The winters are rainy.

The City has a Mediterranean climate that is characterized by mild winters and dry summers. The area usually has low humidity. Rain generally falls only between November and March, with the rainy season tapering off almost completely by the end of April. The average temperature throughout the year is 61°F, with the daily average ranging from 46°F in December and January to 76°F in July. Average daily high temperatures range from 53°F in December and January to 92°F in July (with many days of over 100°F highs). Daily low temperatures range from 38 to 58°F. The average year has 73 days with a high over 90°F, with the highest temperature on record being 114°F on July 17, 1925, and 18 days when the low drops below 32°F, with the coldest day on record being December 11, 1932, at 17°F. Average yearly

precipitation is 17" to 18", with almost no rain during the summer months, to an average rainfall of 3.7" in January. It rains, on average, 58 days of the year and there are 266 sunny days. In February of 1992, Sacramento had 16 consecutive days of rain (6.41"). A record 7.24" of rain fell on April 20, 1880.

On average, 96 days in the year have fog, mostly in the morning (tule fog), primarily in December and January. The fog can get extremely dense, lowering visibility to less than 100 feet and making driving conditions hazardous.

B.3.2. History

A portion of the City lies within the former territory of six Plains Miwok tribelets along the Cosumnes River drainage and two, possibly three tribelets along the Sacramento River. James A. Bennyhoff's research[1] revealed that the Plains Miwok were recognized as a distinct language group as early as 1806 when Spanish explorers first entered the region.

In 1850, the City was established as a hotel and a stop for the stage. The City is located about 15 miles south of historic Sutter's Fort and thus became a crossroads for business, entertainment, mail service and agriculture, and acted as home base for gold miners in nearby communities. After it played its part in the early gold rush and statehood history in California, a close-knit community evolved with a distinctly rural and western lifestyle.

Initially, the town developed around a stage stop on the Monterey Trail, though after the railroad passed by east of town, the City's center shifted to its present location. "Old Town" Elk Grove is located about a mile east of State Route 99 (formerly U.S. Route 99, the north-south artery of the California Central Valley).

Despite the City's close proximity to California's capital city, Elk Grove remained quietly independent of Sacramento's growth and development as it expanded into adjoining countywide areas until the 1980s. The City was incorporated as a general law city on July 1, 2000. In 2008, Elk Grove suffered heavily from the subprime mortgage crisis due to its suburban nature.

B.3.3. Economy and Tax Base

Elk Grove is a rapidly growing city with one of the highest per capita incomes in the Sacramento region. In 2004 and 2005, the US Census Bureau named the City as the fastest growing city in the country. In 2008, the Gadberry Group recognized Elk Grove as one of eight most notable high-growth cities in the nation with the highest increase in average household income. US Census estimates show economic characteristics for the City of Elk Grove. These are shown in Table B-3 and Table B-4. Mean household income in the City was $100,427. Median household income in the City was $84,732. Major employers in the vicinity are shown in Table B-5.

[1] James A. Bennyhoff (1926-1993) was an anthropologist and professor at UC Berkeley, California.

Table B-3 City of Elk Grove Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	462	0.7%
Construction	2,794	3.9%
Manufacturing	3,521	5.0%
Wholesale trade	1,661	2.3%
Retail trade	7,872	11.1%
Transportation and warehousing, and utilities	3,567	5.0%
Information	1,846	2.6%
Finance and insurance, and real estate and rental and leasing	5,206	7.3%
Professional, scientific, and management, and administrative and waste management services	7,256	10.2%
Educational services, and health care and social assistance	17,573	24.8%
Arts, entertainment, and recreation, and accommodation and food services	5,153	7.3%
Other services, except public administration	3,508	4.9%
Public administration	10,482	14.8%

Source: US Census Bureau American Community Survey 2010-2014 Estimates

Table B-4 City of Elk Grove Income and Benefits

Income Bracket	Population	Percent
>$10,000	1,293	3.3%
$10,000 – $14,999	825	2.1%
$15,000 - $24,9999	1,720	4.4%
$25,000 – $34,999	1,901	4.9%
$35,000 – $49,999	3,610	9.3%
$50,000 – $74,999	7,759	19.9%
$75,000 – $99,999	5,840	15.0%
$100,000 – $149,999	8,736	22.4%
$150,000 – $199,999	4,492	11.5%
$200,000 or more	2,825	7.2%

Source: US Census Bureau, 2010

Table B-5 Top Ten Employers in the Vicinity of Elk Grove

Name	Est. Employees[1]
Elk Grove Unified School District[2]	3,313
Apple, Inc.[3]	3,199
California Correctional Health Care Services[4]	1,500
Dignity Health[4]	1,133

Name	Est. Employees[1]
Raley's	799
Wal-Mart Stores, Inc.	680
Cardinal Health, Inc.	430
Autozone, Inc. (including ALLDATA)	412
Kaiser Foundation Health Plan, Inc. [4]	387
Elk Grove, City of[4, 5]	370

Source: EPS, Elk Grove Employment Dynamics

Notes:

1. Constitutes best estimate of current employment from available sources. As noted, many records have been verified through contact with the City or the employer. All other estimates are based on NETS estimates from 2013, and are subject to further verification based on recent changes.
2. Based on total employment reported to NETS for the entire EGUSD. Employment was apportioned to Elk Grove based on the percentage of EGUSD students enrolled at schools in Elk Grove.
3. Based on 2015 estimates from the City of Elk Grove. While some employees at this location are contracted by other employment agencies, for purposes of this analysis, all employees at this location are considered Apple employees.
4. Based on 2015 estimates from the City of Elk Grove.
5. Includes permanent and contract staff.

The County has a wide and varied tax base. Tax base information is tracked and maintained by the Sacramento County Assessor's Office. The following tables show the tax base for the City. Table B-6 shows the secured real property value for Elk Grove. Table B-7 breaks out the City by land use.

Table B-6 City of Elk Grove – Tax Roll Totals by Jurisdiction

Jurisdiction	2015-16 Value ($)	2016-17 Value ($)	Current Year Change	Percent of Current Roll*
Elk Grove	17,412,867,028	18,541,918,216	6%	13

Source: Sacramento County Assessor's Office

*Percentages rounded to the nearest whole number

Table B-7 City of Elk Grove – Summary of Property Types

Jurisdiction	Single Family with HEX*	Single Family Without HEX*	Multi-Family Residential	Vacant Land	Commercial	Agricultural	Mobile Homes	Other	Total
Elk Grove	27, 135	20,779	349	2,743	984	28	248	735	53,001

Source: Sacramento County Assessor's Office

*Homeowners' Exemption

B.3.4. Population

The California Department of Finance estimated the January 1, 2016 total population for the City of Elk Grove was 167,965.

Select demographic information from the 2014 US Census American Community Survey (the most recent data available) is shown in Table B-8.

Table B-8 City of Elk Grove Demographic Information

Demographic Characteristic	Number	Percent
Race		
White	72,430	45.7%
Black or African American	18,017	11.4%
American Indian or Alaska Native	1,036	0.7%
Asian	43,308	27.3%
Hawaiian or Pacific Islander	2,326	1.5%
Two or more races	13,018	8.2%
Households*		
Total Households	47,927	–
Average Household Size	3.18	–

Source: US Census Bureau American Community Survey 2010-2014 Estimates; *US Census Bureau, 2010

B.4 Hazard Identification

Elk Grove's planning team identified the hazards that affect the City and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to Elk Grove (see Table B-9).

Table B-9 City of Elk Grove—Hazard Identification Table

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Likely	Limited	Medium
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Significant	Likely	Critical	High
Dam Failure	Limited	Unlikely	Negligible	Medium
Drought and Water Shortage	Significant	Likely	Significant	High
Earthquake	Significant	Occasional	Limited	Medium
Earthquake: Liquefaction	Limited	Unlikely	Negligible	Low
Flood: 100/200/500-year	Limited	Occasional/Unlikely	Critical	Medium
Flood: Localized Stormwater Flooding	Significant	Likely	Critical	Medium
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Significant	Occasional	Critical	High
River/Stream/Creek Bank Erosion	Limited	Occasional	Negligible	Low
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Critical	Medium
Severe Weather: Extreme Temperatures – Heat	Extensive	Likely	Critical	Medium
Severe Weather: Fog	Extensive	Likely	Critical	High
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Likely	Limited	Medium
Severe Weather: Wind and Tornadoes	Limited	Occasional	Negligible	Low
Subsidence	Limited	Unlikely	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Significant	Highly Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

B.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Elk Grove's hazards and assess the City's vulnerability separate from that of the Sacramento County Planning area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describe the hazard, the geographic extent of the hazard, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City of Elk Grove is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked as medium to high significance (specific to Elk Grove) and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

B.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section B.5.3, includes a description as to how the hazard affects the City and information about past occurrences. The intent of this section is to provide jurisdiction specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

B.5.2. Vulnerability Assessment and Assets at Risk

This section presents the vulnerability assessment for the City and identifies Elk Grove's total assets at risk, including values at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Assets at Risk

The following data from the Sacramento County Assessor's Office is based on the 2015 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table B-10 shows the 2015 Assessor's values (e.g., the values at risk) broken down by property type for the City of Elk Grove.

Table B-10 City of Elk Grove – Total Assets at Risk by Property Use

Property Use	Parcels	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	26	13	$3,770,029	$1,279,559	$5,049,588
Care / Health	41	36	$17,988,238	$89,959,839	$107,948,077
Church / Welfare	44	41	$26,150,728	$111,755,957	$137,906,685
Industrial	192	168	$69,983,619	$250,190,451	$320,174,070
Miscellaneous	923	-	$1,847,474	$0	$1,847,474
Office	153	145	$69,395,713	$378,607,975	$448,003,688
Public / Utilities	605	-	$39,885	$0	$39,885
Recreational	17	13	$9,009,665	$37,673,333	$46,682,998
Residential	47,498	46,557	$3,900,509,457	$10,453,762,727	$14,354,272,184
Retail / Commercial	383	370	$311,734,987	$750,878,784	$1,062,613,771
Vacant	1,481	59	$305,009,048	$9,653,977	$314,663,025
No Data	4	-	$0	$0	$0
Total	**51,367**	**47,402**	**$4,715,438,843**	**$12,083,762,602**	**$16,799,201,445**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facilities and Infrastructure

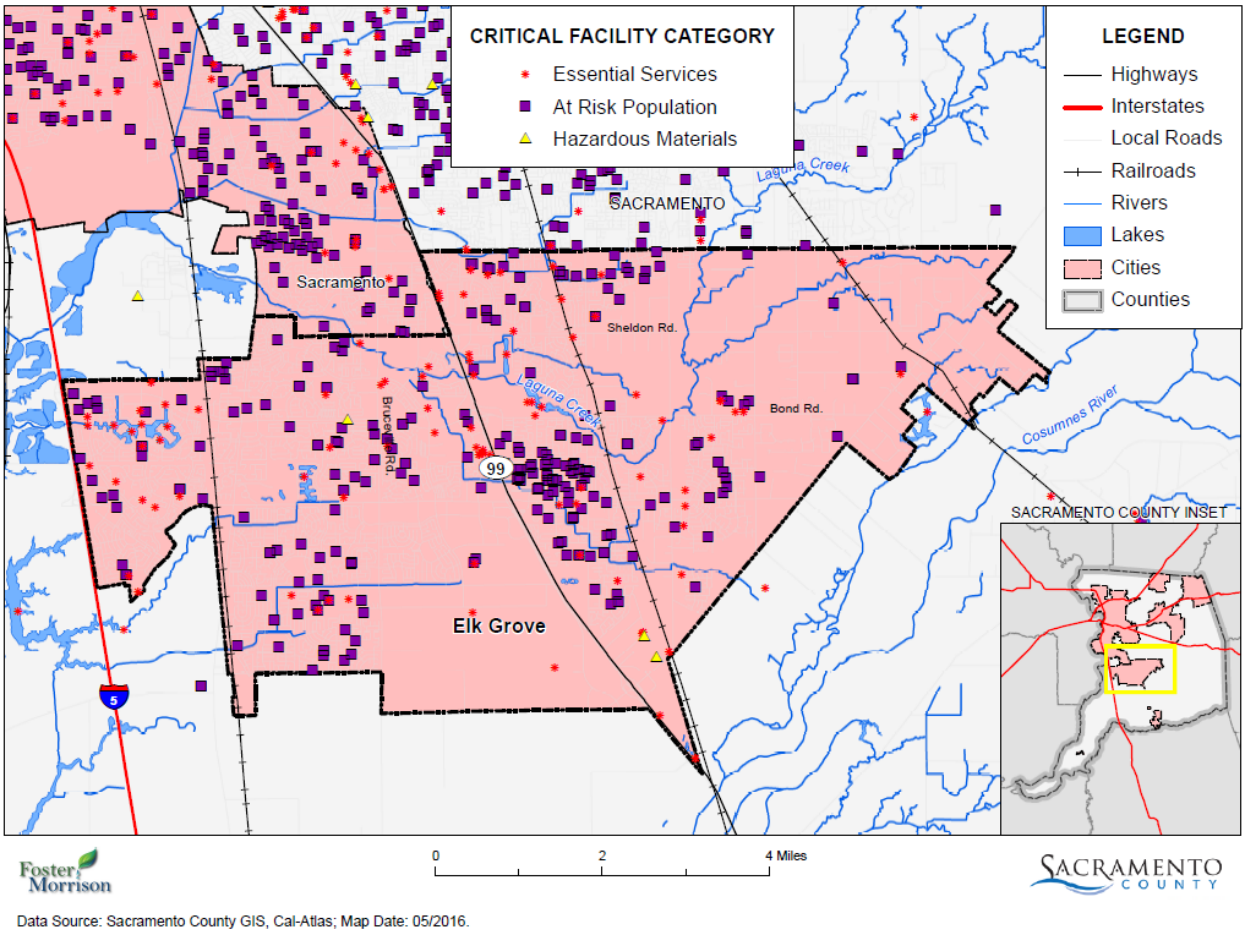
For purposes of this plan, a critical facility is defined as:

> *Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.*

This definition was refined by separating out three classes of critical facilities, that include Essential Services Facilities, At Risk Population Facilities, and Hazardous Materials Facilities, as further described in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Elk Grove from Sacramento County GIS is shown on Figure B-2 and detailed in Table B-11. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix E.

Figure B-2 City of Elk Grove – Critical Facilities



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

Table B-11 City of Elk Grove – Critical Facilities Inventory

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Corporation Yard	1
	Detention Basin	41
	Dispatch Center	1
	Emergency Evacuation Shelter	18
	EOC	1
	Fire Station	8
	Government Facilities	7
	Medical Health Facility	6
	Police	1
	Sand Bag	5
	State and Fed Facilities	1
	Urgent Care Facilities	2

Critical Facility Category	Facility Type	Facility Count
	Total	**92**
At Risk Population Facilities	Adult Day Care	3
	Adult Residential	23
	Assisted Living Centers	57
	Day Care Center	32
	Group Home	6
	Hotel	5
	Infant Center	1
	Private Elementary School	2
	Private High School	2
	Private K-12 School	1
	Public Continuation High School	1
	Public Elementary School	18
	Public High School	5
	Public Middle School	5
	Residential Care/Elderly	54
	School	37
	School-Age Day Care Center	17
	Senior Center	1
	Special Education School	1
	Total	**271**
Hazardous Materials Facilities	Oil Collection Center	2
	Propane Storage	1
	Total	**3**
Grand Total		**366**

Source: Sacramento County GIS

Natural Resources

The City has a variety of natural resources of value to the community:

- Agricultural cropland;
- Annual grassland;
- Fallow agricultural land;
- Horticultural/landscape;
- Irrigation ditches;
- Irrigated pastures;

- Open waters;
- Perennial and seasonal marshes;
- Riparian woodlands;
- Seasonal wetlands; and
- Vernal pools.

Special Status Species

The following special-status species are known to occur within the natural habitats most likely to be present within the City boundaries. These and other species potentially occurring in the City can be found in Table B-12. Figure B-3 shows the locations of sensitive elements within the City.

Table B-12 Special-Status Species Potentially Occurring in the City of Elk Grove

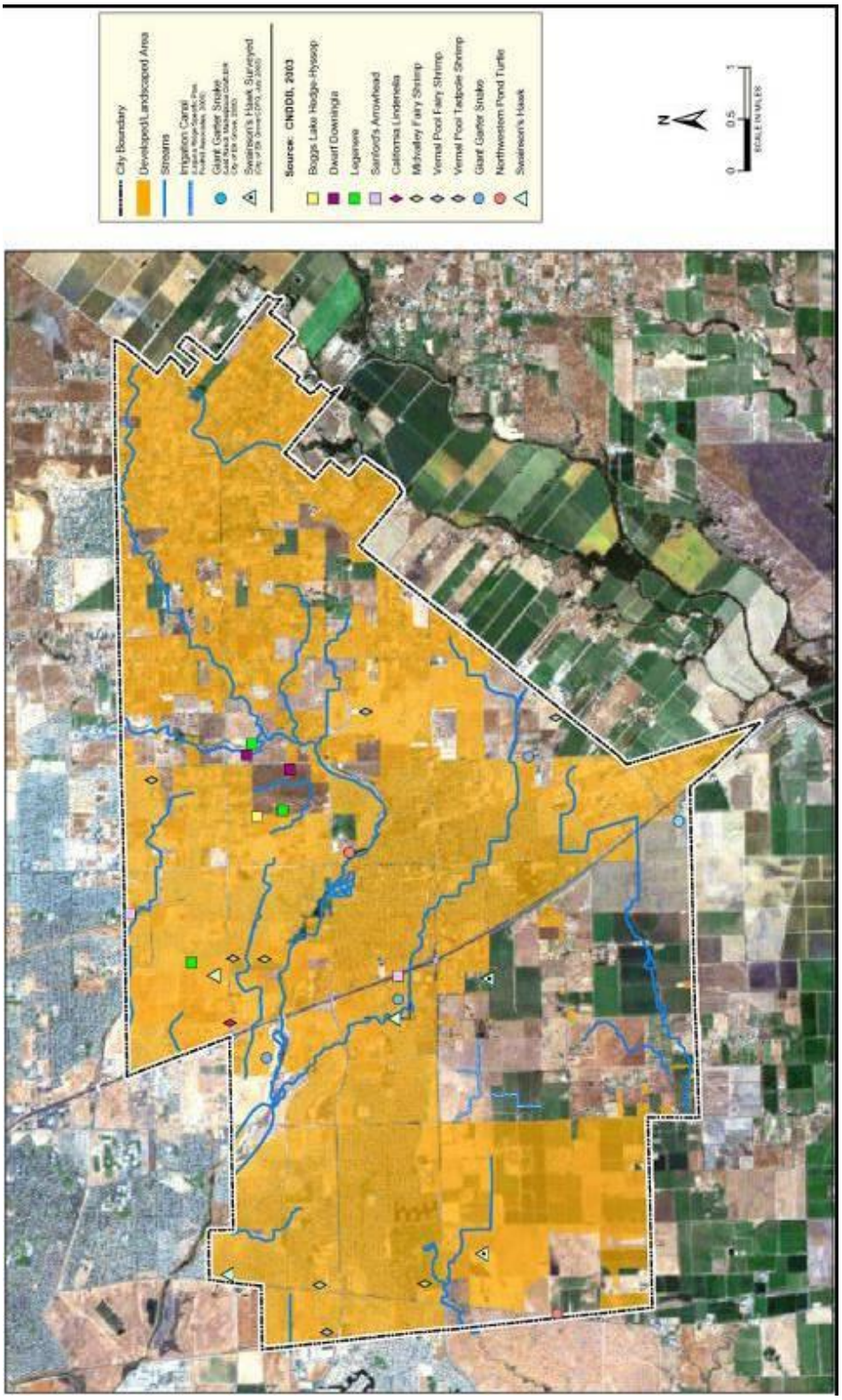
Common Name	Scientific Name	Regulatory Status
Ahart's Dwarf Rush	*Juncus leiospermus var. ahartii*	SC; --; 1 B
Boggs Lake Hedge- hyssop	*Gratiola heterosepala*	--; CE; 1 B
Delta Tule-pea	*Lath yrus jepsonii var. jepsonii*	SC; --; 1 B
Dwarf Downingia	*Downingia pusilla*	--; --; 2
Legenere	*Legenere limosa*	SC; --; 1 B
Mason's Lilaeopsis	*Lilaeopsis masonii*	SC; CR; 1 B
Northern California Black Walnut	*Juglans californica var. hindsii*	SC; --; 1 B
Pincushion navarettia	*Naverretia myersii spp. Myersii*	SC; --; 1 B
Rose Mallow	*Hibiscus lasiocarpus*	SC; --; 1 B
Sacramento Orcutt Grass	*Orcuttia viscida*	FE; CE; 1 B
Sacramento Orcutt Grass Critical Habitat	*Orcuttia viscida Critical Habitat*	--
San Joaquin Saltbrush	*Atriplex joaquiniana*	SC; --; 1 B
Sanford's Arrowhead	*Sagittaria sanfordii*	SC; --; 1 B
Slender Orcutt Grass	*Orcuttia tenuis*	FT; CE; 1 B
Slender Orcutt Grass Critical Habitat	*Orcuttia tenuis Critical Habitat*	--
California linderiella	*Linderiella occidentalis*	SC; --; --
Conservancy fairy shrimp	*Brachinecta conservation*	FE; --; --
Midvalley Fairy Shrimp	*Branchinecta mesovallensis*	SC; --; --
Valley Elderberry Longhorn beetle	*Desmocerus californicus dimorphus*	FT (PX); --; --
Vernal Pool Fairy Shrimp	*Branchinecta lynchi*	FT; --; --
Vernal Pool Tadpole Shrimp	*Lepidurus packardi*	FE; --; --
California Horned Lizard	*Phrynosoma coronatum frontale*	SC; CSC (protected full species); --
California Tiger Salamander	*Ambystoma californiense*	C; CSC (protected); --

Common Name	Scientific Name	Regulatory Status
Giant Garter Snake	*Thamnophis gigas*	FT; CT (protected); --
Northwestern Pond Turtle	*Clemmys marmorata marmorata*	SC; CSC; --
Silvery Legless Lizard	*Anniella pulchra pulchra*	SC; CSC; --
Western Spadefoot Toad	*Scaphio pus hammondii*	SC; CSC (protected); --
Central Valley Fall/Late Fall-run Chinook Salmon and Critical Habitat	*Oncorhynchus tshawytscha*	C; CSC; --
Central Valley Spring-run Chinook Salmon	*Oncorhynchus tshawytscha*	FT; CT; --
Central Valley Winter – run Chinook Salmon and Critical Habitat	*Oncorhynchus tshawytscha*	FE; CE; --
Central Valley Steelhead	*Oncorhynchus mykiss*	FT; --; --
Delta Smelt	*Hypomesus transpacificus*	FT; CT; --
Green Sturgeon	*Acipenser medirostris*	SC; CSC; --
Pacific Lamprey	*Lam petra trident ata*	SC; --; --
River Lamprey	*Lam petra ayresi*	SC; CSC; --
Sacramento Splittail	*Pogonichthys macrolepidotus*	FT; CSC; --
Aleutian Canada Goose	*Branta Canadensis leucopareia*	FD; --; -- (Wintering)
American Bittern	*Botaurus lentiginosus*	SC; --; --
Bank Swallow	*Riparia riparia*	--; CT; -- (nesting)
Black Rail	*Laterallus jamaicensis coturniculus*	SC; CT (fully protected); --
Black Tern	*Chlidonias niger*	SC; CSC; -- (nesting colony)
Cooper's Hawk	*Accipiter cooperi*	--; CSC; -- (nesting)
Grasshopper Sparrow	*Ammodramus savannarum*	SC; --; -- (nesting)
Great Blue Heron	*Ardea herodias*	--; CDF (sensitive); -- (rookery)
Great Egret	*Ardea alba*	--; CDF (sensitive); -- (rookery)
Greater Sandhill Crane	*Grus canadensis tabida*	--; CT (fully protected); --
Lesser Sandhill Crane	*Grus canadensis canadensis*	--;CSC;--
Loggerhead Shrike	*Lanius ludovivianus*	SC; CSC; -- (nesting)
Mountain Plover	*Charadrius montanus*	FPT; CSC; -- (wintering)
Northern Harrier	*Circus cyaneus*	--;CSC;--
Nuttall's Woodpecker	*Picoides nuttallii*	SLC; --; --
Oak Titmouse	*Baeolophus inornatus*	SLC; --; --
Snowy Egret	*Egretta thula*	SC; --; -- (rookery)
Song Sparrow (Modesto Population)	*Melospiza melodia*	--;CSC;--
Swainson's Hawk	*Buteo swainsoni*	--; CT; --
Tricolored Blackbird	*Agelaius tricolor*	SC; CSC; -- (nesting colony)

Common Name	Scientific Name	Regulatory Status
Vaux's Swift	*Chaetura vauxi*	--;CSC;--
Western Burrowing Owl	*Athene cunicularia hypugea*	SC; CSC; -- (burrowing sites)
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	SC; CE (fully protected); -- (nesting)
White-tailed Kite	*Elanus caeruleus*	SC; (fully protected); - - (nesting)
Yellow-breasted chat	*Icteria virens*	--;CSC;--
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	--;CSC;--
Yellow Warbler	*Setophaga petechia*	--;CSC;--
Fringed Myotis	*Myotis thysanodes*	SC; --; --
Greater Western Mastiff bat	*Eumops perotis californicus*	SC; CSC; --
Long-eared Myotis	*Myotis evotis*	SC; --; --
Long-legged Myotis	*Myotis volans*	SC; --; --
Pacific Western Big- eared bat	*Corynorhinus townsendii townsendii*	SC; CSC (full species); --
Pale Townsend's Big- eared bat	*Corynorhinus townsendii pallescens*	SC; CSC (full species); --
San Joaquin Pocket Mouse	*Perognathus inornatus*	SC; --; --
San Joaquin Woodrat	*Neotoma fuscipes riparia*	FE; CSC; --
Small-footed Myotis	*Myotis ciiolabrum*	SC; --; --
Yuma Myotis	*Myotis yumanensis*	SC; --; --

Source: Foothill Associates, 2002 and updated by Michael Baker International May 2016.
FE = federally endangered FT = federally threatened
SC = federal species of concern
C = candidate
CDF- California Department of Fish and Game (sensitive)
FPT = federal proposed threatened
FPE = federal proposed endangered
CE = State endangered
CT = State threatened
CR = State rare
CSC = California species of special concern
C = candidate for listing
1 B = CNPS (California Native Plant Society) list plants rare, threatened, or endangered in California or elsewhere
2 = CNPS list plants rare, threatened, or endangered in California, but more numerous elsewhere * = not enough information available on this species
3 = CNPS list plants about which CNPS needs more information
4 = CNPS list plants of limited distribution – a watch list
D = Delisted
MNBMC = Migratory Non-Game Bird of Management Concern
PX = Proposed Critical Habitat
SLC = Species of Local Concern

Figure B-3 City of Elk Grove Habitat Conditions and Known Occurrences of Special-Status Species



Source: City of Elk Grove General Plan Background Report draft Environmental Impact Report, Foothill Associates, 2003.

Trees

Although native trees such as oaks (*Quercus sp*.) and California black walnuts (J*uglans californica var. jepsonii*) are not afforded special protection under State or federal law, loss of these species is of concern to the California Department of Fish and Wildlife and California Native Plant Society because of their continued depletion throughout California. In addition, the City regulates all projects with the potential to affect "Trees of Local Importance" as defined in Chapter 19.12 of the City's Municipal Code, which is the City's Tree Preservation and Protection Title. Trees of Local Importance include Coast live oak, Valley oak, Blue oak, Interior live oak, Oracle oak, California sycamore, and California black walnut with a diameter at breast height of six inches or greater; or multi-trunked trees with a combined diameter at breast height of six inches or greater.

In November 2005, the City Council formally adopted the Sacramento Tree Foundation's regional Greenprint Program in order to achieve the sustainability and livability goals in the Sacramento region by expanding urban forests and optimizing the benefits of tree canopies. Since inception, the City has funded this program every year, which has resulted in over 1,650 tree plantings throughout the City. The plantings were coordinated through the Sacramento Tree Foundation, and typically held on the City's established Arbor Day for that particular year.

Each planting effort has been very successful in providing additional aesthetic and biological value to the community. The planting areas were strategically selected to benefit the public at large, while providing an environment for a high survival rate for the trees. All planting areas are located on City properties and Cosumnes Community Services District (CCSD) properties. Such plantings areas include the following: 1) areas adjacent to the Fallbrook Trail, Bilby Trail, Laguna Springs Trail, Kaiser Trail, Tributary 4 Trail, and Elk Grove Creek Retention Pond Trail; 2) areas adjacent to the Strawberry Creek Detention Basin and the Brown Road Detention Basin (plantings occurred in April 2011); and 3) areas adjacent to Lower Camden Lake, Underwood Park, and Don Nottoli Park.

Historic and Cultural Resources

Within the City's vicinity there are ten commonly used place names representing historic communities, stations, schools or post offices, these include: Bruceville, Elk Grove, Franklin, Hood, McConnell Station, Pleasant Grove, Point Pleasant, Sheldon, Sloughhouse and Walsh. Portions of two Mexican land grants lie within the City: Leidesdorff's Rancho Rio de los Americanos and Sheldon and Daylor's Rancho Omochumnes.

The North Central Information Center's records search identified 93 prehistoric and historic Native American archaeological sites within the area of Elk Grove. Many of these archaeological sites are village mounds; some of these could contain human remains.

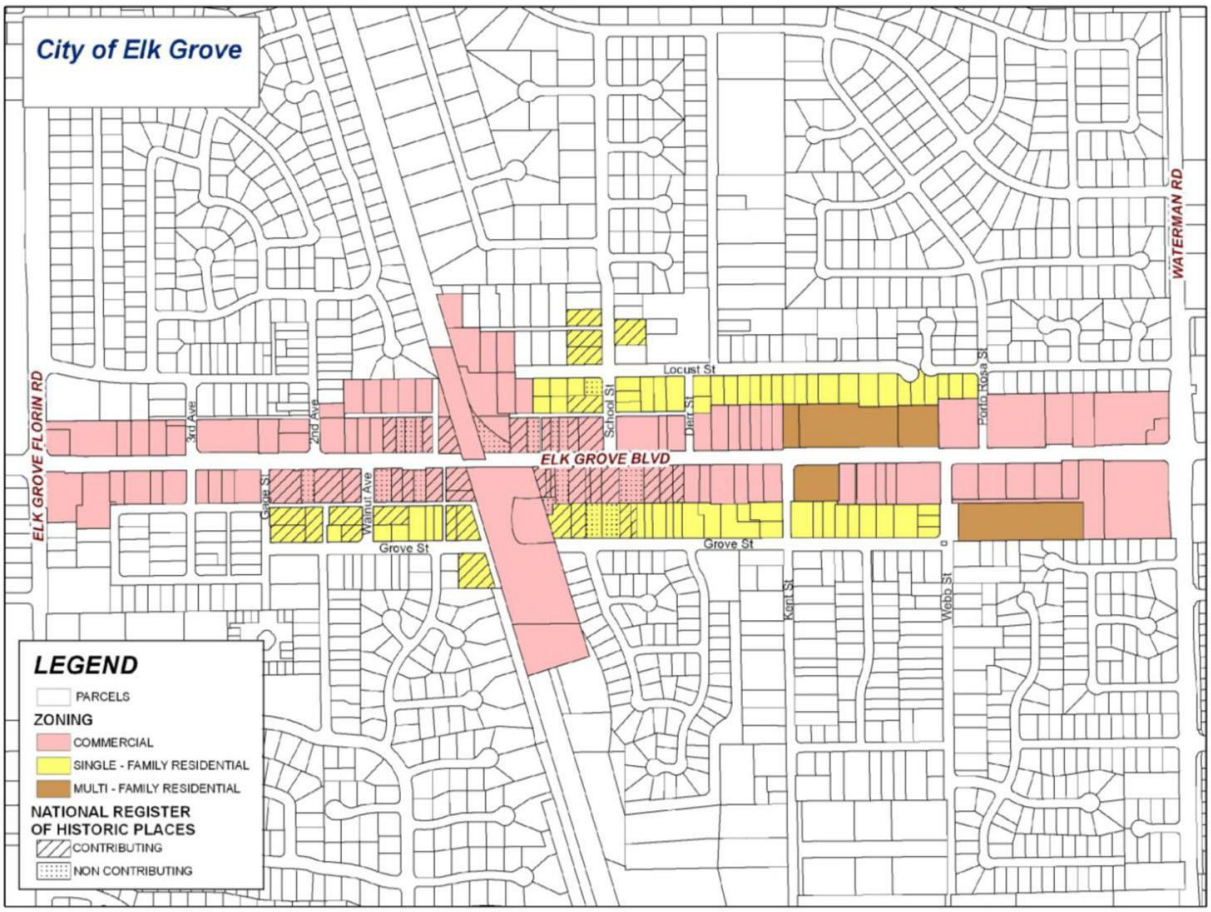
The City has registered federal historic sites, State landmarks and points of interest. These are shown in Table B-13. Figure B-4 illustrates properties included in the Elk Grove Historic District, which is within the Old Town Elk Grove Special Planning Area.

Table B-13 Registered Historic Sites in the City of Elk Grove

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
Ehrhardt, William, House (N2209)	X				7/10/2003
Elk Grove Grammar School / Elk Grove Unified School District (P717)				X	6/12/1989
Elk Grove Historic District (N1553)	X				3/1/1988
Grave Of Elitha Cumi Donner Wilder (719)		X			12/2/1959
Murphy's Ranch (680)		X			5/11/1959
Site of First County Free Library Branch In California (817)		X			6/1/1967
Site of Old Elk Grove Hotel (P532)				X	6/29/1979
Site of Joseph Hampton Kerr Homesite (P126)				X	6/6/1969

Source: California Office of Historical Preservation

Figure B-4 Elk Grove Old Town Historic Property District



Source: City of Elk Grove

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) document America's architectural and engineering heritage. The HABS and HAER structures in the City are listed below:

- Drew-Sherwood Farm
- Drew-Sherwood Farm, Barn
- Drew-Sherwood Farm, House,
- Drew-Sherwood Farm, Shed,
- Drew-Sherwood Farm, Tank House
- Nunes Dairy
- Nunes Dairy, Clay Tile Silo
- Nunes Dairy, Worker's Residence No. 2

Euro-American settlement of Elk Grove began in the mid-19th Century with a Mexican land grant of 11 square leagues of land in the Sacramento Valley to John Sutter, including the Rancho Del San Juan subgrant. This subgrant area occupied 20,000 acres, including the modern-day Elk Grove area. The area developed as an agricultural community consisting of families settling small farms surrounding the Sylvan Corners area, located at the present-day intersection of Sylvan Road, Auburn Boulevard, and Old Auburn Road. The 20th Century saw a boom in urbanization of the area, particularly after World War II, when subdivisions began springing up to accommodate an influx of new residents to the area. The area continued to grow, in part as the rocket manufacturing plant at Aerojet in nearby Rancho Cordova attracted employees and their families to the region. As this new development occurred, many older structures throughout the community were demolished and replaced by tract housing and new commercial development to serve the booming population. As this shift occurred, Elk Grove saw its historical character change to a more urbanized, suburban community, losing its character as a rural agricultural community.

Growth and Development Trends

Since the City's inception in 2000, the City has more than doubled in population due to the development boom and the annexation of Laguna West. Even though development has currently slowed, strong growth is expected to continue.

Population History

At the time of incorporation in July 2000, the population of Elk Grove was 76,298 according to the California Department of Finance population estimates.

In May 2016, the DOF released population estimates as of January 1, 2016. The City's estimated population was 167,965. This represents an annual increase of 1.7% from the previous year. As indicated in Table B-14, from January 1, 2001 through January 1, 2016, the City experienced a 120 percent increase in population, growing from approximately 76,298 residents to 167,965 residents in 2016. The City annexed the Laguna West area in 2003, which accounted for an instant population increase of approximately 13,400 persons, or 55% of the total growth in the year 2003 (reflected in year-2004 in Table B-14 below).

Table B-14 Population History for City of Elk Grove

Year	Population[1,2]	Increase	% Change From Prior Year
2001	76,298	----	----
2002	82,932	6,634	8.7%
2003	88,954	6,022	7.3%
2004	113,391	24,437	27.5%
2005	125,703	12,312	10.9%
2006	135,996	10,293	8.2%
2007	142,003	6,007	4.4%

Year	Population[1,2]	Increase	% Change From Prior Year
2008	146,083	4,080	2.9%
2009	149,302	3,219	2.2%
2010	152,652	3,350	2.2%
2011	154,663	2,011	1.3%
2012	156,871	2,118	1.4%
2013	160,439	3,658	2.3%
2014	162,625	2,186	1.4%
2015	165,121	2,496	1.5%
2016	167,965	2,844	1.7%

Sources: State of California, Department of Finance, E-4 Historical Population Estimates for Cities, Counties, and the State, 2001-2010, with 2000 and 2010 Census Counts, Revised November 2012; and E-4 Historical Population Estimates for Cities. Counties, and the State, 2011-2016 with 2010 Census Benchmark, May 2016.

1 Population estimates are as of Janaury1st of the respective year.

2 The population estimates include the 2000 and 2010 decennial census counts. The revised estimates attempt to provide a consistent data series reflecting both decennial census counts by utilizing the Error of Closure (EOC) adjustment procedure.

Growth Strategy

The Growth Management Policy adopted by the City Council in June 2004 provides an overview of the General Plan vision, the policies that address that vision, and guidelines on how those policies should be implemented.

The General Plan's policies describe how the City plans to manage growth by directing development into appropriate areas, requiring the development of infrastructure prior to need, and requiring project financing structured so that "up-front" provision of infrastructure is possible. Multiple policies within various elements of the City's General Plan provide a comprehensive strategy for controlling future growth. Together, these policies:

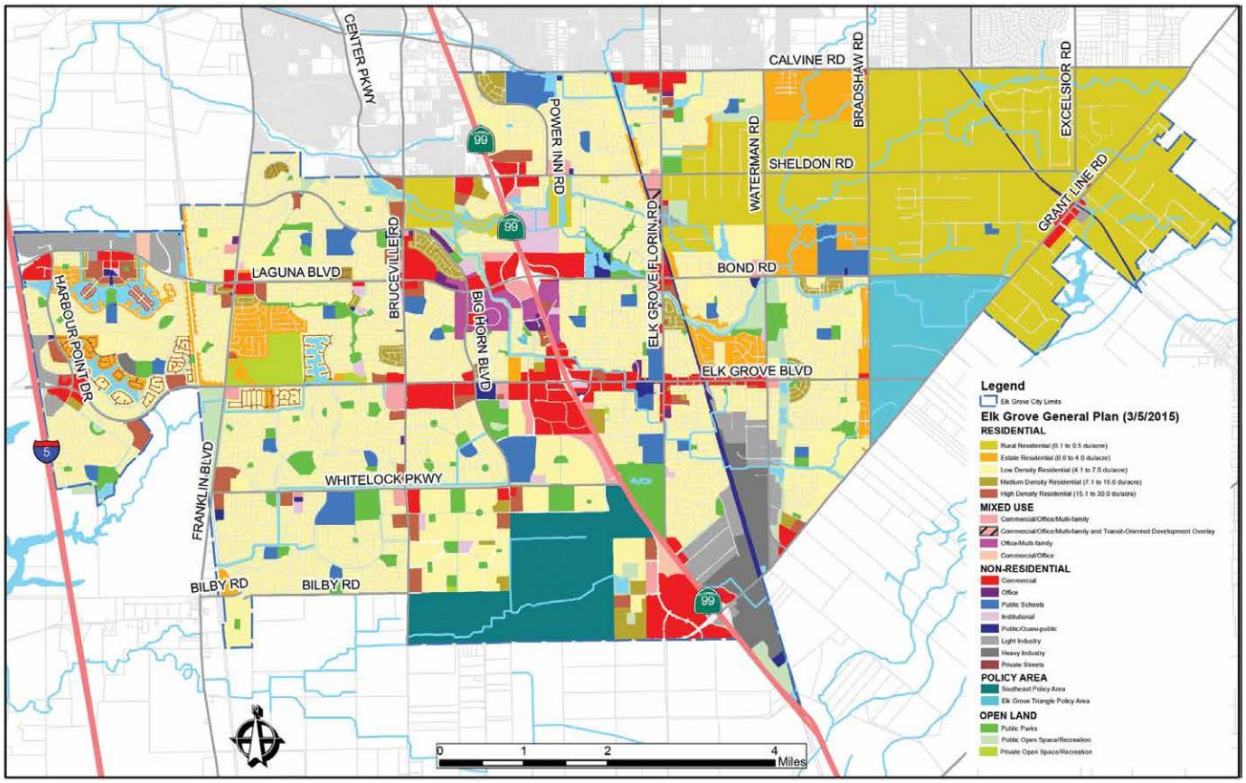
- Provide for balanced land uses by including both new housing and new employment opportunities to serve the City residents;
- Limit residential growth in the City's East Elk Grove area and adjoining rural area;
- Require that new infrastructure (roads, water, sewer lines, storm drain lines, parks, etc.) be built ahead of or concurrent with new development so that problems related to inadequate roadways and other facilities can be avoided;
- Provide for the planning and financing of infrastructure in a logical manner that avoids "leapfrog" development and allows growth to remain within the capacity of the systems that serve it; and
- Coordinate the provision of infrastructure and services with other agencies serving the City such as the Elk Grove Unified School District.

Land Use

Current and future land use in the City is guided through the combination of the City's General Plan Land Use Policy Map and associated policies established in the General Plan's Land Use Element. The Land Use Policy Map illustrates the planned land uses for lands within the City limits – see Figure B-5. The

land use designations as prescribed in the Land Use Policy Map are described below in Table B-15. The land use designations are used in assigning zoning categories and in the review of proposed projects.

Figure B-5 City of Elk Grove Land Use



Source: City of Elk Grove General Plan Land Use Element.

Table B-15 City of Elk Grove General Plan Land Use Designations

Commercial Land Uses	
Designation	**Notes**
Commercial	Generally characterized by office, professional, and retail uses in any mix. Residential uses are not permitted.
Office	Generally characterized by office and professional land uses; may include ancillary retail sales. No residential uses permitted.
Office/Multi-Family	Generally characterized by office and professional land uses; may include ancillary retail sales. Also includes high density residential development.
Commercial/Office	Generally characterized by office, professional, and retail uses in any mix. Residential uses are not permitted.
Commercial/Office/Multi-Family	Generally characterized by office, professional, and retail uses in any mix. Also includes high density residential development.
Light Industry	Generally characterized by industrial or manufacturing activities, which occur entirely within an enclosed building.
Heavy Industry	Generally characterized by industrial or manufacturing activities, which may occur inside or outside of an enclosed building.

Commercial Land Uses		
Public, Quasi-Public, and Open Space Land Uses Note: These categories will typically be applied to lands after acquisition by the City or another agency has occurred or after the acceptance of roadways by the City or Caltrans, and are intended to reflect existing land uses, rather than planned facilities.		
Public/Quasi-Public	Includes lands owned by the City, the Elk Grove Unified School District (with the exception of public schools), the Cosumnes Community Services District (CCSD) (with the exception of public parks), and other public agencies.	
Public Parks	Includes public parks owned by the CCSD or other public agencies.	
Public Open Space/Recreation	Includes lands owned by public entities which have been reserved for open space uses such as habitat mitigation, lakes, trails, golf courses, and similar uses.	
Private Open Space/Recreation	Includes lands owned by private entities, which have been reserved for open space uses such as habitat mitigation, lakes, trails, golf courses, and similar uses. Included in this category are commercial recreation facilities principally oriented to outdoor use.	
Public Schools	Includes public schools or sites (K-12) owned and operated by the Elk Grove Unified School District or other public school districts.	
Institutional	Includes facilities such as hospitals, congregate care facilities, and the like.	
Private Streets	Used to designate existing private streets; locations of planned private streets are not shown on the General Plan Land Use Map	
Residential Land Uses		
Residential Land Use Designations	**Dwelling Units Per Gross Acre**	**Notes**
Rural Residential	0.1 - 0.5	Minimum lot size: 2 to 10 acres. Areas with minimum lot size greater than 10 acres are included in agricultural land use categories.
Estate Residential	0.51 – 4.0	Lot sizes range from ¼ acre to 2 acres.
Low Density Residential	4.1+ - 7.0	Lot sizes vary, generally from approximately 6,000 to 10,000 sf.
Medium Density Residential	7.1+ - 15.0	May include small lot single family development or condo town-home-type development.
High Density Residential	15.1+ - 30.0	May consist of apartments, condominiums, or clustered single family.
Agriculture		
Designation	**Minimum Parcel Size (Gross Acres)**	**Notes**
Rural Agriculture	10 – 20	Residential uses permitted; one dwelling unit per parcel.
General Agriculture	20+	This designation applies to areas outside the 2002 City limits only.
Other Designations		
Designation	**Notes**	

Commercial Land Uses	
Urban study area	Area is not planned for specific urban uses, but is subject to preparation of detailed land use feasibility planning and analysis (see General Plan, Land Use Element text for further information).
Transit Oriented Development (TOD)	Area is identified for potential transit uses such as train stations, transfer stations, transit hubs, park and ride facilities, etc. The underlying designation shall be used for base land uses. The intent of this overlay designation is to identify that specific transit uses shall be incorporated into development consistent with the underlying base land use designation. No development activity shall preclude intended transit facilities. Corresponding rights- of- way dedications shall be required with discretionary approvals as appropriate.

Source: City of Elk Grove General Plan

Development since 2011 Plan

As shown in Table B-16 below, Elk Grove has seen a growth of 8.2% of population between 2010 and January 1, 2015.

Table B-16 City of Elk Grove Population Changes Since 2011

Year	Population	Change	% Change
2010[1]	152,652	–	–
2015[2]	165,121	12,469	8.2%

Source: [1]US Census Bureau, [2]California Department of Finance

The Elk Grove Building Department tracked total building permits issued since 2011 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table B-17 and Table B-18. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people living in the area potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the City to identified priority hazards.

Table B-17 City of Elk Grove Total Development Since 2011

Property Use	2011	2012	2013	2014	2015
Residential	220	319	207	593	639
Commercial	10	23	10	9	9
Industrial	2	0	2	2	6
Other	0	0	0	0	0
Total	**232**	**342**	**219**	**604**	**654**

Source: City of Elk Grove, ONESolution Permitting Program

Table B-18 City of Elk Grove Development in Hazard Areas since 2011

Property Use	1% Annual Chance Flood[1]	Area Protected by Levee	Wildfire Risk Area[2]	Other
Residential	0	0	0	0
Commercial	0	3	0	0
Industrial	0	0	0	0
Other (pools, barns, etc.)	3	0	0	0
Total	**0**	**0**	**0**	**0**

Source: City of Elk Grove

[1] Development only in SFHA depicted on FEMA DFIRM maps.

[2]Moderate or higher wildfire risk area

Future Development

The Sacramento Council on Governments (SACOG) modeled population projections for the City of Elk Grove and other areas of the region in 2012 for a Metropolitan Transportation Plan/Sustainable Communities Strategy report. This forecast uses a 2008 base year estimate with projections to 2020 and 2035 for population, housing units, households and employment. SACOG estimated the City population in 2020 and 2035 to be 175,615 and 207,663 respectively.

B.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table B-9 as medium or high significance hazards and primary hazards in the State of California. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the Base Plan. In general, the most vulnerable structures are those located within the flood risk areas, wildfire risk areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Agricultural Hazards: Insects/Pests

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Agricultural cropland occurs interspersed throughout the East Elk Grove area/rural region in the City. Because this habitat is intensively managed, vegetation is limited to cultivate crops, predominately grains, orchards, and vineyards, with ruderal (weedy) vegetation along the margins. Ruderal species present within the City include Italian ryegrass (*Lolium multiforum*), ripgut brome (*Bromus diandrus*), and yellow star-thistle (*Centaurea solstitialis*). Perennial pepperwood (*Lepidium lantifolium*), an invasive noxious weed, is also present within the City, and may negatively impact City agricultural resources if it is allowed to spread within agricultural fields.

Insect pests may affect cultivated grain, orchard, and vineyard production within the City. Specific insect pest hazards include the glassy-winged sharp shooter, light brown apple moth, grape vine mealybug, and other insect pest species. Other potential hazards to the City's agricultural resources include the introduction of new plant diseases.

Glassy-Winged Sharpshooter

The glassy-winged sharpshooter (*Homalodisca vitripennis*) ranges over many habitats, including agricultural crops, urban landscapes, native woodlands, and riparian vegetation. It is reported to feed on hundreds of plant species. Hosts for the glassy-winged sharpshooter vary widely and include woody plants and annual and perennial herbaceous plants. It occurs in unusually high numbers on citrus. Common landscape and garden host plants include bird of paradise, eucalyptus, euonymus, citrus, crepe myrtle, pittosporum, sunflower, hibiscus, xylosma, and cottonwood, among many others. This species can spread the disease-causing bacterium *Xylella fastidiosa* from one plant to another. This bacterium is the causal agent of devastating plant diseases such as Pierce's disease of grape, oleander leaf scorch, almond leaf scorch and mulberry leaf scorch.

Light Brown Apple Moth

The light brown apple moth (*Epiphyas postvittana*) has been confirmed in Solano and Contra Costa counties, and has potential to spread to the City. This moth has a host range that includes many trees and ornamental species, giving it the potential to cause serious damage to natural areas and urban settings as well as to agricultural crops. It is not known how damaging the pest would be if it were to become established in California. The light brown apple moth is a serious pest of grapes, citrus, pome fruits, stone fruits, and kiwifruit in Australian areas that have a climate similar to that of California's Central Valley and is a major introduced pest in New Zealand, where it is favored by the cooler climate.

Grape Vine Mealybug

Grape vine mealybugs (Planococcus ficus) are a pest insect species that has been found in the Central Valley. The host range of the vine mealybug includes grape, fig, date palm, apple, avocado, citrus, and a few ornamentals.

Damage by the vine mealybug is similar to that of other grape-infesting mealybugs in that it produces honeydew that drops onto the bunches and other vine parts and serves as a substrate for black sooty mold. If ants are not present, a vine with a large population of this pest can have so much honeydew that it resembles candle wax. Also, the mealybug itself will be found infesting bunches making them unfit for consumption. Like the grape, obscure, and longtailed mealybugs, vine mealybug can transmit grape viruses.

Other Insect Pest Species and Diseases

The introduction of other insect pest species may negatively impact the City's agricultural resources. Many invasive insect pest species, including the Asian citrus psyllid, brown marmorated stink bug, citris leafminer, Diaprepes root weevil, European grapevine moth, Indian walking stick, and spotted wing drosophila are currently present in southern and coastal California, and may eventually be found within Sacramento County and the City. Similarly, the introduction of exotic plant diseases may affect the City's cultivated grains, orchards, vineyards, and other agricultural resources.

Past Occurrences

The City Planning Team noted that there have been no past occurrences of agricultural hazards in the City.

Vulnerability to Agricultural Hazards

Values at Risk

The City Planning Team noted that if an agricultural hazard were to occur within the city limits of Elk Grove, it may cause a risk to agricultural crops city-wide.

Future Development

Future development in the City is not expected to be affected by agricultural hazards.

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Climate change will require the City of Elk Grove to prepare for warmer and more extreme temperatures, decreased water supply, drought, flooding, increasing energy and water demand, and public health risks.

In California average temperatures are projected to rise as much as 9 degrees Fahrenheit by 2100. This is especially pertinent for Elk Grove where extreme heat events are likely to increase and urban heat islands may intensify already high temperatures. Characterized by asphalt roads, concrete roofs, and energy use, urban developments modify the natural landscape using materials that create and/or retain heat.

Past Occurrences

- 1973-47: La Nina
- 1975-76: La Nina
- 1982-83: El Nino
- 1988-89: La Nina
- 1997-98: El Nino
- 2006: California Heat Wave
- 2012-15: North American Drought
- 2015-16: El Nino

Vulnerability to Climate Change

Assets at Risk

The City's population, resources, and economy are vulnerable to climate change impacts, particularly flooding, extreme heat, and water supply. Without reduction strategies in place, community-wide greenhouse gases (GHG) emissions are anticipated to significantly increase based on the City's anticipated growth.

Future Development

The City of Elk Grove is committed to meeting State standards for the reduction of greenhouse gas emissions to achieve sustainable land use. The places we live, the methods used to construct our homes, and where we work dictate how far and by what means we travel and how much energy we use. Effective strategies include more compact development patterns, infill and reuse of underutilized properties, intensifying development near transit and mixed use activity centers, and locating jobs closer to housing. Similarly, "green" buildings and development projects, as part of a broader sustainability plan, will consume less energy, produce fewer emissions, protect occupant health, minimize waste, and create jobs.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

Dam failures can result from a number of natural or man-made causes such as earthquakes, erosion of the face or foundation, improper siding, rapidly rising flood waters, structural/design flaws, and deliberate human actions. A dam failure can cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to electric generating

facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas.

A catastrophic dam failure, depending on size of dam and population downstream, could exceed the response capability of local communities. Damage control and disaster relief support would be required from other local governmental and private organizations, and from state and federal governments.

Warning ability is generally determined by the frequency of inspections for structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate. The existence and frequency of updating and exercising an evacuation plan that is site-specific assists in warning and evacuation functions.

Folsom Dam, owned by the US Bureau of Reclamation, is the primary dam of concern which has the potential to affect the Sacramento County Planning Area and the local jurisdictions and populations in the inundation areas. Figure 4.75 in Section 4.3.6 in the Base Plan shows the areas of Sacramento County at risk to a dam failure of the Folsom Dam.

Past Occurrences

The City Planning Team noted no past occurrences of dam failure.

Vulnerability to Dam Failure

A failure of the Folsom or other high or significant hazard dam can cause significant loss of life, property damage, loss of critical facilities and infrastructure, and displacement of city residents.

Mass evacuation of the inundation area may be essential to save lives, if warning time should permit. Extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food, and temporary shelter would be required for injured or displaced persons. Identification and burial of many dead persons would pose difficult problems; public health would be a major concern. Many families would be separated, particularly if the failure should occur during working hours, and a personal inquiry or locator system would be essential. These and other emergency operations could be seriously hampered by the loss of communications, damage to transportation routes, and the disruption of public utilities and other essential services.

Governmental assistance could be required and may continue for an extended period. These efforts would be required to remove debris and clear roadways, demolish unsafe structures, assist in re-establishing public services and utilities, and provide continuing care and welfare for the affected population including, as required, temporary housing for displaced persons.

Values at Risk

Sacramento County provided a GIS inundation layer for the Folsom Dam system, as part of the following breaks:

- Folsom Right Wing
- Folsom Mormon
- Folsom Dike 4
- Folsom Dike 5
- Folsom Dike 6
- Folsom Dike 7
- Folsom Dike 8
- Folsom Dam

GIS was used to determine the possible impacts of dam failure flooding within the City of Elk Grove. The methodology described in Section 4.3.6 of the Base Plan was followed in determining structures and values at risk in potential dam inundation areas. Table B-19 shows the property use, improved parcel count, total land value, improved values, and total values that fall in the dam inundation zones.

Table B-19 City of Elk Grove– Count of Parcels and Values in Dam Inundation Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	0	0	$0	$0	$0
Care / Health	8	8	$5,038,155	$27,163,461	$32,201,616
Church / Welfare	10	10	$7,462,921	$38,693,473	$46,156,394
Industrial	28	19	$19,885,629	$85,632,412	$105,518,041
Miscellaneous	342	0	$191,408	$0	$191,408
Office	41	38	$12,981,404	$89,719,651	$102,701,055
Public / Utilities	168	0	$0	$0	$0
Recreational	3	3	$3,151,630	$16,705,147	$19,856,777
Residential	15,570	15,475	$1,255,080,031	$3,444,469,538	$4,699,549,569
Retail / Commercial	71	70	$43,864,787	$109,780,313	$153,645,100
Vacant	98	3	$26,241,857	$559,773	$26,801,630
No Data	0	0	$0	$0	$0
Total	**16,339**	**15,626**	**$1,373,897,822**	**$3,812,723,768**	**$5,186,621,590**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Table B-20 shows potential losses from a Folsom Dam failure with loss estimate and loss ratios for the City. The loss ratio is the loss estimate (i.e., total of improved and contents value for all parcels located in the dam inundation zone in the City) divided by the total potential exposure and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3-foot flood depth (30% damage), 6-foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table B-20 City of Elk Grove– Dam Inundation Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
Folsom Dam Inundation	15,626	$3,812,723,768	$2,132,745,432	$5,945,469,200	$1,783,640,760 $3,567,281,520 $5,945,469,200	10.6% 21.2% 33.6%

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table B-19 and Table B-20, the City of Elk Grove has 15,626 improved parcels and roughly $7.3 billion of structure and contents value in the Folsom Dam inundation area. The 3-foot loss ratio of 10.6%, the 6-foot loss ratio of 21.2%, and the total loss ratio of 33.6% indicates that the City has large amounts of assets at risk to a possible Folsom Dam failure.

Population at Risk

The dam inundation zones were overlayed on the parcel layer using GIS. Those residential parcel centroids that intersect the dam inundation zones were counted and multiplied by the 2010 Census Bureau average household factors for the City. According to this analysis, there is a total population of 49,211 residents of the City at risk to dam inundation. This is shown in Table B-25.

Table B-21 City of Elk Grove – Count of Improved Residential Parcels and Population in Dam Inundation Zone

Improved Residential Parcels	Population*
15,475	49,211

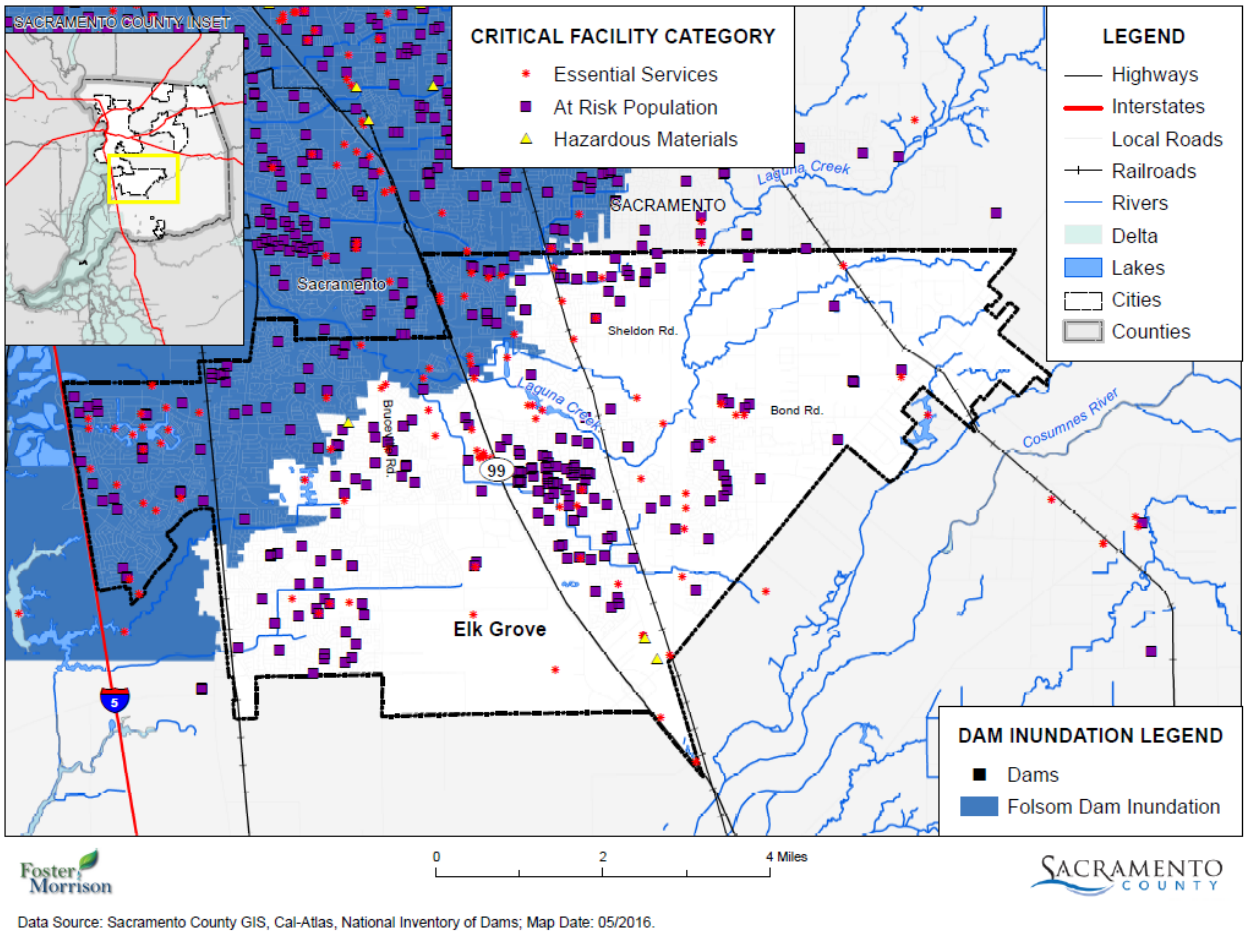
Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data, 2010 US Census Bureau

* Average household populations from the 2010 US Census were used: Galt – 3.18.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Elk Grove in the Folsom Dam inundation zone. GIS was used to determine whether the facility locations intersect the inundation area. Details of critical facilities in the inundation area in the City of Elk Grove are shown in Figure B-6 and Table B-22. As shown on the table and figure, Elk Grove has 99 critical facilities located in the Folsom Dam inundation area. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure B-6 City of Elk Grove – Critical Facilities in Dam Inundation Zone



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table B-22 City of Elk Grove – Critical Facilities in Dam Inundation Zones

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Detention Basin	22
	Emergency Evacuation Shelter	5
	Fire Station	3
	Government Facilities	1
	Sand Bag	2
	Total	**33**
At Risk Population Facilities	Adult Day Care	1
	Adult Residential	5
	Assisted Living Centers	13
	Day Care Center	9
	Hotel	3
	Private Elementary School	1

Critical Facility Category	Facility Type	Facility Count
	Private High School	1
	Private K-12 School	1
	Public Elementary School	6
	Public High School	2
	Public Middle School	1
	Residential Care/Elderly	8
	School	9
	School-Age Day Care Center	6
	Total	**66**
Total		**99**

Source: Sacramento County GIS

Future Development

Future development in the City will conform to the City's flood ordinance. Dam failure inundation zones will be factored into decisions on where to site future development.

Drought and Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Drought is different from many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for manufacturing, tourism, recreation, and commercial and domestic use. As the population in the City continues to grow, so will the demand for water.

The occurrence of drought in California, including the City, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability to drought is City-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels.

Past Occurrences

California's currently in its fifth year of severe drought. The time period of June 2015-May 2016 has been the 3rd warmest on record for California. California saw 2015 as the warmest year on record. On January 17, 2014 California State Governor, Jerry Brown, declared a drought state of emergency. On

May 9, 2016, California State Governor, Jerry Brown issued an order to continue water savings as drought persists.

Vulnerability to Drought and Water Shortage

Water resources are essential assets to communities and a shared economic responsibility of business and industry, farms and factories, individuals and communities. Water resource management is an urgent and growing need. Without water, neither small businesses nor major global industries can function. Nor can family farms, major agribusinesses, energy production facilities, computer manufacturers, or steel companies. Similarly, poor water quality, or limited or unreliable access to water means higher costs for all businesses – and all consumers. Water scarcity means greater risks for a community's long-term viability and a negative impact on their competitiveness. It also means that a community's ability to grow and create jobs is at risk.

Future Development

As the population in the area continues to grow, so will the demand for water. Water shortages in the future may be worsened by drought, as the City relies on surface water and groundwater for its water source. Increased planning including conjunctive use will be needed to account for population growth and increased water demands.

Earthquake

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

No known earthquake faults pass through the city limits or the Planning Area. However, nearby faults outside of the Sacramento Planning Area even far from the City have the potential to generate earthshaking which could cause damage in Elk Grove.

Past Occurrences

Since earthquakes have regional effects, the past occurrences detailed in Section 4.2.12 of the Base Plan are assumed to have affected Elk Grove.

Vulnerability to Earthquake

Assets at Risk

A variety of industrial uses are located in Elk Grove and the Planning Area, primarily in the southern portion of Elk Grove and in the Laguna West area west of the City. Many of these industrial facilities use and/or store chemicals and other materials that could result in damage both on- and off-site in the event of an accident.

Natural Resources at Risk

If an earthquake were to occur within the city limits of Elk Grove, it may cause hazards city-wide. All natural resources would be at risk.

Cultural and Historic Resources at Risk

If an earthquake were to occur within the city limits of Elk Grove, the City's historical buildings could be at risk.

Future Development

All development in the City is at risk to future earthquake. This risk is mitigated by the enforcement of building codes in the City that require buildings to take earthquake risk into account during construction.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–Medium

Note: For the Base Plan, the 2015 DFIRM was used for analysis. The City of Elk Grove Planning Team noted that many of the LOMRs that exist in the City were not considered in the creation of the new DFIRM. In addition, there were also many structures within the City that are elevated above the floodplain. As a result, the Planning Team noted that the Elk Grove flood data from the previous plan is a better representation of the flood risk for the City than that provided for this Base Plan based on the 2015 DFIRMs. As such, the 2011 methodology and City flood data is carried forward into this plan for the City of Elk Grove only. This affects the flood zones, values at risk, population at risk, and critical facilities at risk sections below.

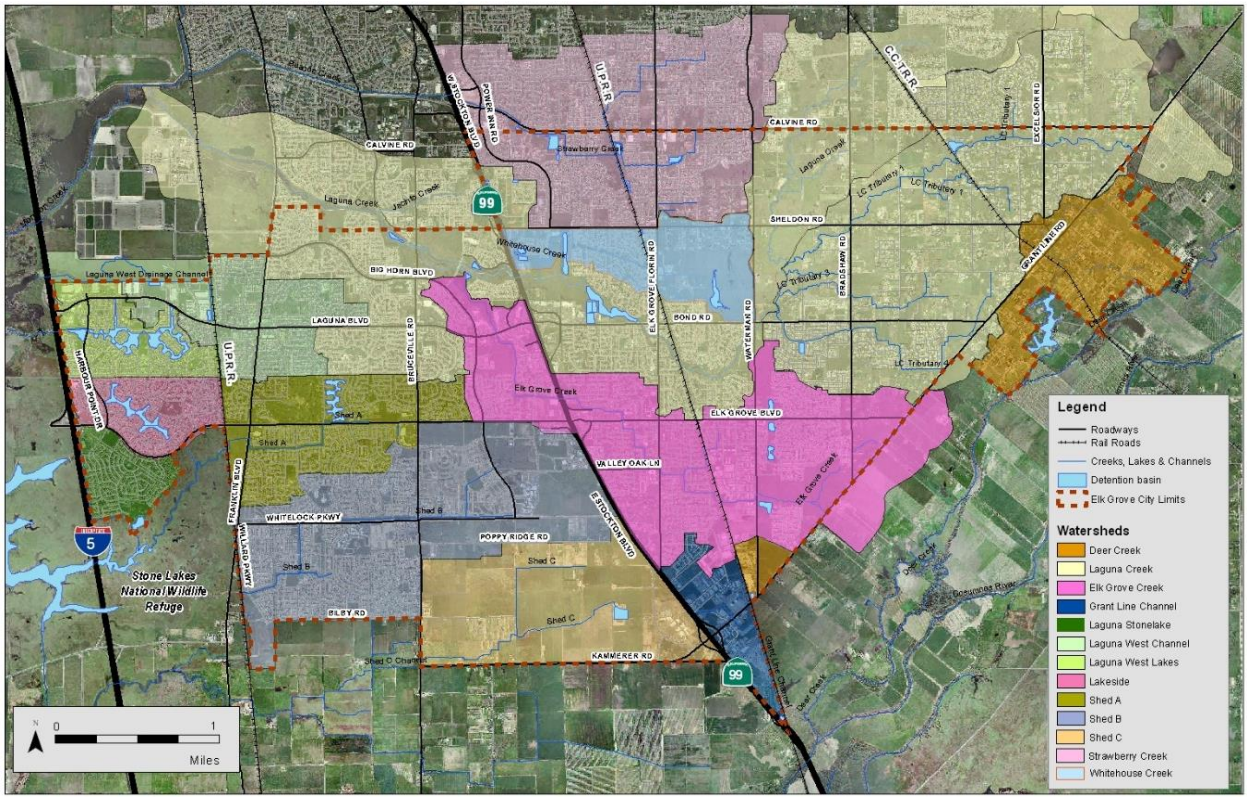
Hazard Profile and Problem Description

The occurrence of flooding in the City is an increasing safety, economic and environmental concern. The City has not experienced flooding conditions that have resulted in any damage to habitable structures since the City's incorporation; however, smaller localized flooding occurs on an annual basis. The developed areas within the City that are susceptible to potential flooding expose people and property to flood risks that affect personal safety and economic stability. Potential flood damage to homes, businesses, industries and infrastructure can be devastating in terms of personal loss and the cost of repairs and replacement of damaged properties.

The City inherited a traditional storm drainage and flood control system from Sacramento County upon incorporation in 2000 and this storm drainage collection and conveyance system, which consists of channels, creeks, ditches, pipes, streets and detention basins provides the City with a dependable means of minimizing the opportunities of flooding which can cause damage to the City's residents and infrastructure. The City's storm drainage and flood control system is continually undergoing expansion to accommodate new development flows as well as making improvements to the existing infrastructure in order to encourage nonstructural environmentally friendly storm drainage and flood control practices.

The drainage within the City is conveyed through a storm drainage and flood control system consisting of about 400 miles of underground pipes; and 60 miles of natural and constructed channels. The City drains within thirteen watersheds as delineated in Figure B-7. Within the watersheds there are ten major natural creeks or open channels (Figure B-7) that convey runoff within the City including Elk Grove Creek, Laguna Creek, Strawberry Creek, Whitehouse Creek, Deer Creek, Ehrhardt Channel, the Franklin Creek, Shed C Channel, Grant Line Channel, and the Laguna West Channel. Four of the creeks, Elk Grove Creek, Laguna Creek, Strawberry Creek, and Deer Creek convey runoff that originates outside the City limits. All of the watersheds and channels located within the City, ultimately drain into the Stone Lakes National Wildlife Refuge floodplain with the exception of the Deer Creek and Grant Line Channel watersheds, which drain to Deer Creek and ultimately to the Cosumnes and Mokelumne Rivers.

Figure B-7 City of Elk Grove Watershed Delineations, Creeks and Channels

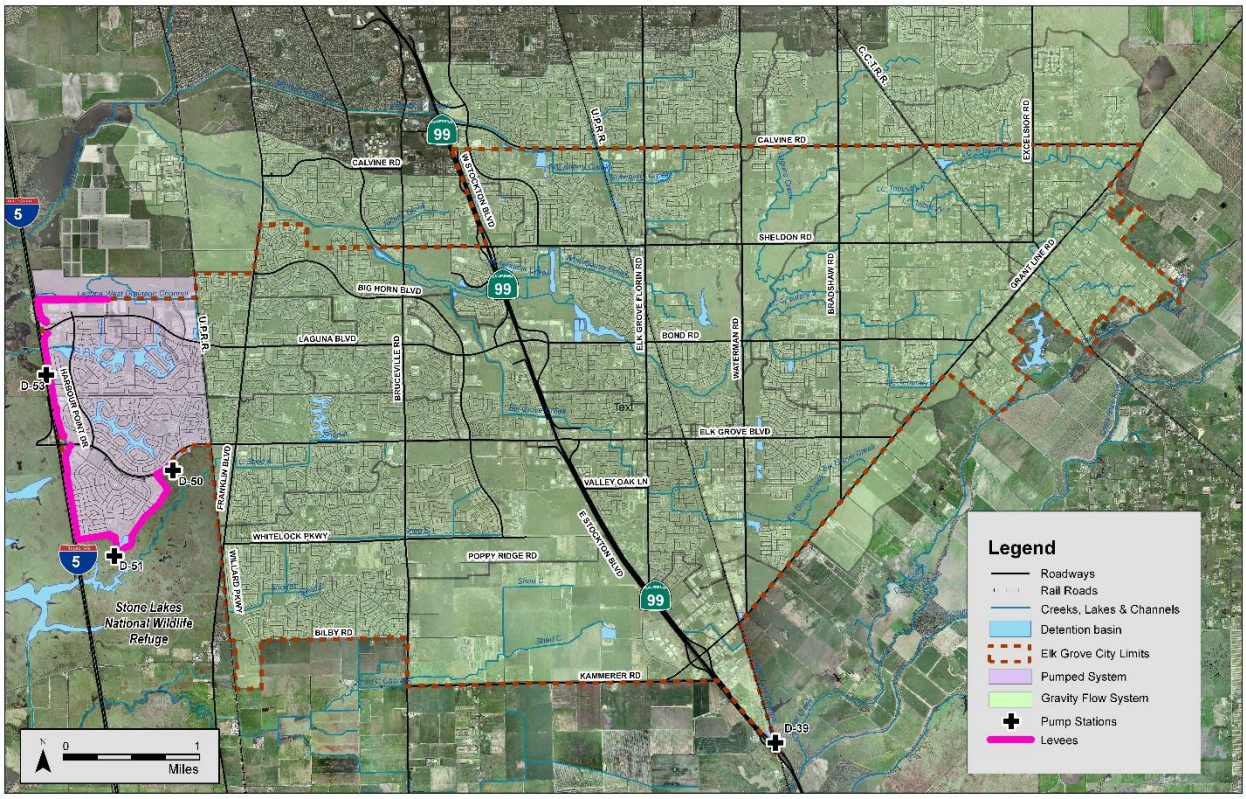


Source: City of Elk Grove GIS

The City's storm drainage and flood control system can be characterized as a gravity flow system for the portion of the City east of the Union Pacific Railroad tracks and a pumped system west of the Union Pacific Railroad tracks for the area referred to as the Laguna West communities. The three pump stations for the Laguna West area are located in the Laguna West Channel, Lakeside and Laguna Stonelake watersheds. The Laguna West area is protected by a perimeter levee system which protects the communities from the backwater effects of the Cosumnes and Mokelumne Rivers. There is also a pump station located in the Grant Line Channel watershed. The City has nineteen detention basins that were primarily constructed in conjunction with commercial and residential development in order to mitigate

project stormwater runoff flows to pre-project levels. Figure B-8 depicts the locations of the pump stations, levees, basins, and the gravity flow areas.

Figure B-8 City of Elk Grove Pump Stations, Levees, Detention Basins, and Gravity Flow Areas



Source: City of Elk Grove GIS

The majority of the City's storm drainage and flood control system facilities and channels are owned by the City, with some portions being privately owned. The City owns and operates the storm drainage and flood control facilities, which consist of pump stations, levees, detention basins and other flood control features.

Current land use of properties adjacent to storm drainage, flood control facilities and channels vary widely, and include all types of land uses present within the City, such as commercial, residential, industrial, recreational, open space, small scale agricultural, mixed-use and public facilities. Underground drainage pipes are typically located within or adjacent to public roadways. Natural and constructed channels are typically maintained as open space, with some recreational uses, such as bicycle trails, located along the channel corridor in some areas of the City.

The eastern portion of the City (primarily east of Waterman Road) is predominately rural with residences built on large lots where agricultural practices are common. A majority of the East Elk Grove area/rural region does not have an underground pipe system, curbs or gutters. Stormwater is collected and conveyed by roadside ditches that have very limited flow carrying capacity. This results in roads experiencing

flooding and standing water at a few locations. In some areas the roads may overtop, which impacts driving, particularly at night.

Along the eastern and southern edges of the City, the Cosumnes River represents a major flood hazard. The Cosumnes River is the last river in California, which remains undammed along its entire length, so flooding caused by this river can be extensive.

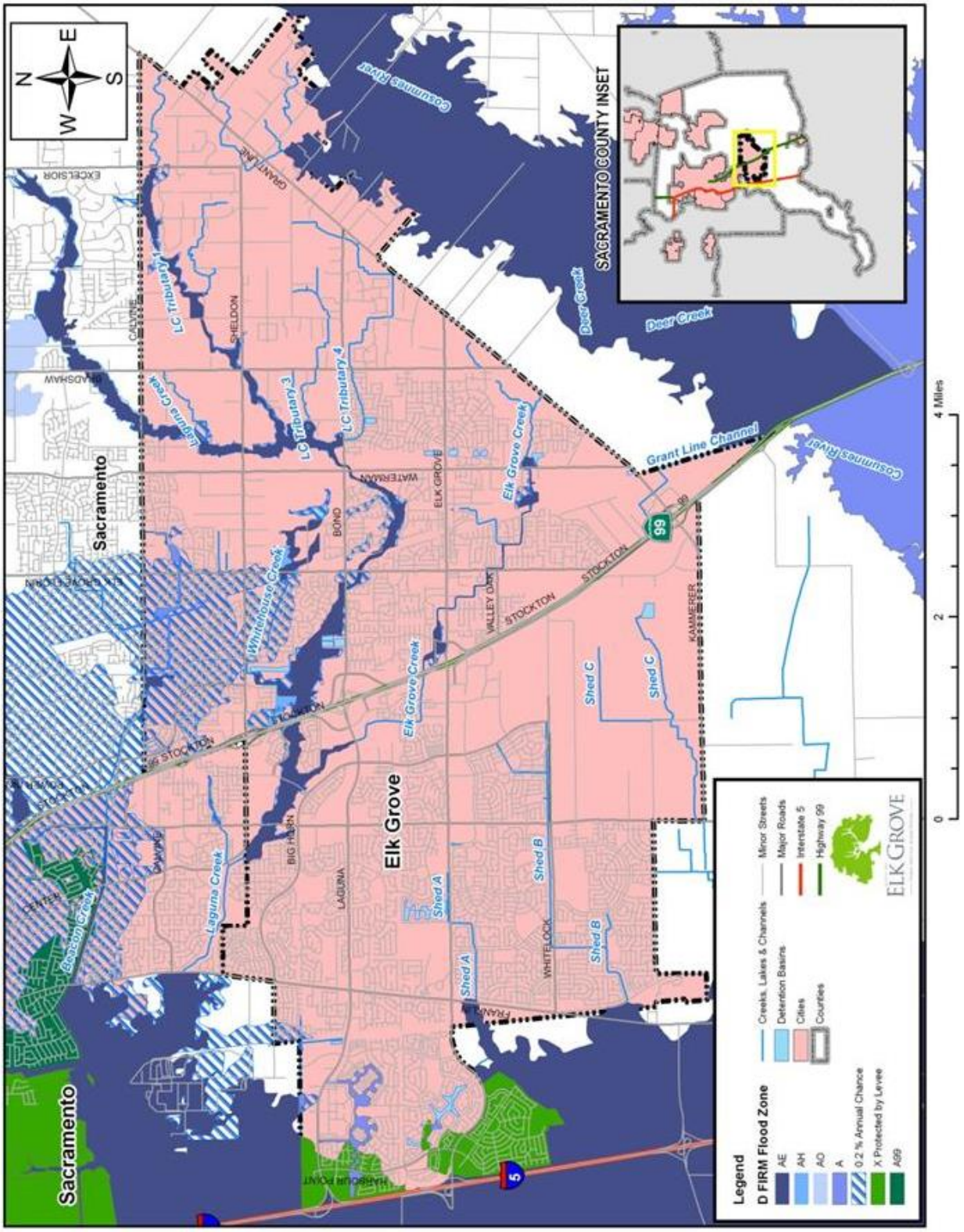
Past Occurrences

Other than occasional localized street flooding, there have not been any significant incidents of flooding that have adversely impacted the City.

Flood Zones

A small portion of the City is located within the 100-year flood zone as defined by the Federal Emergency Management Agency (FEMA). The City does have a much larger portion that falls in the 500-year flood zone. This is seen in Figure B-9.

Figure B-9 City of Elk Grove – FEMA DFIRM Flood Zones (2011)



Vulnerability to Flood

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Elk Grove. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table B-23 shows the property use, improved parcel count, and structure values that fall in a floodplain in the City.

Table B-23 City of Elk Grove – Count and Improved Value by Property Use and Detailed Flood Zone (2011)

Flood Zone	Land Use	Parcel Count*	Structure Value
A	Residential	0	$0
	Office	0	$0
	Industrial	0	$0
AE	Residential	27	$15,272,070
	Retail/Commercial	5	$8,573,610
	Office	0	$0
	Industrial	2	$1,116,572
	Care/Health	1	$4,482,262
	Public/Utilities	1	$140,434
	Recreational	1	$6,118,405
0.2% Annual Chance	Residential	3,903	$721,966,516
	Retail/Commercial	26	$72,632,878
	Office	2	$3,943,437
	Industrial	10	$6,708,943
	Care/Health	2	$2,883,601
	Church/Welfare	2	$448,517
	Recreational	2	$298,743
	Vacant	2	$5,998
X Protected by Levee	Residential	2,029	$530,596,181
	Retail/Commercial	27	$42,305,386
	Office	12	$79,565,721
	Industrial	2	$14,652,715
	Care/Health	1	$2,643,511
	Recreational	1	$4,275,000
	Vacant	1	$6,774,363
X	Residential	39,140	$7,435,667,208
	Retail/Commercial	301	$785,243,971

Flood Zone	Land Use	Parcel Count*	Structure Value
	Office	147	$268,228,606
	Industrial	156	$229,297,136
	Care/Health	29	$46,613,053
	Church/Welfare	32	$89,662,386
	Public/Utilities	2	$310,654
	Recreational	9	$21,126,867
	Agricultural	15	$1,259,382
	Miscellaneous	11	$37,392,267
	Vacant	27	$7,939,858
	NO DATA	1	$70,000
Total		**45,929**	**$10,448,216,251**

Source: Sacramento County Secured Roll Assessor & Parcel Data, City of Elk Grove and Sacramento County Preliminary DFIRM, January 2011

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Table B-24 summarizes Table B-23 above and shows City of Elk Grove loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table B-24 City of Elk Grove – Flood Loss Summary (2011)

Flood Zone	Improved Parcel Count	Total Improved Value	Estimated Contents Value	Total Improved/ Contents Value	Loss Estimate	Loss Ratio
1% Annual Chance	37	$35,703,353	$17,851,677	$53,555,030	$10,711,006	0.04%
0.2% Annual Chance*	3,949	$808,888,633	$404,444,317	$1,213,332,950	$242,666,590	1.01%

Source: Sacramento County Secured Roll Assessor & Parcel Data, City of Elk Grove and Sacramento County Preliminary DFIRM, January 2011

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

According to Table B-23 and Table B-24, the City of Elk Grove has 37 improved parcels and structures and contents valued at roughly $43 million in the 1% annual chance floodplain. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a 1% chance in any given year of a flood event causing roughly $10.7 million in damage in the City of Elk Grove. The City of Elk Grove has 3,949 improved parcels and structures and contents valued at roughly $945 million in the 0.2% annual chance floodplain. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a 0.2% chance of a flood event causing $242 million in damages in the City of Elk Grove. A loss ratio of 0.04% and 1.01% indicates that losses in Elk Grove to flood would be relatively minor.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for Elk Grove. According to this analysis, there is a total population of 118 and 12,558 residents of the City at risk to flooding in the 1% an 0.2% annual chance floodplains, respectively. This is shown in Table B-25.

Table B-25 City of Elk Grove – Count of Improved Residential Parcels and Population by Flood Zone (2011)

Flood Zone	Improved Residential Parcels	Population*
1% Annual Chance	37	118
Shaded X (0.2% Annual Chance)*	3,949	12,558

Source: Sacramento County Secured Roll Assessor & Parcel Data, City of Elk Grove and Sacramento County Preliminary DFIRM, January 2011

* Average household populations from the 2010 US Census were used: Elk Grove– 3.18.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Elk Grove in identified FEMA DFIRM flood zones. GIS was used to determine whether the facility locations intersects a DFIRM flood hazard areas, and if so, which zone it intersects. Details of critical facilities in the floodplain in the City of Elk Grove are shown in Figure B-10 and Table B-26. As shown on the table and figure, Elk Grove has 17 critical facilities located in 1% annual chance and 39 critical facilities in the 0.2% annual chance DFIRM flood zones.

Figure B-10 City of Elk Grove – Critical Facilities and Flood Zones (2011)

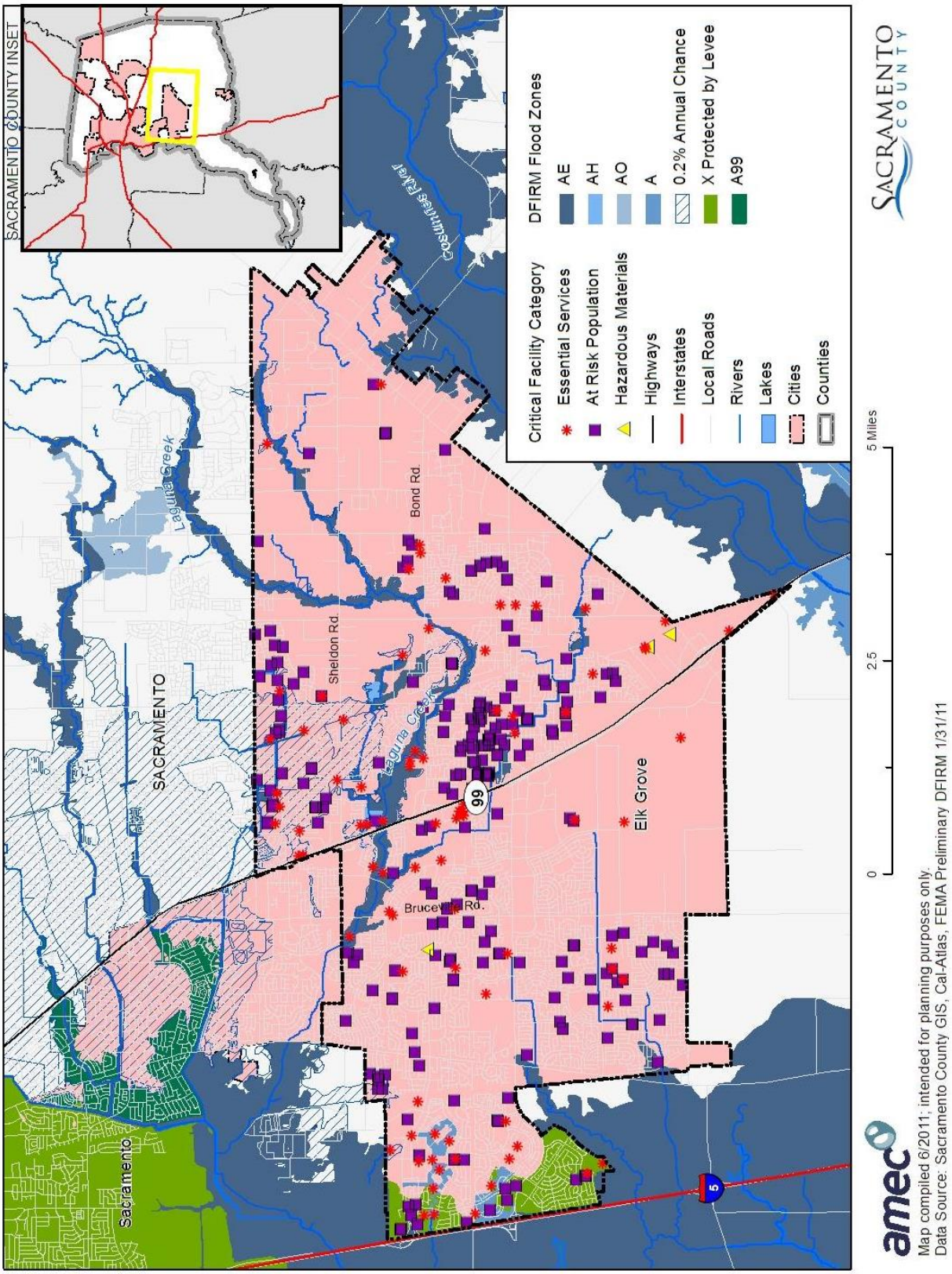


Table B-26 City of Elk Grove – Critical Facilities and Flood Zones (2011)

Flood	CF Category	Count
1% Annual Chance	Essential Services Facilities	15
1% Annual Chance	At Risk Population Facilities	2
0.2% Annual Chance	Essential Services Facilities	10
0.2% Annual Chance	At Risk Population Facilities	29
Total		**56**

Source: Sacramento County Secured Roll Assessor & Parcel Data, City of Elk Grove and Sacramento County Preliminary DFIRM, January 2011

*This count only includes those critical facilities in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all critical facilities in the 1% annual chance floodplain.

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Elk Grove joined the National Flood Insurance Program (NFIP) on 10/15/2001. The City does not participate in the CRS program. NFIP data indicates that as of February 19, 2016, there were 1,444 flood insurance policies in force in the City with $465,096,000 of coverage. Total premiums for the city were $541,770. Of the 1,444 policies, 1,433 were residential and 11 were non-residential. 8 of the policies were in A zones; while the remaining 1,436 were in B, C, and X zones, with 9 of these standard policies and 1,427 preferred policies. The GIS parcel analysis detailed above identified 37 parcels in the 100-year flood zone. 8 policies for 37 parcels in the 100-year floodplain equates to insurance coverage of 21.6 percent. There have been no historical claims for flood losses in the City.

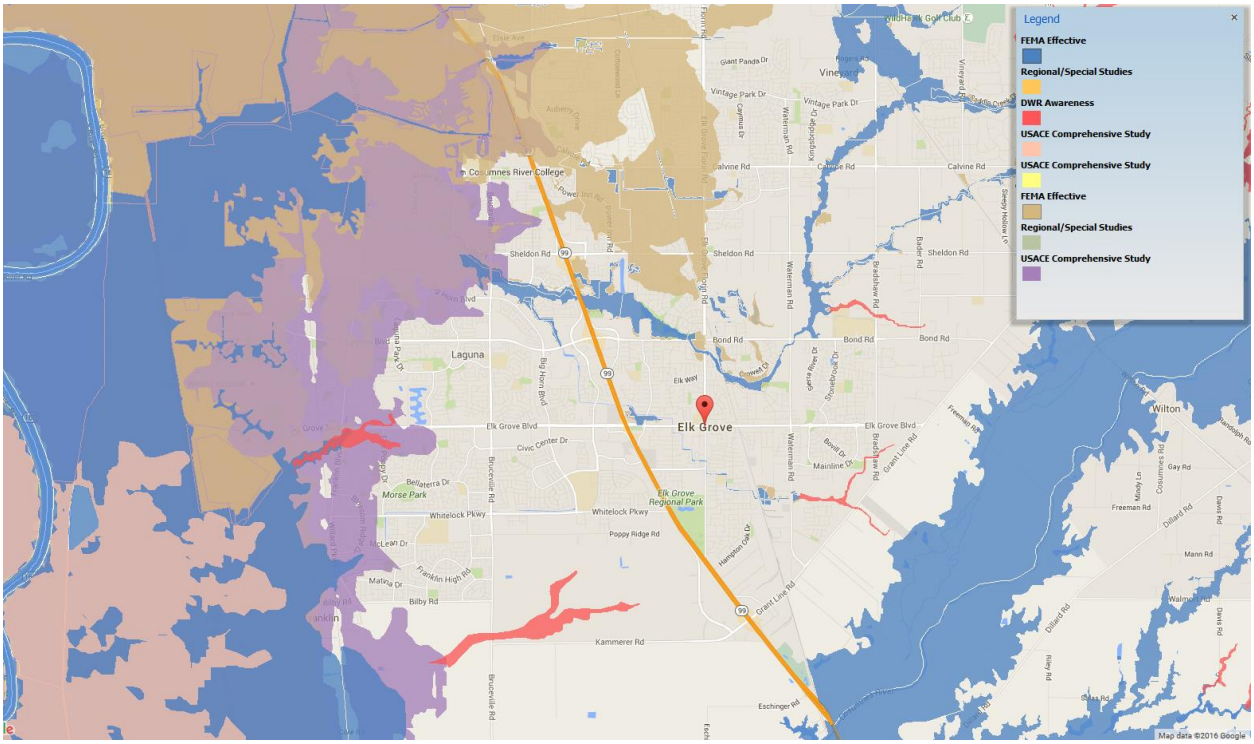
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Sacramento County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year and 500-year event risks, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency, however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. The BAM map for Elk Grove is shown in Figure B-11.

Figure B-11 City of Elk Grove Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 100-Year, Orange – Local 100-Year (developed from local agencies), Red – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), Pink – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), Purple – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Natural Resources at Risk

The City Planning Team noted that if a flood were to occur within the city limits of Elk Grove, it may impact all natural resources.

Historic and Cultural Resources at Risk

The City Planning Team noted that if a flood were to occur within the city limits of Elk Grove, the City's historical building could be at risk.

Future Development

The City enforces the floodplain ordinance. If development is to occur in the floodplain, it is required to conform to the elevation standards of the floodplain ordinance. While the use of fill to create buildable area is strongly discouraged by City policy, should it be allowed, there shall be no net increase to the water surface elevation adjacent to, downstream, and upstream of the development, as determined by the City. Other improvements may be required as part of the proposed project. A Conditional Letter of Map Revision (CLOMR) issued by FEMA shall be required prior to grading permit issuance, unless only a LOMR is required. A Letter of Map Revision (LOMR) issued by FEMA shall be required prior to issuance of the first building permit.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Localized flooding occurs at various times throughout the year and there are several areas of concern unique to the City. Historically, the City has been at risk of flooding primarily during severe weather storms when the waterway/creek systems swell with heavy rainfall. This may produce localized street flooding due to high water in the waterway/creek systems. The previous discussion on the 100/200/500 year flood included detailed information of the City's drainage and localized creek systems that during these heavy rains can be overwhelmed and cause flooding.

Past Occurrences

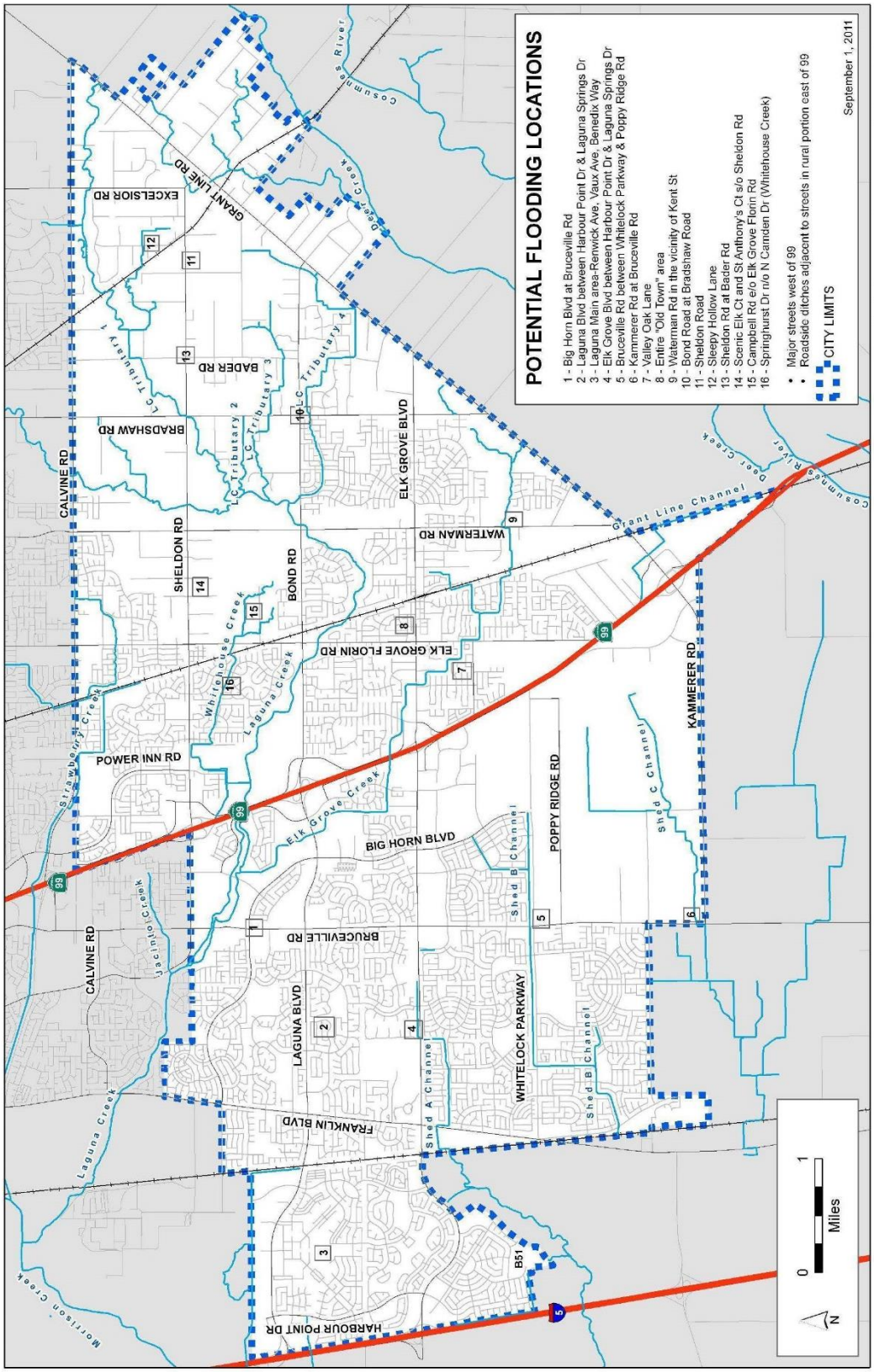
The East Elk Grove area and rural area has localized flooding which is widespread but generally minor. These areas of potential concern are included in Figure B-12 and Table B-27. In portions of this area, roadside ditches and culverts lack volume capacity and are prone to blockages from debris. Streets of primary concern that are monitored during rain events in this area are Sheldon Road, Bradshaw Road, Grant Line Road, Waterman Road, Bader Road, Bond Road, and Elk Grove Boulevard.

During heavy rainfall, the major streets west of Highway 99 experience localized flooding due to inlets being blocked with leaves resulting in standing water on one or more lanes in the roadway. Major streets of primary concern that are monitored during rain events in this area are Big Horn Boulevard, Laguna Boulevard, Bruceville Road, Elk Grove Boulevard, and Franklin Boulevard.

Vulnerability to Localized Flooding

Figure B-12 and Table B-27 identifies known and past occurrences of such areas and the associated problems encountered. This list is an initial inventory of key problem areas and is not intended to be a complete inventory of all problems and locations associated with severe weather events and localized flooding in the City.

Figure B-12 Potential Localized Flooding Locations



Source: City of Elk Grove GIS.

Table B-27 City of Elk Grove's Road List of Localized Flooding Problem Areas

Road Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Big Horn Blvd. at Bruceville Rd.	X					X	
Laguna Blvd. between Harbour Point Dr. and Laguna Springs Dr.	X			X		X	X
Laguna Main areas – Renwick Ave., Vaux Ave., Benedix Way	X					X	X
Elk Grove Blvd. between Harbour Point Dr. and Laguna Springs Dr.	X			X		X	X
Bruceville Rd. between Whitelock Parkway and Poppy Ridge Rd.	X					X	X
Bruceville Rd just north of Kammerer Rd	X	X		X		X	
Kammerer Rd. at Bruceville Rd.	X	X		X		X	
Valley Oak Ln.	X					X	X
Entire "Old Town" Area	X					X	X
Waterman Rd. in the vicinity of Kent St.	X			X		X	
Bond Rd. at Bradshaw Rd.	X					X	
Sheldon Rd.	X					X	
Sleepy Hollow Ln.	X					X	
Sheldon Rd. at Bader Rd.	X					X	X
Scenic Elk Ct. and St. Anthony's Ct. s/o Sheldon Rd.	X					X	
Springhurst Dr. north of N. Camden Dr.	X					X	
Major Roads west of Hwy. 99	X					X	X
Roadside Ditches East Elk Grove Area/ Rural area	X					X	X

Source: City of Elk Grove

Future Development

Future development in the City will use Low Impact Development (LID) techniques and infiltration best management practices (BMPs) such as infiltration trenches, infiltration basins, bio retention planters, porous pavement, dry wells and green streets. The City will need to be proactive to ensure that increased

development has proper siting and drainage for stormwater. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized flooding. Mitigating the causes of the localized stormwater flooding will reduce future risks of losses.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the City from several sources. Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse can occur very quickly with relatively little warning. Such a failure could occur where a levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

The City has participated in FEMA's Map Modernization Project and the requirements of Title 44 of the Federal Code of Regulations (CFR), Section 65.10 of the National Flood Insurance Program (NFIP) regulations to certify the Laguna West levee system. The Laguna West levee system meets the design, operation and maintenance criteria set forth 44 CFR Section 65.10. The City also participates in the U.S. Army Corps of Engineers Rehabilitation Inspection PL84-99 Program for non-federal levees and non-project levees.

The City implements levee operation and maintenance activities, which provide maintenance recommendations and requirements for specific levee inspections and maintenance operations. Levee inspections and maintenance activities include vegetation control, rutting/depressions, erosion control, slope stability, cracking, rodent control, encroachments/excavation, riprap revetments/banks, closure structures, underseepage relief wells/toe drainage system, seepage/sandboils, debris removal, roadway crown, utilities, minor structures, and mosquito abatement.

Past Occurrences

There have been no past occurrences of levee failure in the City. The City's levee system is designed to protect the Laguna West communities from the backwater effects of the Cosumnes and Mokelumne Rivers. These levees have never experienced flood waters on the water side of the levees. If a 100-year flood event should occur, backwater effects from the Cosumnes and Mokelumne Rivers are expected to last for only one (1) to two (2) days as the Cosumnes River is an uncontrolled watershed and the peak flows from the river will last for a short period of time.

Vulnerability to Levee Failure

In addition to flooding, a major overtopping of a levee may result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters. On the Sacramento River system, depending on which dams are releasing the flows, advance warning of river stages may be as much as 24 hours.

Values at Risk

GIS was used to determine the possible impacts of levee failure flooding within the City of Elk Grove. The methodology described in Section 4.3.12 of the Base Plan was followed in determining structures and values at risk to a levee failure. However, this analysis was performed based on the most current 2015 DFIRMs which still reflect some levees as providing 100-year level of protection. According to the County, all levees have since been decertified as not providing a 100-year level of protection, so this analysis is based solely on the information presented in the DFIRMs. Further it is important to note that many levee improvement projects are ongoing throughout the Planning Area, some of which will be providing certification of area levees to both a 100-year and 200-year levels depending on applicable requirements. Thus, this analysis reflects a moment in time and while it does provide information on areas developed behind levees, the X Protected by Levee flood zone will continue to change as these projects are completed and new certifications obtained. Figure B-9 showed the X Protected by Levee zones in the City. Table B-28 shows the property use, improved parcel count, improved values, total values and estimated loss of parcels that fall in a X Protected by Levee flood zone in the City.

Table B-28 City of Elk Grove – Count and Improved Value by Property Use in Levee Protected Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value*
Agricultural	0	0	$0	$0	$198
Care / Health	1	1	$500,000	$1,390,000	$1,890,000
Church / Welfare	3	3	$3,547,808	$13,583,425	$17,131,233
Industrial	6	3	$5,439,577	$13,221,911	$18,661,488
Miscellaneous	37	0	$198	$0	$198
NO DATA	0	0	$0	$77,253,175	$87,257,120
Office	29	28	$10,003,945	$0	$0
Public / Utilities	25	0	$0	$0	$0
Recreational	0	0	$0	$644,671,874	$861,257,374
Residential	2,201	2,193	$216,585,500	$28,090,146	$44,856,204
Retail / Commercial	33	33	$16,766,058	$0	$9,027,277
Vacant	24	0	$9,027,277	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value*
Total	**2,359**	**2,261**	**$261,870,363**	**$778,210,531**	**$1,040,081,092**

Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

Table B-29 shows potential losses from levee failure with loss estimates and loss ratios for the City. The loss ratio is the loss estimate (i.e., total of improved and contents value for all parcels located in levee protected zones in the City) divided by the total potential exposure and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3-foot flood depth (30% damage), 6-foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table B-29 City of Elk Grove – X Protected by Levee Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
X Protected by Levee	2,261	$778,210,729	$462,485,748	$1,240,696,477	$372,208,943.10 $744,417,886.20 $1,240,696,477	2.2% 4.4% 7.4%

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016

*Three values are shown here due to varying flood depths expected – 3-foot, 6-foot, and total loss.

According to the information in Table B-28 and Table B-29, the City has 2,261 improved parcels and roughly $1.5 billion of structure and contents value in the X Protected by Levee areas. The 3-foot loss ratio of 2.2%, the 6-foot loss ratio of 4.4%, and the total loss ratio of 7.4% indicates that the City has moderate amounts of assets at risk to possible levee failures.

Structures protected by levees that fail are often total losses. The analysis above assumes all levees in the City break at one time, which is unlikely. The extent and depth of actual flooding and associated damage will vary depending on the location, nature, depth, and extent of any levee break.

Population at Risk

The DFIRM flood zones, including the X Protected by Levee flood zone, were overlayed on the parcel layer. Those residential parcel centroids that intersect the X Protected by Levee zone were counted and multiplied by the 2010 Census Bureau average household factors for Elk Grove. According to this analysis, there is a total population of 6,974 residents of the City in an X Protected by Levee zone.

Table B-30 City of Elk Grove – Count of Improved Residential Parcels and Population in X Protected by Levee Zone

Residential Parcels	Population at Risk
2,193	6,974

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Elk Grove in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersect a DFIRM flood zone, and if so, which zone it intersects. Details of critical facilities in the X Protected by Levee zone in the City of Elk Grove were shown in the flood section in Figure B-10 and Table B-26. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Table B-31 City of Elk Grove – Critical Facilities in Levee Protected Zones

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Sand Bag	2
	Total	**2**
At Risk Population Facilities	Adult Day Care	1
	Adult Residential	1
	Assisted Living Centers	3
	Day Care Center	2
	Hotel	3
	Private Elementary School	1
	Public Elementary School	1
	Residential Care/Elderly	1
	School	1
	School-Age Day Care Center	1
	Total	**15**
X Protected by Levee Total		**17**

Source: FEMA DFIRM 4/16/2015, Sacramento County GIS

Natural Resources at Risk

If a levee failure were to occur within the city limits of Elk Grove, it could cause flooding city-wide. All natural resources would be at risk.

Historic and Cultural Resources at Risk

If a levee failure were to occur within the city limits of Elk Grove, it could cause flooding city-wide. All historical buildings would be at risk.

Future Development

The City's levee system is located in the Laguna West/Stonelake communities. These communities are built-out and only infill projects are anticipated to occur in these areas. Any future development will be required to meet the City's development standards, policies and ordinances.

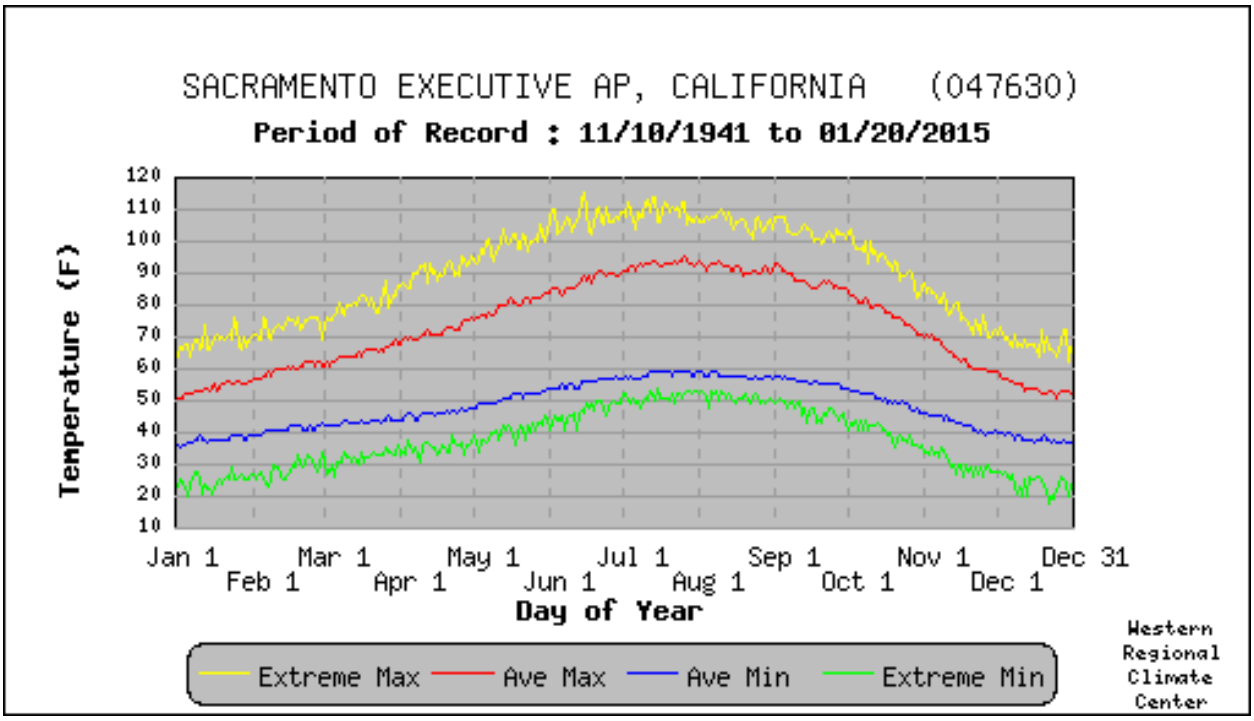
Severe Weather: Extreme Temperatures Cold and Freeze

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The City experiences temperatures that hover around or below 32 degrees during the winter months (see Figure B-13). Many months see a high number of days where daily low temperatures fall below 32°F (see Table B-33). Generally, people who live and work in this weather are prepared to cope with the extremes in that they dress appropriately and stay indoors.

Figure B-13 Daily Temperatures Averages and Extremes for the City of Elk Grove



Source: Western Regional Climate Center, Sacramento FAA Airport Station

Past Occurrences

Table B-33 shows past record lows for the City of Elk Grove.

Table B-32 Record Low Temperatures in the City of Elk Grove

Month	Temperature	Date	Month	Temperature	Date
January	20°	1/5/1950	July	48°	7/8/1983
February	23°	2/7/1989	August	48°	8/05/1950
March	26°	3/5/1971	September	42°	9/30/1927
April	31°	4/9/1999	October	35°	10/30/1948

Month	Temperature	Date	Month	Temperature	Date
May	34°	5/3/1950	November	26°	11/21/1941
June	41°	6/7/1950	December	18°	12/22/1990

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Vulnerability to Extreme Cold

Impact to such cold temperatures has resulted in damage to such infrastructure as; domestic water pipes, irrigation systems, unprotected fire protection systems (fire sprinklers) and surface icing on streets and walkways. Health impacts are the primary concern with this hazard, though economic impacts are also an issue. The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable.

Future Development

Future development addresses extreme cold issues by building energy efficient homes with renewable energy systems that can save energy and money on electricity, water heating, or space heating and cooling. Also, ultra-efficient homes are being incorporated into the community with state-of-the-art energy-efficient construction, appliances, and lighting with commercially available renewable energy systems, such as solar water heating and solar electricity. Energy saving and water-wise drought tolerant landscapes are also being incorporated into future landscape development.

Severe Weather: Extreme Temperatures – Extreme Heat

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The City experiences temperatures in excess of 100 degrees during the summer and fall months. The temperature moves to 105-110°F in rather extreme situations (see Figure B-13 above). Many months see a high number of days where daily high temperatures exceed 90°F (see Table B-33). Generally, people who live and work in this weather are prepared to cope with the extremes in that they dress appropriately and stay in air conditioned buildings during the peak temperature periods of the day.

Past Occurrences

The City opens "Cooling centers" during the occasional periods of extreme heat. In the past, the cooling centers were opened an average of 5 times per year and have had very low attendance. Churches and schools can be opened in the event there is a need to expand the cooling centers throughout the City. If long term or widespread heat conditions continue, County Emergency Operation Services would declare a local emergency or the possibility of a state emergency would be activated. Those being served at the

City cooling centers could be transferred to larger Red Cross centers opened within the County. Table B-33 shows past record highs for the City of Elk Grove.

Table B-33 Record High Temperatures in the City of Elk Grove

Month	Temperature	Date	Month	Temperature	Date
January	74°	1/12/2009	July	114°	7/13/1972
February	76°	2/19/1964	August	110°	8/10/1996
March	88°	3/26/1988	September	108°	9/01/1950
April	95°	4/30/1996	October	104°	10/02/2001
May	105°	5/28/1984	November	87°	11/01/1960
June	115°	6/15/1961	December	72°	12/28/1967

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Vulnerability to Extreme Heat

Health impacts are the primary concern with this hazard, though economic impacts are also an issue. The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable.

Reliance on air conditioning causes a strain on the electrical energy in the City. Occasionally peak demands outweigh supply and a condition known as brown-out occurs. This is an extremely dangerous situation for electrical equipment as it operates without the needed electricity causing damage to the systems. Days of extreme heat have been known to result in medical emergencies, civil unrest, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts.

Future Development

Future development addresses extreme heat issues by building energy efficient homes with renewable energy systems that can save energy and money on electricity, water heating, or space heating and cooling. Also, ultra-efficient homes are being incorporated into the community with state-of-the-art energy-efficient construction, appliances, and lighting with commercially available renewable energy systems, such as solar water heating and solar electricity. Energy saving and water-wise drought tolerant landscapes are also being incorporated into future landscape development.

Severe Weather: Fog

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

The Sacramento Valley can produce some extremely dangerous fog in the winter and early spring months. These are a type of radiation fog called "tule fog." Tule fog forms on cold and clear nights, when the ground is moist and there is very little wind. Under such conditions the ground cools quickly and thus cools the air above it as well. The moisture in this cooled air condenses and can create extremely dense fog. Since the air may be stagnant and there is little evaporative effect from the sun in winter months, tule fog can last for several days and, in some instances, over a week. Under these conditions, visibility is often reduced to 600 feet, but can drop to less than 10 feet.

Past Occurrences

There have not been any significant fog incidents that have adversely impacted the City.

Vulnerability to Fog

When tule fog forms, a severe risk is posed to traffic with the potential for multi-car pileups, especially on freeways such as Highway 99 and Interstate 5. This may have an economic impact on the City due to delays in transportation times or even the shutting-down of the major freeways of Interstate 5 and Highway 99. The same dense and lingering fog can also produce adverse health effects in those with respiratory ailments.

Future Development

Fog is unlikely to affect future development in the City.

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the City. Damage related to severe weather has occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the City. Wind and lightning often accompany these storms and have caused damage in the past.

Past Occurrences

Heavy rains and storms occur during the winter and spring months causing occasional localized street flooding. There have not been any significant incidents of flooding that have adversely impacted the City.

Vulnerability to Heavy Rains and Storms

Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees. Table B-27 presented above provides details of those areas within the City that are most often affected during these heavy storm events and have localized flooding issues.

Future Development

The City has a Storm Drainage Master Plan, which identifies improvements necessary as part of new development to address flood risk. Additionally, the City has adopted General Plan policy discouraging fill in floodplains and has adopted new flood damage prevention regulations in its Municipal Code. Future development in the City is subject to these requirements. New critical facilities such as communications towers should be built to withstand hail damage, lightning, and heavy rains.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The General Plan noted that:

> *There are no known fire hazards in Elk Grove that require the implementation of specific policies in this General Plan.*

However, due to its significance in the State of California, wildfire vulnerability is profiled here.

Past Occurrences

The City Planning Team noted that occasionally, open field brush fires have occurred in the City:

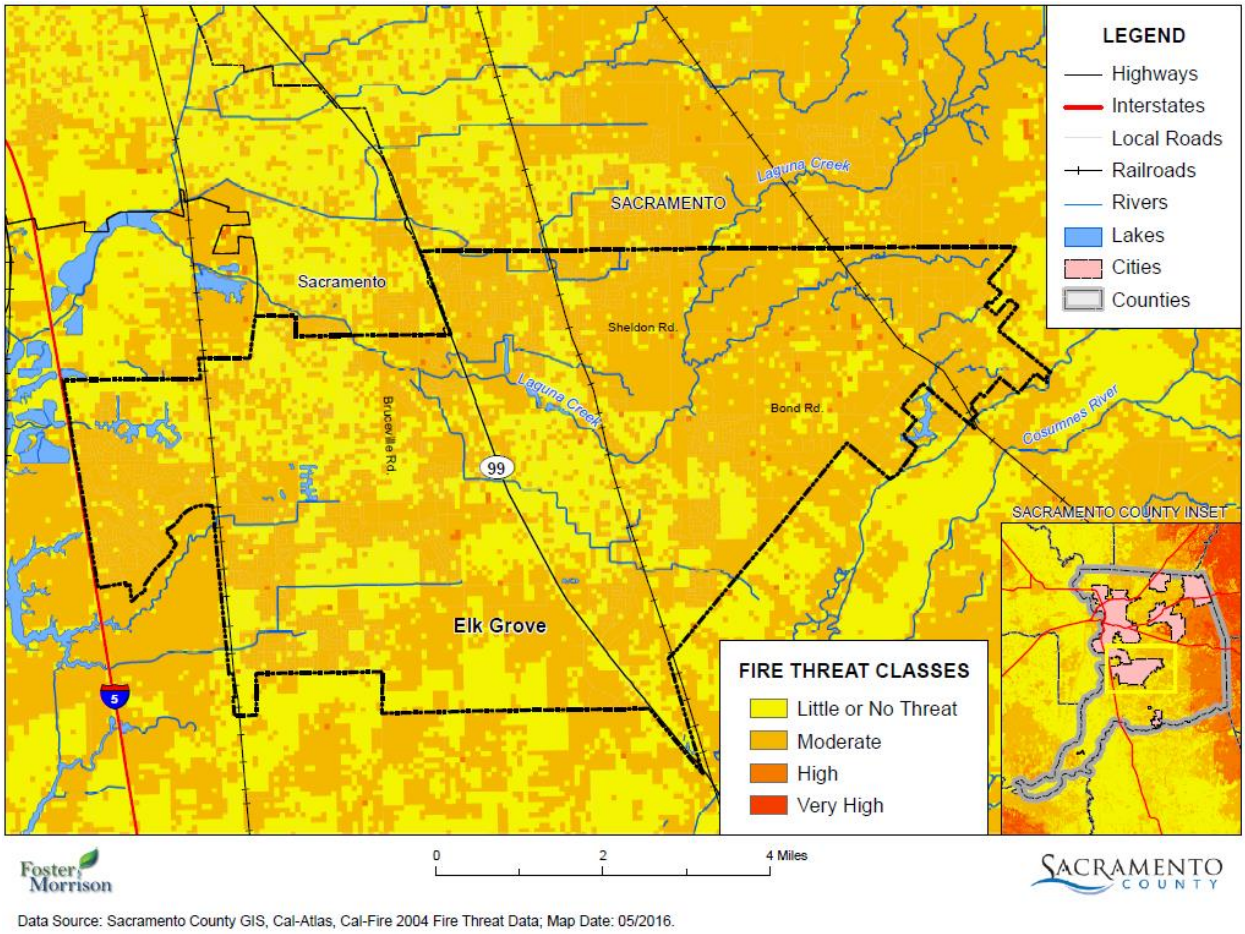
- A 25-acre fire that occurred on June 9 of 2015. A grass fire that started about 1:30 p.m. at Bond and Waterman roads was driven by high, shifting winds. It quickly spread toward homes that border the field to the east and south. The fire damaged one Elk Grove home and prompted evacuation of several other residences before it was contained.
- On June 6, 2016, a small grass fire broke out in an Elk Grove residential area. The fire was first reported near Sundance Lane and Auberry Drive in an empty grass field. Though no injuries were reported, the half-acre blaze did damage a backyard fence and some gardening equipment.
- On July 12, 2016, a grass fire burned 10 acres at a vacant lot that bordered a neighborhood, a shopping center, and an elementary school. No injuries, deaths, or building damages were reported. This fire occurred around 12:45 p.m. near Dandelion Drive in north Elk Grove.

No major fires have occurred since the City was incorporated.

Vulnerability to Wildfire

Following the methodology described in Section 4.3.17 of the Base Plan, a wildfire map for the City of Elk Grove was created (see Figure B-14). Wildfire threat within the City ranges from little or no threat to moderate.

Figure B-14 City of Elk Grove's Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Values at Risk

Analysis results for Elk Grove are shown in Table B-34, which summarizes total parcel counts, improved parcel counts and their land and structure values by property use.

Table B-34 City of Elk Grove – Count and Value of Parcels by Property Use and Fire Severity Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Little or No Threat					
Agricultural	15	$1,467,860	9	$1,182,461	$2,650,321
Care / Health	18	$3,516,832	18	$11,864,956	$15,381,788

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Church / Welfare	16	$7,909,979	16	$39,422,750	$47,332,729
Industrial	103	$32,803,932	88	$126,302,376	$159,106,308
Miscellaneous	359	$1,483,436	0	$0	$1,483,436
NO DATA	3	$0	0	$0	$0
Office	78	$26,932,359	74	$130,587,306	$157,519,665
Public / Utilities	252	$39,875	0	$0	$39,875
Recreational	9	$3,145,503	5	$15,544,439	$18,689,942
Residential	19,437	$1,504,378,755	18,971	$3,897,242,431	$5,401,621,186
Retail / Commercial	195	$118,750,870	187	$274,099,287	$392,850,157
Vacant	463	$71,424,854	29	$5,013,562	$76,438,416
Total	**20,948**	**$1,771,854,255**	**19,397**	**$4,501,259,568**	**$6,273,113,823**
Moderate					
Agricultural	11	$2,302,169	4	$97,098	$2,399,267
Care / Health	23	$14,471,406	18	$78,094,883	$92,566,289
Church / Welfare	28	$18,240,749	25	$72,333,207	$90,573,956
Industrial	89	$37,179,687	80	$123,888,075	$161,067,762
Miscellaneous	560	$363,913	0	$0	$363,913
NO DATA	1	$0	0	$0	$0
Office	75	$42,463,354	71	$248,020,669	$290,484,023
Public / Utilities	351	$10	0	$0	$10
Recreational	8	$5,864,162	8	$22,128,894	$27,993,056
Residential	27,997	$2,390,190,848	27,529	$6,542,847,701	$8,933,038,549
Retail / Commercial	187	$189,721,347	182	$470,748,481	$660,469,828
Vacant	1,015	$233,530,628	30	$4,640,415	$238,171,043
Moderate Total	**30,345**	**$2,934,328,273**	**27,947**	**$7,562,799,423**	**$10,497,127,696**
High					
Miscellaneous	4	$125	0	$0	$125
Public / Utilities	2	$0	0	$0	$0
Residential	64	$5,939,854	57	$13,672,595	$19,612,449
Retail / Commercial	1	$3,262,770	1	$6,031,016	$9,293,786
Vacant	3	$53,566	0	$0	$53,566
High Total	**74**	**$9,256,315**	**58**	**$19,703,611**	**$28,959,926**
Grand Total	**51,367**	**$4,715,438,843**	**47,402**	**$12,083,762,602**	**$16,799,201,445**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data, CAL FIRE

Population at Risk

The Fire Threat Zone dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for the City. According to this analysis, there is a total population of 87,723 residents of Elk Grove at risk to moderate or higher wildfire risk. This is shown in Table B-35.

Table B-35 City of Elk Grove – Count of Improved Residential Parcels and Population by Fire Severity Zone

Fire Threat Zone	Improved Residential Parcels	Population*
Little or No Threat	18,971	60,328
Moderate	27,529	87,542
High	57	181
Very High	0	0

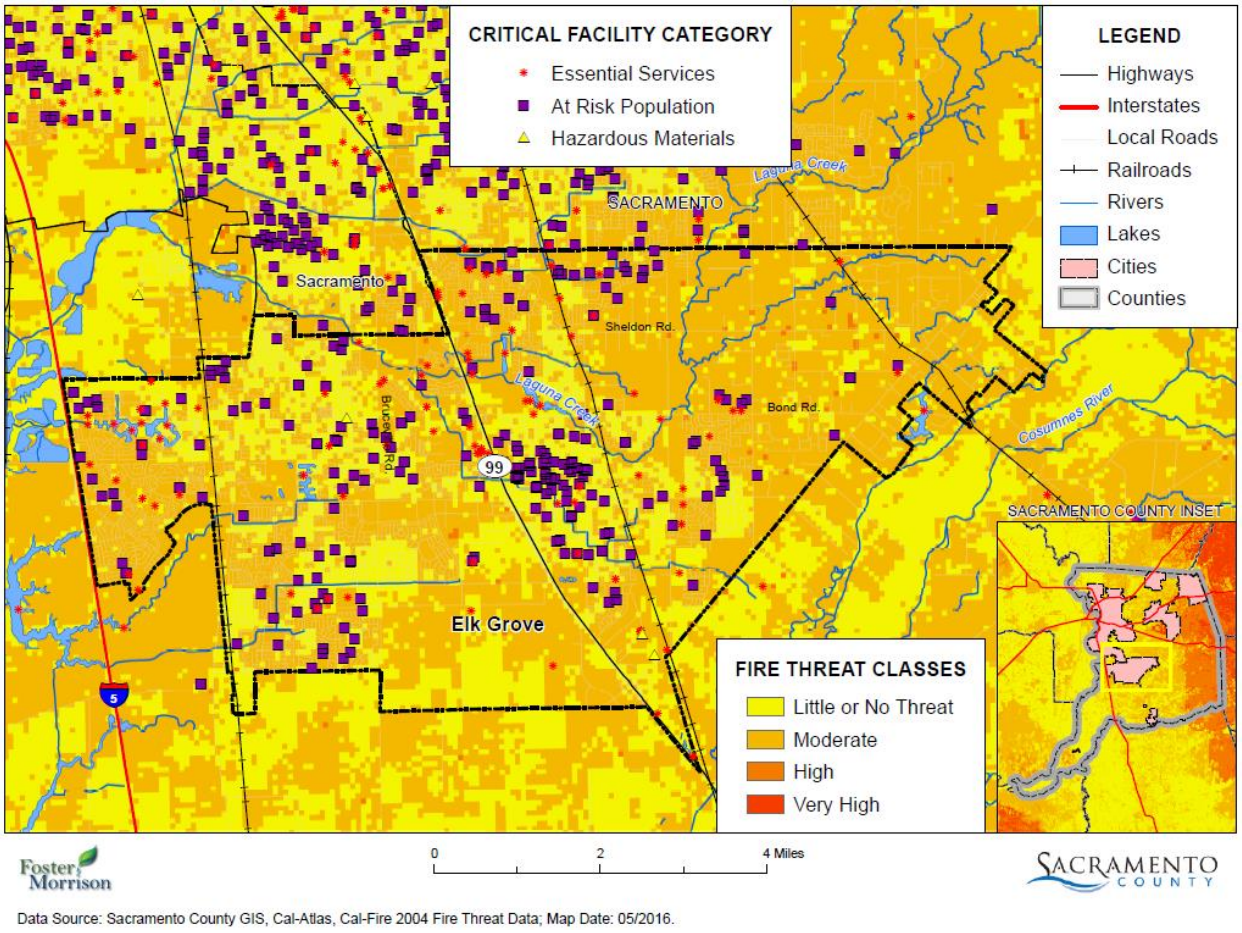
Source: Sacramento County 2015 Parcel/Assessor's Data, CAL FIRE

* Average household populations for Elk Grove (3.18) from the 2010 US Census were used

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect a fire threat zone provided by CAL FIRE, and if so, which zone it intersects. There are seven facilities in the moderate or higher fire severity zone in the City. These are shown in Figure B-15 and detailed in Table B-36. Details of critical facility definition, type, name and address and jurisdiction by fire threat zone are listed in Appendix E.

Figure B-15 City of Elk Grove – Critical Facilities in the Fire Threat Zone



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table B-36 City of Elk Grove – Critical Facilities in the Fire Threat Zone

Critical Facility Category	Facility Type	Facility Count
Little or No Threat		
Essential Services Facilities	Detention Basin	20
	Emergency Evacuation Shelter	6
	Fire Station	5
	Government Facilities	3
	Medical Health Facility	4
	Sand Bag	2
	Total	**40**
At Risk Population Facilities	Adult Day Care	3
	Adult Residential	13
	Assisted Living Centers	27
	Day Care Center	14

Critical Facility Category	Facility Type	Facility Count
	Group Home	3
	Hotel	2
	Private High School	2
	Public Elementary School	7
	Public High School	2
	Public Middle School	1
	Residential Care/Elderly	30
	School	16
	School-Age Day Care Center	5
	Senior Center	1
	Special Education School	1
	Total	**127**
Hazardous Materials Facilities	Oil Collection Center	1
	Propane Storage	1
	Total	**2**
Little or No Threat Total		**169**
Moderate		
Essential Services Facilities	Corporation Yard	1
	Detention Basin	21
	Dispatch Center	1
	Emergency Evacuation Shelter	12
	EOC	1
	Fire Station	3
	Government Facilities	4
	Medical Health Facility	2
	Police	1
	Sand Bag	3
	State and Fed Facilities	1
	Urgent Care Facilities	2
	Total	52
At Risk Population Facilities	Adult Residential	10
	Assisted Living Centers	30
	Day Care Center	18
	Group Home	3
	Hotel	3
	Infant Center	1
	Private Elementary School	2

Critical Facility Category	Facility Type	Facility Count
	Private K-12 School	1
	Public Continuation High School	1
	Public Elementary School	11
	Public High School	3
	Public Middle School	4
	Residential Care/Elderly	24
	School	21
	School-Age Day Care Center	12
	Total	**144**
Hazardous Materials Facilities	Oil Collection Center	1
	Total	**1**
Moderate Total		**197**
Grand Total		**366**

Source: CAL FIRE, Sacramento County GIS

Natural Resources at Risk

If a wild fire were to occur within the city limits of Elk Grove, all natural resources would be at risk.

Historic and Cultural Resources at Risk

If a wild fire were to occur within the city limits of Elk Grove, all historical buildings and cultural resources would be at risk.

Future Development

Development may occur in the moderate or higher wildfire severity areas; however, City ordinances for building in these areas are enforced.

B.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

B.6.1. Regulatory Mitigation Capabilities

Table B-37 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Elk Grove.

Table B-37 City of Elk Grove's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive /Master Plan	Y	General Plan The City's General Plan was first adopted in 2003 and is currently being comprehensively updated. The Plan as currently adopted identifies a number of safety issues and concerns for the community and includes policies for addressing these issues. Implementation of the policies is deferred to subsequent plans. http://www.elkgrovecity.org/city_hall/departments_divisions/planning/land_use_regulations/ Storm Drainage Master Plan The City also has a Storm Drainage Master Plan, adopted in 2011, which identifies candidate stormwater drainage projects to address the existing deficiencies and future growth impacts on area drainage. These projects implement the mitigation strategy identified in this LHMP. http://www.elkgrovecity.org/city_hall/departments_divisions/public_works/drainage/storm_drainage_master_plan/
Capital Improvements Program	Y	Capital Improvement Program The Capital Improvement Program is adopted annually by the City Council and identifies capital construction projects to be completed by the City over the coming five years. Many of the projects identified in the plan address potential hazards, such as drainage improvements, telecom infrastructure, and improvements to the emergency operations center. The Plan is an excellent approach to implementing mitigation actions. http://www.elkgrovecity.org/UserFiles/Servers/Server_109585/File/Departments/Finance/05-11-16%20FY%202016-2021%20Capital%20Improvement%20Program%20(PROPOSED)%20Attachment.pdf http://www.elkgrovecity.org/city_hall/departments_divisions/public_works/capital_improvements Title 21 Plans/Capital Improvement Program http://www.codepublishing.com/CA/ElkGrove/#!/ElkGrove21/ElkGrove2115.html#21.15
Economic Development Plan	N	The City Council reviewed the Economic Development Work Plan at its regular meeting on June 22, 2016. The Work Plan does not address hazards and is not an appropriate location to address mitigation actions.
Local Emergency Operations Plan	Y	
Continuity of Operations Plan	Y	

Transportation Plan/Program	Y	Bicycle, Pedestrian, and Trail Master Plan The City's transportation plan is comprised of the maps and policies in the General Plan, along with other planning documents in the Bicycle, Pedestrian, and Trails, Master Plan, the ADA Transition Plan, and services plans for the City's transit service, e-Tran. Most of these plans do not address hazards as they are focused on the delivery of transportation infrastructure for the movement of goods, services, and people around the through the City. However, as this infrastructure is designed, best engineering practices apply to ensure that the improvements do not impact drainage ways, increase fire severity, or otherwise create a hazards to persons and property. http://www.elkgrovecity.org/city_hall/departments_divisions/planning/resources_and_policies/bicycle_pedestrian_and_trails_master_plan Transportation Program http://www.elkgrovecity.org/city_hall/departments_divisions/transit_e-tran/comprehensive_transit_analysis/ http://www.elkgrovecity.org/city_hall/departments_divisions/public_works/traffic_engineering/
Stormwater Management Plan/Program	Y	The City's Storm Drain Master Plan explains the City's Stormwater Management program and the stormwater regulations. Chapter 15.12 Stormwater Management and Discharge Control http://www.codepublishing.com/CA/ElkGrove/#!/ElkGrove15/ElkGrove1512.html#15.12 Storm Drainage Master Plan http://www.elkgrovecity.org/city_hall/departments_divisions/public_works/drainage/storm_drainage_master_plan/
Engineering Studies for Creeks	Y	Various studies
Community Wildfire Protection Plan	N	The City is not in a wildfire hazard area, therefore no plan is required.
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y 2013	The City adopted a Climate Action Plan in 2013 to identify steps the City will take to address climate change.
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	2010/2013 Yes, codes are enforced by the City's Building Division.
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	Y	Rating: 3/9 (urban/rural)

Site plan review requirements	Y	Since 2005 the City has had a discretional design review requirement for all new non-residential and multifamily construction over 1,000 square feet. Master home plans (track subdivisions) are also subject to design review. http://www.elkgrovecity.org/city_hall/departments_divisions/public_works/handouts_and_requirements/
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y 2006	The City's Zoning regulations are included in Title 23 of the Municipal Code. A comprehensive update was completed in 2006. The code is regularly reviewed and updated. Title 23 Zoning http://www.elkgrovecity.org/city_hall/departments_divisions/planning/land_use_regulations/
Subdivision ordinance	Y	Title 22 Land Development The City recently adopted Flood Damage Prevention regulations as part of its Municipal Code. The regulations are modeled after the State's model ordinance for non-coastal communities. The regulation will implement policies in the General Plan relative to limiting development in the floodplain. http://www.codepublishing.com/CA/ElkGrove/#!/ElkGrove22/ElkGrove22.html
Floodplain ordinance	Y	The City recently adopted Flood Damage Prevention regulations as part of its Municipal Code. The regulations are modeled after the State's model ordinance for non-coastal communities. The regulation will implement policies in the General Plan relative to limiting development in the floodplain.
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Chapter 15.12 Stormwater Management and Discharge Control http://www.codepublishing.com/CA/ElkGrove/#!/ElkGrove15/ElkGrove1512.html#15.12 Land Grading and Erosion Control http://www.codepublishing.com/CA/ElkGrove/#!/ElkGrove16/ElkGrove1644.html#16.44
Flood insurance rate maps	Y	FEMA and recorded maps.
Elevation Certificates	Y	Various sites throughout the City
Acquisition of land for open space and public recreation uses	Y	General Plan http://www.elkgrovecity.org/city_hall/departments_divisions/planning/land_use_regulations/ Bicycle, Pedestrian, and Trail Master Plan http://www.elkgrovecity.org/city_hall/departments_divisions/planning/resources_and_policies/bicycle_pedestrian_and_trails_master_plan Storm Drainage Master Plan http://www.elkgrovecity.org/city_hall/departments_divisions/public_works/drainage/storm_drainage_master_plan/ Laguna Ridge Specific Plan http://www.elkgrovecity.org/city_hall/departments_divisions/planning/current_development_projects/laguna_ridge_specific_plan
Erosion or sediment control program	Y	Chapter 16.44 Land Grading and Erosion Control http://www.codepublishing.com/CA/ElkGrove/

Other	Y	Chapter 17.04 Uniform Fire Code http://www.codepublishing.com/CA/ElkGrove/#!/ElkGrove17/ElkGrove1704.html#17.04
How can these capabilities be expanded and improved to reduce risk?		
Continue to implement programs and update/enforce regulations.		

Source: City of Elk Grove

City of Elk Grove General Plan

The General Plan is a broad framework for planning the future of the City. It is the official policy statement of the City Council to guide the private and public development in a manner to gain the maximum social and economic benefit to its citizens. The General Plan includes a Safety Element that focuses on safety issues to be considered in planning for the present and future development for the City. Several major sources of potential safety hazards exist in the City and are addressed in this Safety Element:

- Potential release of toxic or hazardous substances as the result of accidents on truck routes and/or railroad lines which pass through the City;
- The release of toxic or hazardous substances which are used by commercial and industrial businesses in the City;
- Flooding;
- Regional seismic activity and other geologic hazards; and
- Traffic accidents at grade railroad crossings.

Thus, the City's Safety Element contains one overarching goal:

- Guiding Goal 1: A High Quality of Life for All Residents.

City of Elk Grove Storm Drainage Master Plan

The City has developed a comprehensive Storm Drainage Master Plan (SDMP) to provide a variety of drainage concepts for upgrading the existing storm drainage and flood control collection system. The SDMP identifies and analyzes the existing drainage deficiencies throughout the City to provide a range of drainage concepts for the construction of future facilities required to serve the City at buildout of the General Plan; to establish criteria for selecting and prioritizing projects; and to utilize the SDMP for the potential development of a capital drainage financing program. The SDMP combines the demands of flood-risk reduction with ecosystem enhancements while incorporating urban development and rural residential land uses to provide an effective plan that will meet both the City's and community's vision.

City of Elk Grove Capital Improvement Program

The Capital Improvement Program (CIP) includes all active projects and those expected to be undertaken during the coming five fiscal years. Specific projects and their scheduled completions were selected based on:

- Implementation of the City's General Plan;
- Existing traffic patterns and associated improvement needs;

- Projected traffic patterns, based on assumptions regarding the quantity and location of expected development;
- The need to establish a coherent roadway network, with strategic connections that distribute traffic flows efficiently;
- Minimizing disruptions associated with construction activity;
- Availability of funding; and
- City Council direction.

City of Elk Grove Emergency Operations Plan

The City's Emergency Operations Plan (EOP) establishes an Emergency Management Organization (EMO) and assigns functions and tasks consistent with California's Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS). It provides for the integration and coordination of planning efforts of multiple jurisdictions. This Plan was reviewed and approved by representatives from each City department, local special districts with emergency services responsibilities in the City, and the Sacramento Operational Area Office of Emergency Services. The content is based upon guidance approved and provided by the State of California, the Federal Emergency Management Agency and the federal Department of Homeland Security (DHS). The intent of the EOP is to provide direction on how to respond to an emergency from the initial onset, through an extended response, and into the recovery process.

City of Elk Grove Bicycle, Pedestrian and Trail Master Plan

The Bicycle, Pedestrian and Trails Master Plan (BPTMP or Master Plan) is intended to guide and influence pedestrian, bicycle, and trail policies, programs, and development standards to make biking and walking in the City of Elk Grove (City) more safe, comfortable, convenient, and enjoyable for all community members. The ultimate goal of the BPTMP is to increase the number of persons who walk and bicycle for transportation to work, school, and errands, and for recreation. The City seeks to have exemplary bicycle, pedestrian, and trail facilities that provide connectivity throughout the City and the wider Sacramento region in order to offer recreational opportunities and an alternative method for transportation for City residents.

City of Elk Grove Municipal Codes and Policies

The City has many Municipal Codes and policies related to mitigation. These codes and policies can be primarily or secondarily focused on mitigation.

Municipal Codes Focused Primarily on Mitigation

Chapter 15.12 Stormwater Management and Discharge Control: This Chapter identifies the City's police power to protect and promote public health, safety and general welfare relative to management of stormwater. While stormwater runoff is one step in the natural cycle of water, human activities, including but not limited to, agriculture, construction, manufacturing and operation of an urban infrastructure, may result in undesirable discharges of pollutants and certain sediments. Such discharges may accumulate in the local channels and waterways and eventually may be deposited in the waters of the United States.

This Chapter provides a mechanism to protect and enhance the quality of watercourses, water bodies and wetlands within the City in a manner consistent with the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act and the NPDES MS4 permit by controlling the contribution of urban pollutants to stormwater runoff which enters the City storm drainage system.

Chapter 16.04 Building: In order to regulate the erection, construction, enlargement, alternation, repair, moving, removal, demolition, conversion, occupancy, equipment, wiring, plumbing, height, area, and maintenance of all buildings and structures within the City has adopted the 2010 edition of the California Building Code (Title 24, Part 2 Volumes 1 and 2, published by the International Code Council (ICC), administrative sections, Chapter 29, Appendices A, C and I, and amendments, as adopted by the Building Standard Commission of the State of California and codified at Title 24, Part 2 in the California Code of Regulations). This Chapter, and the building code that it incorporates by reference, provides a process for the permitting and review of proposed structures to ensure the structures meet minimum health and safety standards.

Chapter 16.44 Land Grading and Erosion Control: This Chapter was adopted to minimize damage to surrounding properties and public right-of-way, minimize sedimentation and prevent degradation of water quality, and minimize the disruption of natural stormwater flows. This Chapter establishes administration procedures, minimum standards of review, and implementation and enforcement procedures for controlling erosion, sedimentation and other pollutant runoff associated with construction and other land disturbance. Projects that result in land disturbance greater than one acre are required to obtain coverage under the State Water Board's Construction General Permit in addition to satisfying the requirements of the Land Grading and Erosion Control Code.

Chapter 16.50 Floodplain Damage Prevention: This Chapter was recently adopted to provide regulations to all publicly and privately owned land within flood-prone areas. The regulations provide a permit process for development within the 100-year floodplain consistent with the State's model ordinance, establish development and construction standards for areas within the 100-year floodplain and document the process, consistent with current practice, the City uses to manage revisions to the 100-year floodplain.

Chapter 17.04 Fire: This Chapter was adopted by the City Council of the City for the purpose of prescribing regulations governing conditions hazardous to life and property from fire or explosion, that certain code known as the California Fire Code, Title 24, California Code of Regulations, Part 9, incorporating the International Fire Code published by the International Code Council, being particularly the 2009 Edition, including the appendices thereof, and the International Fire Code Standards published by the International Code Council, being particularly the 2009 Edition, and the wholes thereof, save and except such portions as hereinafter deleted, modified or amended herein. The Chief of the Cosumnes Community Services District Fire Department or his or her designee shall have authority to enforce this Chapter and issue citations for violations of this code.

Title 21 Plans/Capital Improvement Program: The purpose of this title is to provide for the adoption and amendment of general plans, community plans, and specific plans, and to establish procedures for the preparation and review of a capital procedure program providing for the physical development of the City.

Title 22 Land Development: The Land Development Title was adopted to supplement and implement the Subdivision Map Act. The Planning Director shall adopt rules to implement the various processes generally set forth in this Title and the Subdivision Map Act. The rules shall apply to, but not be limited to, instructions for preparing and completing applications for parcel maps, subdivision maps, certificates of compliance, reversions to acreage, and compliance with the California Environmental Quality Act (CEQA).

Title 23 Zoning: Whereas the General Plan describes land use in a broad sense, Title 23 Zoning more specifically describes the zone classification and associated allowable uses for each piece of property within the City. For each zone classification, standards such as minimum lot size, maximum building height, building setbacks and maximum lot coverage are specified. Prior to building permit issuance, the project proponent shall demonstrate that the proposal complies with the applicable zoning requirements. The Zoning Title promotes water quality protection. For example, this Title may designate natural stream buffers, open spaces or erosion-prone areas that need special protection. In addition, the Zoning Title can indirectly affect water quality; for example limits on lot coverage result in more vegetated areas to infiltrate and filter runoff and less impervious surface.

Codes Secondarily Focused on Mitigation

Title 7 Historic Preservation: The purpose of this Title is to promote the general welfare and economic and social vitality of the people and City by providing for the identification, designation, protection, enhancement, perpetuation and use of historic resources including buildings, structures, objects, sites, districts, and cultural landscapes within the City that reflect special elements of the City's heritage and cultural diversity for the following reasons:

- To encourage public knowledge, understanding, appreciation, and use of the City's past;
- To foster civic pride in the beauty and character of the City and in the accomplishments of its past;
- To enhance the visual character of the City by encouraging reuse of old buildings and construction that complements nearby historic resources;
- To increase the economic benefits of historic resource preservation to the City and its inhabitants;
- To protect property values within the City;
- To identify as early as possible and resolve conflicts between the preservation of historic resources and alternative land uses; and
- To conserve valuable material and energy resources by ongoing use and maintenance of the built and natural environment.

The Historic Preservation title is applied to historic resources and resources potentially eligible for historic designation, and includes those resources affected by any project proposed by the City or subject to review by the City.

Chapter 16.130 Swainson's Hawk Code: This Chapter addresses a process for mitigating for the loss of Swainson's hawk habitat, which the city requires at a 1:1 ratio. Mitigation can be achieved through the payment of a fee which is used to fund the City's Swainson's hawk habitat restoration program. Other options for achieving mitigation through the code include the direct transfer to the City of a Swainson's hawk habitat conservation easement along with an easement monitoring endowment or the purchase of

mitigation credits at a CDFG approved mitigation bank. The site must be surveyed to determine whether it is suitable Swainson's hawk foraging habitat.

Chapter 19.12 Tree Preservation Protection Code: This Chapter strives to protect and preserve trees of local importance which include coast live oak, valley oak, blue oak, interior live oak, oracle oak, California sycamore, and California black walnut with a single trunk six inches dbh or greater or a multi-trunk with a combined dbh of six inches or greater. This Chapter requires mitigation for the removal of trees of local importance with dimensions described above, trees that have been selected for preservation, all portions of adjacent off-site native trees which have driplines that extend onto the project site, and all off-site native trees which may be impacted by utility installation and/or improvements associated with a project. Current policies require that every inch lost will be mitigated by an inch planted or equivalent credit obtained from a tree mitigation bank.

B.6.2. Administrative/Technical Mitigation Capabilities

Table B-38 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Elk Grove.

Table B-38 City of Elk Grove's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	There are maintenance programs in place to reduce risks.
Mutual aid agreements	Y	California Master Mutual Aid Agreement, Law Enforcement Mutual Aid Agreement, Fire and Rescue Mutual Aid Agreement (via Cosumnes Fire District), Public Works Mutual Aid Agreement, County of Sacramento Operational Area Council, U.S. Army Corps of Engineers Rehabilitation Inspection PL84-99 Program, NFIP, County of Sacramento OES, County of Sacramento EMD
Other		Flood training, January 2016
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
Floodplain Administrator	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
Emergency Manager	Y PT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.

Development Services Director	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
Public Works Director	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
GIS Coordinator	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
Other		
Technical		
Warning systems/services (Reverse 911)	Y	Reverse 911, pump station alarms, Local Hazard Mitigation Plan, Debris Management Plan
Hazard data and information	Y	FEMA Floodplain maps, localized flooding maps
Grant writing	Y	Various departments provide grant writing efforts.
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: City of Elk Grove

B.6.3. Fiscal Mitigation Capabilities

Table B-39 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table B-39 City of Elk Grove's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	There are funding resources that have been used in the past and can be used in the future.
Authority to levy taxes for specific purposes	Y	There are funding resources that have been used in the past and can be used in the future.
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	There are funding resources that have been used in the past and can be used in the future.
Storm water utility fee	Y	There are funding resources that have been used in the past and can be used in the future.
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Community Development Block Grant	Y	There are funding resources that have been used in the past and can be used in the future.
Other federal funding programs	Y	FEMA, U.S. Army Corps of Engineers Rehabilitation Inspection PL84-99 Program
State funding programs	Y	Stormwater grant
Other		
How can these capabilities be expanded and improved to reduce risk?		
Continue to train staff, implement programs and enforce regulations.		

Source: City of Elk Grove

B.6.4. Mitigation Education, Outreach, and Partnerships

Table B-40 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information. More information can be found below the table.

Table B-40 City of Elk Grove's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	Emergency preparedness and disaster education information provided at local neighborhood meetings and via social media
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Public meetings to address emergency preparedness and flood control operations. Information is also provided at local outreach events and via social media.
Natural disaster or safety related school programs	Y	Earthquake and fire drills.
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	Y	Frequent training with regional partners such as SMUD, PG&E, County of Operational Emergency Services, Sacramento County Water Agency, CSD Fire and Department of Homeland Security
Other		
How can these capabilities be expanded and improved to reduce risk?		
Continue to train staff, implement programs and enforce regulations.		

B.6.5. Other Mitigation Efforts

The City is implementing or has completed in the last ten years, with or without FEMA monies, the following mitigation projects:

- Certified the Laguna West levees to participate in the Map Moderation Program and to be in compliance with FEMA's 44 CFR Section 65.10 of the National Flood Insurance Program so that the federally subsidized flood insurance is available to the residents of the City;
- Adoption of resolution (#2007-189) that includes the City as an active member of the Sacramento Operational Area Council;
- Adoption of resolution (#25-2010) for compliance with SEMS/NIMS and certifies us as an "Accredited Disaster Council" to comply with the requirements of Cal OES;
- Mutual Aid Agreements with the following:
    - California Master Mutual Aid Agreement
    - Law Enforcement Mutual Aid Agreement
    - Fire and Rescue Mutual Aid Agreement (via Cosumnes Fire District)
    - Public Works Mutual Aid Agreement
    - Sacramento Operational Plan
- Social Media updates to inform the public of dangers and preventative steps to consider to mitigate any threats to their safety;
- Activated cooling and warming centers during extreme weather, as necessary;
- The Police Department's Problem Oriented Police Unit provides disaster education through neighborhood meetings or the Citizens Academy;
- Police Officers receive annual training on emergency response, including responses to local hazards or naturally created hazards;
- Disaster responses from the Police Department to Suburban Propane or the Sacramento Wastewater Treatment Plant;
- Development of a Disaster Debris Management Plan;
- Levee inspections through the U.S. Army Corps of Engineers Rehabilitation Inspection PL84-99 Program to ensure the City's levees are being properly maintained;
- Grant Line Channel restoration work to restore the damage channel back to pre-storm conditions;
- Floodplain studies and LOMRs for new development projects and existing properties to be removed from the FEMA 100-year floodplain;
- Replacement of pump equipment for pump stations D50 and D53 to protect public safety if a pump failure should occur and the corresponding parts are not readily available;
- Annual update of Storm Response and Flood Fighting Operation Plan to provide emergency information and support to City staff responding to both forecasted and actual storm events, and emergency information;
- Beaver Management Program to effectively address the challenges presented by beaver activity within the City's network of creeks, channels and storm drainage infrastructure to help prevent flooding;
- Requests and inquiries from the City's residents, businesses and insurance agents for flood zone information;
- Drainage facility map books to provide a snap shot of the overall drainage conveyance and flood control system to assist the City with planning, design, operation and maintenance efforts;
- Sandbag distribution sites to help assist residents to protect their property from flooding by offering sandbags at specific locations throughout the City prior to and during storm events;
- Drainage and floodplain easement information maintained in a Geographic Information System (GIS) to assist the City with planning, design, operation and maintenance efforts;
- Public outreach efforts and education on emergency preparedness;

- Development of a comprehensive Storm Drainage Master Plan to provide a variety of drainage concepts for upgrading the existing storm drainage and flood control collection system to accommodate future development to serve the City at buildout of the General Plan ;
- Identification of new and existing programs and activities that lay out a program level approach to holistically address vital function and values of drainage conveyance, flood control, aquatic resources and water quality that benefit public health and safety, minimize property damage and protect the environment; and
- Development of the draft Flood Control Operation and Maintenance Manual to maintain the City's flood control system.

B.7 Mitigation Strategy

B.7.1. Mitigation Goals and Objectives

The City of Elk Grove adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

B.7.2. NFIP Mitigation Strategy

As a participant of the National Flood Insurance Program (NFIP), the City of Elk Grove has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Elk Grove will continue to comply with the requirements of the NFIP in the future.

The City's regulatory activities apply to existing and new development areas of the City by implementing flood protection measures for new/existing structures and maintaining drainage systems. The goal of the program is to enhance public safety, and reduce impacts and losses while protecting the environment.

The City of Elk Grove Public Works Department provides public outreach activities, which include map information services, public awareness, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current flood mapping. In addition, the Public Works Department provides information about the stormwater management program and up-to-date information related to the maintenance of the City's drainage system.

More information about the floodplain administration in the City of Elk Grove can be found in Table B-41.

Table B-41 City of Elk Grove Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	1,444 $541,770 $465,096,000

NFIP Topic	Comments
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	0
How many structures are exposed to flood risk within the community?	37 (1% Annual Chance) 3,949 (0.2% Annual Chance)
Describe any areas of flood risk with limited NFIP policy coverage	None
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	Yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review, GIS, education or outreach, inspections, engineering capability, Storm Drainage and Flood control Management Program
What are the barriers to running an effective NFIP program in the community, if any?	None
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	None
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	August 2010
Is a CAV or CAC scheduled or needed?	No
Regulation	
When did the community enter the NFIP?	10/15/2001
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes, General Plan and Floodplain Policy strongly discourages building in the floodplain, unless it can be mitigated
Provide an explanation of the permitting process.	Plans are reviewed to determine flood zone information
Community Rating System	
Does the community participate in CRS?	No
What is the community's CRS Class Ranking?	N/A
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

B.7.3. Mitigation Actions

The planning team for the City of Elk Grove identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be

implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan, as well as other Local Planning Efforts

Hazards Addressed: All hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation. eed to address flood mitigation efforts for the 200-year floodplain to meet Senate Bill 5 regulations.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan; EOP update; California Flood Legislation; Storm Drainage Master Plan

Responsible Office: City of Elk Grove, Public Works Department - Drainage

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Storm Drainage Utility Fee (Drainage Fund) and other funding

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Mutual Aid Agreements

Hazards Addressed: Emergency Response

Goals Addressed: 1, 2, 3, 4

Issue/Background: Mutual aid agreements are necessary to be in place if a disaster occurs to provide integration and coordination of planning efforts for multiple jurisdictions. The intent of these agreements are to provide direction on how to respond to an emergency from the initial onset, through an extended response, and into the recovery process. Disasters know no boundaries and other emergency agencies are needed to help with emergency response.

Project Description: Ensure that Mutual Aid Agreements are in place such as: California Master Mutual Aid Agreement, Law Enforcement Mutual Aid Agreement, Fire and Rescue Mutual Aid Agreement (via Cosumnes Fire District), Public Works Mutual Aid Agreement, County of Sacramento Operational Area Council, U.S. Army Corps of Engineers Rehabilitation Inspection PL84-99 Program, NFIP, County of Sacramento OES, and County of Sacramento EMD.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented:

- General Plan (Safety Element)
- Emergency Operation Plan
- Storm Drainage Master Plan

Responsible Office/Partners: City of Elk Grove, Public Works Department – Drainage; City of Elk Grove Police Department

Project Priority: Emergency response is a priority.

Cost Estimate: Unknown

Benefits (Losses Avoided): Assistance with emergency response from other agencies.

Potential Funding: Storm Drainage Utility Fee (Drainage Fund) and other funding

Timeline: On-Going

Action 3. Elk Grove Green Street Project: Repurposing Urban Runoff with Green Instructure Technologies

Hazards Addressed: Flood protection, drainage deficiencies, water quality, habitat protection, education and outreach, and awareness and stewardship

Goals Addressed: 1, 2, 3

Issue/Background:

- Reduce pollutant loads entering Elk Grove Creek and ultimately discharging into Stone Lakes National Wildlife Refuge and the Sacramento River – San Joaquin River Delta.
- Use pre-treated urban runoff for groundwater recharge.
- Protect riparian areas from further degradation.
- Reduce the risk of flooding by reducing runoff volumes and peak flows.

Project Description: The City prioritized a ½ mile section of major roadway for retrofit to repurpose stormwater as groundwater and provide other high-quality benefits in an impaired urbanized watershed. The Project will replace an outdated drainage system and impervious pavement with pervious materials and linear biofiltration planters connected to dry wells along the street frontage. The proposed green infrastructure will: 1) reduce pollutant loads entering Elk Grove Creek, which outfalls into the Stone

Lakes National Wildlife Refuge and the Delta, 2)use pretreated urban runoff for groundwater recharge, and 3)provide flood protection. Assuming an average annual rainfall of 18", the 5.56 acre watershed will generate 6.84 acre-feet of stormwater for capture and infiltration. The Project, located on a major arterial that connects elementary, middle, and high schools will provide safer, enhanced pedestrian and bicycle access, traffic calming measures, and will enhance the City's Safe Routes to Schools Program

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Green Street Project was identified in the Storm Drainage Master Plan.

Responsible Office/Partners: City of Elk Grove, Public Works Department - Drainage

Project Priority: The City of Elk Grove is currently seeking $2.5 million in Stormwater Grant funding from the State Water Control Board to complete this project.

Cost Estimate: $5 million

Benefits (Losses Avoided): Reduce pollutant loads, impacts on groundwater supplies, riparian areas degradation, and reduce peak flows.

Potential Funding: Storm Drainage Utility Fee (Drainage Fund) and Grants

Timeline: Completed by January, 2020

Action 4. Hazard Education and Risk Awareness

Hazards Addressed: Flood protection, drainage deficiencies, water quality, habitat protection, education and outreach, and awareness and stewardship

Goals Addressed: 1, 2, 3, 4

Issue/Background: Implement hazard education and awareness activities that address multiple hazards such as public awareness programs, information on all types of hazards, response during hazard events, educating the public on hazard mitigation and preparedness measures, and hosting public workshops.

Project Description: Increase public educate on how to be prepared for hazards and disasters.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented:

- General Plan (Safety Element)
- Emergency Operation Plan
- Storm Drainage Master Plan

Responsible Office/Partners: City of Elk Grove, Public Works Department – Drainage; City of Elk Grove Police Department

Project Priority: Education and risk awareness is a priority program for many City departments.

Cost Estimate: Unknown

Benefits (Losses Avoided): General public educated on how to prepare for disasters, what to do when a disaster strikes, and assistance after a disaster.

Potential Funding: Storm Drainage Utility Fee (Drainage Fund) and other funding

Timeline: On-Going

Action 5. City of Elk Grove's Storm Drainage Master Plan (SDMP)

Hazards Addressed: Flood protection, drainage deficiencies, water quality, habitat protection, education and outreach, and awareness and stewardship

Goals Addressed: 1, 2, 3, 4

Issue/Background:

- Protect the value and function of the public storm drainage and flood control systems infrastructure and extend its useful life.
- Improve the storm drainage and flood control systems by incorporating features that promote water quality, groundwater recharge, and habitat protection, whenever feasible.
- Foster awareness and stewardship of water quality and aquatic ecosystems.
- Comply with applicable local, state and federal laws and regulations.

Project Description: The SDMP was developed to provide a variety of drainage concepts for upgrading the existing storm drainage and flood control collection system (Drainage System). The SDMP identifies and analyzes the existing drainage deficiencies throughout the City; provides a range of drainage concepts for the construction of future facilities required to serve the City at buildout of the General Plan; and establishes criteria for selecting and prioritizing projects. Furthermore, the SDMP may be utilized for the development of a capital drainage financing program. The SDMP combines the demands of flood-risk reduction with ecosystem enhancements while incorporating urban development and rural residential land uses to provide an effective plan that will meet both the City's and community's vision.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implement the programs and projects identified in the SDMP.

Responsible Office/Partners: City of Elk Grove, Public Works Department - Drainage

Project Priority: Programs and projects will be evaluated and selected on a case-by-case basis.

Cost Estimate: Unknown

Benefits (Losses Avoided): Avoids flooding, degradation of water quality, and impacts on groundwater supplies.

Potential Funding: Storm Drainage Utility Fee (Drainage Fund), Sacramento County Zone 11A fee (Drainage Impact Fee Program), and Grants

Timeline: None

Annex C City of Folsom

C.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Folsom, a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to the City of Folsom, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this community.

C.2 Planning Process

As described above, the City of Folsom followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC) and Steering Committee, the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table C-1. Additional details on plan participation and City representatives are included in Appendix A.

Table C-1 City of Folsom Planning Team

Name	Position/Title	How Participated
Allan Laca	Senior Civil Engineer – Public Works	Reviewed draft LHMP and provided input. Coordinated review with the City. Attended coordination meeting.
Dave Nugen	Capital Improvements Section Manager – Public Works	Reviewed draft LHMP and provided input.
Ron Phillips	Fire Chief	Reviewed draft LHMP and provided input. Attended coordination and planning team meetings.
Sarah Cheney	Senior Civil Engineer – Public Works	Reviewed draft LHMP and provided input. Coordinated review with the City. Attended coordination and planning team meetings.

C.2.1. Coordination with Other Community Planning Efforts

Coordination with other community planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the City integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table C-2.

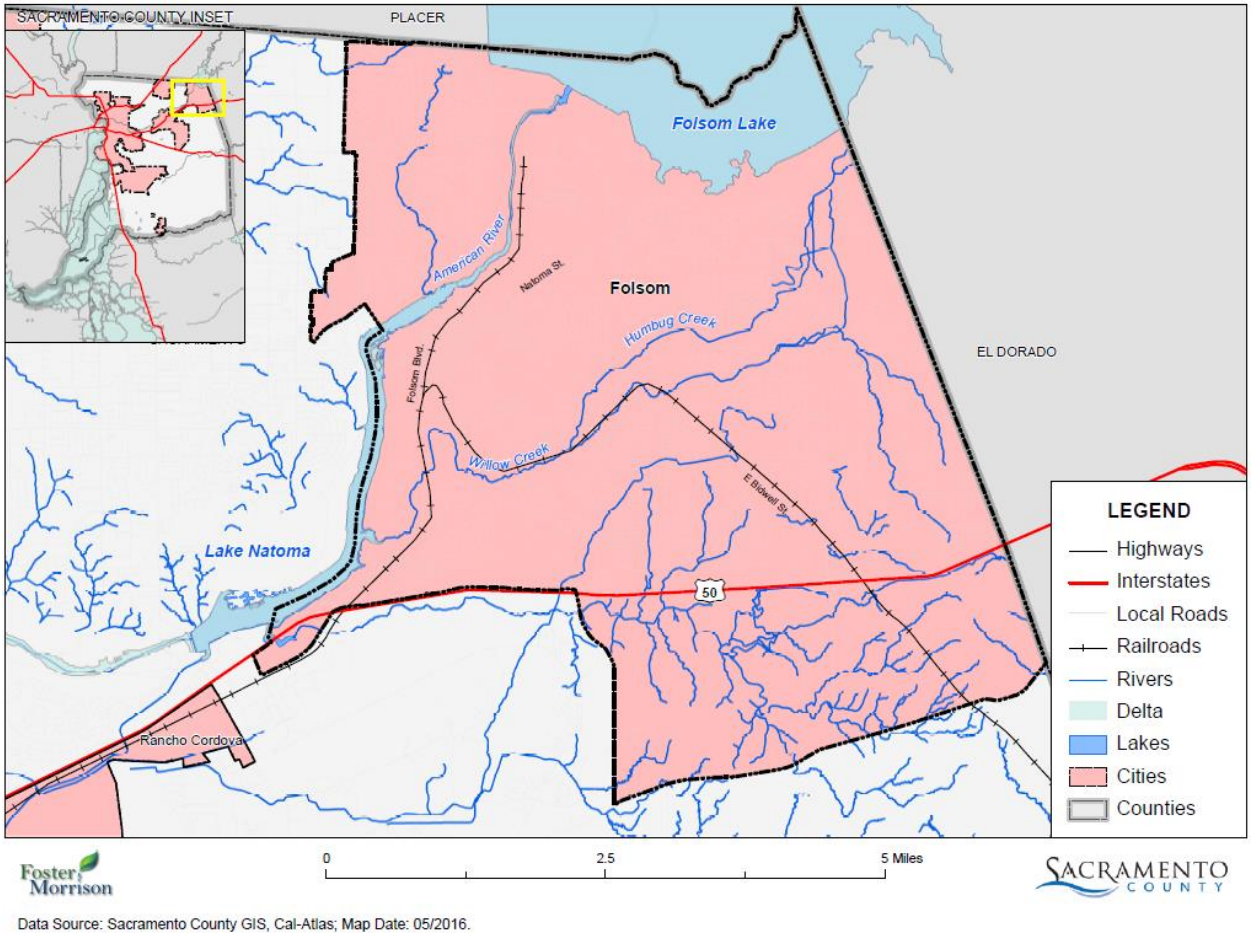
Table C-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
General Plan	The General Plan was adopted in 1988. The Housing Element was updated in 1993. A comprehensive update to the General Plan is being developed and is in draft form. The 2035 General Plan is proposed to be adopted on November of 2017. The Safety Element will be updated to incorporate elements of the Local Hazard Mitigation Plan.
Emergency Operations Plan	Elements of the Local Hazard Mitigation Plan will be implemented in the next update of the Emergency Operations Plan.
Stormwater Basins Project	Rehabilitation of City-maintained Storm Drainage Detention Basins throughout the City of Folsom. to reduce the occurrence of flooding.
Capital Improvement Program	Constructed/implemented several projects identified in last LHMP.

C.3 Community Profile

The community profile for the City of Folsom is detailed in the following sections. Figure C-1 displays a map and the location of the City of Folsom within Sacramento County.

Figure C-1 City of Folsom



C.3.1. Geography and Climate

Folsom is located about 25 miles east of California's state capitol in Sacramento, 85 miles from Lake Tahoe and 110 miles from San Francisco. Residents have access to Sacramento International Airport and air cargo operations at Mather Field Airport. Folsom has direct access to Highway 50 with three interchanges. Highway 50 connects to Interstate 5 and Interstate 80. The Folsom Lake Crossing, a new bridge across the American River below Folsom Dam, opened in March 2009 helping to relieve local traffic between El Dorado and Placer counties. Public transportation includes light rail service from Folsom to Sacramento. Local bus service connects Folsom's three light rail stations to major employment centers and other points of interest. Amtrak Rail service is available from downtown Sacramento.

Folsom enjoys mild winters that are cool and moist with some fogs and Mediterranean summers that are clear, hot, and dry. This climate is ideal for temperate fruit and nut crops, as well as some wine grapes and cold hardy citrus. Folsom's average temperature varies from low temperatures of 37 to 60 degrees to high temperatures of 53 to 94 degrees. Annual rainfall averages 23 inches per year falling primarily from November through March. Elevation is 350 feet.

C.3.2. History

Folsom is famous across the country thanks to a country song about a prison recorded by Johnny Cash in 1956. The City's rich history actually began more than a century earlier with California's great Gold Rush and arrival of the railroad. Gold was first discovered along the south bank of the American River in the area known as Negro Bar. The discovery led to massive gold mining operations, as well as a need for rail service.

In 1847, William Leidesdorff, a successful trader who owned a prosperous shipping business, traveled to Sacramento by steamboat to see the 35,000 acres he had purchased years earlier. His land holdings extended from today's Bradshaw Road along the south side of the American River to the present City of Folsom. That same year, U.S. Army Captain Joseph Folsom's regiment arrived in California. At the conclusion of the Mexican-American War, Folsom remained in the state and became interested in purchasing the land that Leidesdorff had left to his heirs following his death in 1848.

After a long fight to obtain the land, Folsom hired fellow railroad pioneer Theodore Judah to help establish a town site near the Negro Bar mining spot on the American River. Their early plans included shops along Sutter Street and a railroad depot. Folsom named the new town "Granite City." Judah and Folsom planned the town as a railroad terminus before there were railroads in California. Though Folsom didn't live to see it, his dream came true on Feb. 22, 1856 when the first train on the first railroad in the West arrived in Folsom from Sacramento.

Following Folsom's death at the age of 38, his successors renamed the town in his memory. By January 1856, every lot had been sold, and three new hotels were open in the town known as Folsom. Several decades later, construction began on Folsom Prison. Inmates helped construct the facility, which opened in 1880 when the first prisoners were moved to relieve over-crowding at San Quentin.

Following construction of the Folsom Powerhouse, Folsom made history in 1895 with the first long-distance transmission of electricity (22 miles from Folsom to Sacramento). The Powerhouse helped usher in the age of electricity with this notable accomplishment. The City's historic truss bridge was completed in 1893 to transport people, cattle and small vehicles across the American River. In 1917, the Rainbow Bridge opened to accommodate automobiles. It was the only option for crossing the river until the Lake Natoma Crossing opened in 1999.

Following a campaigned spearheaded by the Chamber of Commerce in 1946, Folsom became a city. The final vote was 285 in favor of incorporation and 168 opposed. Members of the first City Council were Leland Miller, Harry Patton, Eugene Kerr, Wendell Van Winkle and Norbert Relvas. Hazel McFarland was elected city clerk and Wilma Hoxie was the first treasurer. Council members elected Eugene Kerr as the City's first mayor.

C.3.3. Economy and Tax Base

Folsom has established itself as an important suburb in the Sacramento region with its solid base of small businesses, retail chains, and food service establishments. With an ongoing commitment to providing high-

quality, economical, responsive services to the local community, the City is well-positioned for future commercial redevelopment, neighborhood enhancements, and positive changes.

US Census estimates show economic characteristics for the City of Folsom. These are shown in Table C-3 and Table C-8. Mean household income in the City was $100,163. Median household income in the City was $110,870.

Table C-3 City of Folsom Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	85	0.3%
Construction	1,589	4.8%
Manufacturing	4,420	13.5%
Wholesale trade	818	2.5%
Retail trade	3,029	9.2%
Transportation and warehousing, and utilities	945	2.9%
Information	545	1.7%
Finance and insurance, and real estate and rental and leasing	3,605	11.0%
Professional, scientific, and management, and administrative and waste management services	3,992	12.2%
Educational services, and health care and social assistance	6,555	20.0%
Arts, entertainment, and recreation, and accommodation and food services	2,241	6.8%
Other services, except public administration	1,194	3.6%
Public administration	3,747	11.4%

Source: US Census Bureau American Community Survey 2010-2014 Estimates

Table C-4 City of Folsom Income and Benefits

Income Bracket	Population	Percent
>$10,000	716	2.9%
$10,000 – $14,999	543	2.2%
$15,000 - $24,9999	1,010	4.0%
$25,000 – $34,999	1,438	5.7%
$35,000 – $49,999	1,905	7.6%
$50,000 – $74,999	3,352	13.3%
$75,000 – $99,999	3,564	14.2%
$100,000 – $149,999	6,379	25.4%
$150,000 – $199,999	3,606	14.4%
$200,000 or more	2,598	10.3%

Source: US Census Bureau, 2010

Major employers include Intel Corporation, Folsom-Cordova Unified School District, Mercy Hospital, Kaiser Permanente, Maximus, Verizon, Costco, Walmart, Folsom State Prison, Home Depot, Target, Lowe's, Trader Joe's, Kohl's, Best Buy, Winco, REI, Sam's Club, Video Products Distributors, Cal-ISO, the City of Folsom, and Micron Technology.

The City has a wide and varied tax base. Tax base information is tracked and maintained by the Sacramento County Assessor's Office. The following tables show the tax base for the City. Table C-5 shows the secured real property value for the City of Folsom Table C-6 breaks out the City by land use.

Table C-5 City of Folsom – Property Tax Roll Totals

Jurisdiction	2015-16 Value ($)	2016-17 Value ($)	Current Year Change	Percent of Current Roll*
Folsom	11,973,366,059	12,576,166,745	5%	9

Source: Sacramento County Assessor's Office
*Percentages rounded to the nearest whole number

Table C-6 City of Folsom – Summary of Property Types

Jurisdiction	Single Family with HEX*	Single Family Without HEX*	Multi-Family Residential	Vacant Land	Commercial	Agricultural	Mobile Homes	Other	Total
Folsom	13,296	7,792	317	1,744	755	17	854	574	25,349

Source: Sacramento County Assessor's Office
*Homeowners' Exemption

C.3.4. Population

The California Department of Finance estimated the January 1, 2015 total population for the City of Folsom was 74,909.

Select demographic information from the 2014 US Census American Community Survey (the most recent data available) is shown in Table C-7.

Table C-7 City of Folsom Demographic Information

Demographic Characteristic	Number	Percent
Race		
White	51,612	70.4%
Black or African American	4,276	5.8%
American Indian or Alaska Native	399	0.5%
Asian	10,374	14.1%
Hawaiian or Pacific Islander	416	0.6%
Two or more races	3,242	4.4%
Households*		

Demographic Characteristic	Number	Percent
Total Households	24,951	–
Average Household Size	2.61	–

Source: US Census Bureau American Community Survey 2010-2014 Estimates; *US Census Bureau, 2010

C.4 Hazard Identification

Folsom's planning team identified the hazards that affect the City and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to Folsom (see Table C-8).

Table C-8 City of Folsom—Hazard Identification Assessment

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Unlikely	Negligible	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Significant	Likely	Critical	Low
Dam Failure	Significant	Unlikely	Critical	High
Drought and Water Shortage	Extensive	Occasional	Limited	Medium
Earthquake	Extensive	Unlikely	Catastrophic	Low
Earthquake: Liquefaction	Limited	Unlikely	Limited	Low
Flood: 100/200/500-year	Significant	Occasional/Unlikely	Critical	Medium
Flood: Localized Stormwater Flooding	Limited	Likely	Negligible	Medium
Landslides	Limited	Unlikely	Limited	Low
Levee Failure	N/A	N/A	N/A	N/A
River/Stream/Creek Bank Erosion	Limited	Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Limited	Likely	Negligible	Low
Severe Weather: Extreme Temperatures – Heat	Limited	Likely	Negligible	Low
Severe Weather: Fog	Significant	Likely	Negligible	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Limited	Likely	Negligible	Medium
Severe Weather: Wind and Tornadoes	Limited	Occasional	Limited	Low
Subsidence	N/A	N/A	N/A	N/A
Volcano	N/A	N/A	N/A	N/A
Wildfire:(Burn Area/Smoke)	Significant	Likely	Critical	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

C.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Folsom's hazards and assess the City's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City of Folsom is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City of Folsom and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

C.5.1. Hazard Profile

Each hazard vulnerability assessment in Section C.5.3, includes a description as to how the hazard affects the City and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

C.5.2. Vulnerability Assessment and Total Assets at Risk

This section presents the vulnerability assessment for the City and identifies Folsom's total assets at risk, including values at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Sacramento County Assessor's Office is based on the 2015 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table C-9 shows the 2015 Assessor's values (e.g., the values at risk) broken down by property type for the City of Folsom.

Table C-9 City of Folsom – Total Assets at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	17	0	$56,930,100	$0	$56,930,100
Care / Health	33	27	$30,572,662	$139,628,498	$170,201,160

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Church / Welfare	34	30	$9,231,139	$50,689,315	$59,920,454
Industrial	39	34	$28,569,542	$97,359,974	$125,929,516
Miscellaneous	685	1	$635,638	$65,000	$700,638
Office	218	199	$148,632,665	$763,788,850	$912,421,515
Public / Utilities	424	-	$0	$0	$0
Recreational	17	13	$15,543,139	$38,863,089	$54,406,228
Residential	20,433	19,930	$2,376,060,690	$5,877,871,359	$8,253,932,049
Retail / Commercial	362	345	$289,631,149	$712,877,748	$1,002,508,897
Vacant	810	18	$218,249,715	$2,499,240	$220,748,955
No Data	-	-	$0	$0	$0
Total	**23,072**	**20,597**	**$3,174,056,439**	**$7,683,643,073**	**$10,857,699,512**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facilities and Infrastructure

For purposes of this plan, a critical facility is defined as:

> *Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.*

This definition was refined by separating out three classes of critical facilities, that include Essential Services Facilities, At Risk Population Facilities, and Hazardous Materials Facilities, as further described in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Folsom from Sacramento County GIS is shown on Figure C-2 and detailed in Table C-10. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix E.

Figure C-2 City of Folsom – Critical Facilities

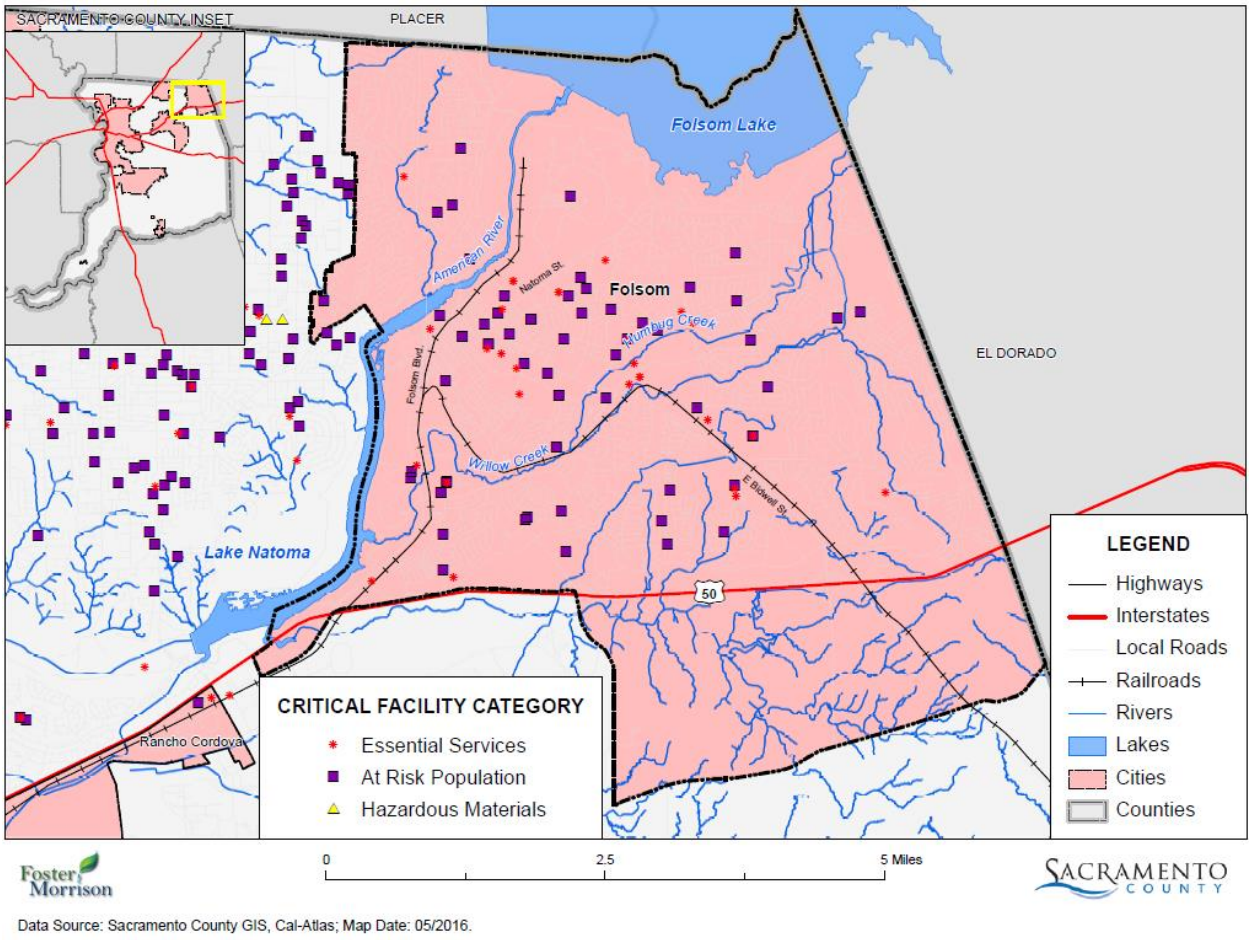


Table C-10 City of Folsom – Critical Facilities Inventory

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Emergency Evacuation Shelter	9
	Fire Station	4
	General Acute Care Hospital	2
	Government Facilities	3
	Light Rail Stop	3
	Medical Health Facility	5
	Police	1
	Water Treatment Plant	1
	Total	**28**
At Risk Population Facilities	Adult Residential	1
	Charter School	1

Critical Facility Category	Facility Type	Facility Count
	College/University	1
	Day Care Center	20
	Hotel	1
	Infant Center	2
	Prison	1
	Private Elementary School	6
	Private High School	1
	Public Continuation High School	1
	Public Elementary School	9
	Public High School	1
	Public Middle School	2
	Residential Care/Elderly	17
	Total	**64**
Grand Total		**92**

Source: Sacramento County GIS

Natural Resources

The natural environment of Folsom presents a variety of natural resources. Environmental considerations have been taken into consideration during development protecting hillsides, riparian habitats, vernal pools, local streams and other localized environmentally sensitive areas. Much of these areas have been preserved in open space.

The City of Folsom has a variety of natural resources of value to the community:

Vegetation Communities

The City of Folsom Planning Area includes the following vegetation communities:

- Chamise Chaparral
- Interior Live Oak Woodland
- Blue Oak Woodland and Savanna
- California Annual Grassland
- Cottonwood/Willow Riparian
- Freshwater Marsh
- Seasonal Wetlands
- Vernal Pools
- Lake Shoreline Fluctuation Zone
- Ruderal and Barren Areas

Special Status Animal Species

According to the California Department of Fish and Game, twenty nine special status wildlife species are known or suspected to occur in the Folsom area.

- Valley Elderberry Longhorn Beetle
- California Red-legged Frog
- Foothill Yellow-legged Frog
- Western Spadefoot
- Western Pond Turtle
- California Horned Lizard
- Bald Eagle
- Golden Eagle
- Peregrine Falcon
- Prairie Falcon
- Burrowing Owl
- Osprey
- Northern harrier
- Sharp-shinned hawk
- Cooper's hawk
- Ferruginous hawk
- Merlin (Falco columbarius)
- Long-eared owl
- Short-eared owl
- Loggerhead Shrike
- Tricolor blackbird
- Yellow-breasted Chat
- Yellow Warbler
- Greater Sandhill Crane
- Willow Flycatcher
- Purple Martin
- Pallid bat
- Townsends big-eared bat
- California mastiff bat

Special Status Plant Species

A special-status plant species, as defined here, meets one or more of the following criteria:

- Officially listed by the California Department of Fish and Game (CDFG) as rare, threatened, or endangered and/or by the U.S. Fish and Wildlife Service (USFWS) as threatened or endangered or proposed for listing.
- A federal or State candidate species for listing as threatened or endangered or State candidate for listing as rare. Such a species may become formally listed during the course of a project.
- Listed under one of the following categories in the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants of California (Skinner and Pavlik 1994) and/or the Electronic Inventory of Rare and Endangered Vascular Plants of California (Skinner and Pavlik 1994; update 2001):
  - ✓ List 1A – Plants presumed extinct in California.
  - ✓ List 1B – Plants rare, threatened, or endangered in California and elsewhere.

- ✓ List 2 – Plants rare, threatened, or endangered in California but more common elsewhere.

Table C-11 lists the special status plant species in the vicinity of Folsom.

Table C-11 Special-Status Plant Species Occurring in the General Vicinity of Folsom

Species	Status/Federal /State/CNPS[1]	Habitat Requirements[2]	Blooming Period
Atriplex joaquiniana San Joaquin spearscale	-/-/1B	Chenopod scrub, alkali meadow, grassland; in seasonal alkali wetlands or alkali sink scrub.	Apr-Oct
Balsamorhiza macrolepis var macrolepis Big-scale balsamroot	-/-/1B	Grassland, cismontane woodland; sometimes on serpentine.	Mar-Jun
Calystegia stebbinsii Stebbin's morning glory	FE/SE/1B	Chaparral, cismontane woodland; in open areas on red clay soils of the Pine Hill formation, or on gabbroic or serpentine soils. (Endemic to Pine Hill formation in El Dorado and Nevada counties.)	Apr-Jul
Ceanothus roderickii Pine Hill ceanothus	FE/SR/1B	Cismontane woodland, chaparral; on gabbroic soils, often in "historically disturbed" areas. (Endemic to the Pine Hill Area in Eldorado County.)	May-Jun
Chlorogalum grandiflorum Red Hills soaproot	-/-/1B	Cismontane woodland, chaparral, lower montane coniferous forest; on serpentine and gabbro substrates; often on "historically disturbed" sites.	May-Jun
Clarkia biloba ssp. Brandegeae Brandegee's clarkia	-/-/1B	Chaparral, cismontane woodland; often on roadcuts.	May-Jul
Cordylanthus mollis ssp. Hispidus Hispid bird's-beak	-/-/1B	Meadows, playas, grassland; in damp alkaline soils, especially in alkali meadows and sinks.	Jun-Sep
Downingia pusilla Dwarf downingia	-/-/2	Mesic grassland, vernal pools; on margins of different types of vernal pools and vernal lakes.	Mar-May
Eryngium pinnatisectum Tuolumne button-celery	-/-/1B	Cismontane woodland, lower montane coniferous forest, vernal pools; on mesic sites.	Jun-Aug
Fremontodendron decumbens Pine Hill flannelbush	FE/SR/1B	Chaparral, cismontane woodland; on rocky ridges, often among rocks and boulders. Endemic to gabbroic and serpentine soils. (Endemic to Eldorado and Nevada Counties.)	Apr-Jul
Fritillaria eastwoodiae Butte County fritillary	-/-/3	Chaparral, cismontane woodland, lower montane coniferous forest; usually on dry slopes in serpentine, red clay, or sandy loam soils; sometimes on mesic sites.	Mar-May
Galium californicum ssp. Sierra El Dorado bedstraw	FE/SR/1B	Cismontane woodland, chaparral, lower montane coniferous forest; on gabbroic soils in mostly oak woodland. (Endemic to El Dorado County.)	May-Jun
Gratiola heterosepala Boggs Lake hedge- hyssop	-/SE/1B	Freshwater marshes and swamps, vernal pools; in clay soils, usually in vernal pools, sometimes on lake margins.	Apr-Aug

Species	Status/Federal /State/CNPS[1]	Habitat Requirements[2]	Blooming Period
Helianthemum suffrutescens Bisbee Peak rush rose	-/-/3	Chaparral; in openings, often on serpentine, gabbroic, or Ione formation soils.	Apr-Jun
Juncus leiospermus var. ahartii Ahart's dwarf rush	-/-/1B	Vernal pools; restricted to edges of pools.	Mar-May
Juncus leiospermus var. leiospermus Red Bluff dwarf rush	-/-/1B	Chaparral, grassland, cismontane woodland, vernal pools; in vernally mesic sites or at edges of vernal pools.	Mar-May
Lathyrus sulphureus var. argillaceus Dubious pea	-/-/3	Cismontane woodland, lower and upper montane coniferous forest.	Apr
Legenere limosa Legenere	-/-/1B	Vernal pools; in beds of pools. (Many historical occurrences extirpated.)	Apr-Jun
Navarretia myersii ssp. Myersii Pincushion navarretia	-/-/1B	Vernal pools, mesic grassland; on clay soils within non-native grassland.	May
Orcuttia tenuis Slender Orcutt grass	FT/SE/1B	Vernal pools.	May-Oct
Orcuttia viscid Sacramento Orcutt grass	FE/SE/1B	Vernal pools. (Endemic to Sacramento County.)	Apr-Jul
Sagittaria sanfordii Sanford's arrowhead	-/-/1B	Marshes and swamps; in standing or slow-moving, fresh-water ponds and ditches.	May-Oct
Senecio layneae Layne's ragwort	FT/SR/1B	Chaparral, cismontane woodland; on ultramafic soils; occasionally along streams.	Apr-Jul
Wyethia reticulate El Dorado County mule ears	-/-/1B	Chaparral, cismontane woodland, lower montane coniferous forest; in openings on stony red clay and gabbroic soils. (Endemic to El Dorado County.)	May-Jul

Footnotes:
1 Status:
FE - Federally-listed as endangered.
FT - Federally-listed as threatened.
SE - State-listed as endangered.
SR - State-listed as rare.
1B - CNPS (California Native Plant Society): Plants rare, threatened or endangered in California and elsewhere.
2 - CNPS: Plants rare, threatened, or endangered in California but more common elsewhere.
3 - CNPS: Plants about which we need more information – a review list.
4 - CNPS: Plants of limited distribution – a watch list.
2 Sources: CNPS (2001); CNDDB (2002); Hickman (1993) 3 Source: CNDDB (2002)

Historic and Cultural Resources

Table C-12 shows registered historic sites the in the City of Folsom.

Table C-12 Registered Historic Sites in the City of Folsom

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
Chinese Diggings, Natoma Station Ground Sluice (P712)				X	11/22/1988
Chung Wah Cemetery (N1918)	X				8/21/1995
Cohn House (N1001)	X				1/21/1982
Coloma Road At Nimbus Dam (746)		X			7/5/1960
Folsom Depot (N1035)	X				2/19/1982
Folsom Powerhouse (N258)	X				10/2/1973
Folsom-Overland Pony Express Route In California (702)		X			9/11/1959
Negro Bar (P798)				X	5/31/1994
Old Folsom Powerhouse (633)		X			3/3/1958
Southern Pacific Railroad Superintendent House (N2411)	X				6/13/2008
Terminal Of California's First Passenger Railroad (558)		X			12/31/1956
Yeong Wo Cemetery (P810)				X	5/30/1995

Source: California Office of Historical Preservation

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) document America's architectural and engineering heritage. Table C-13 lists the HABS and HAER structures in Sacramento County.

Table C-13 City of Folsom HABS and HAER Structures

Area	Historic Building/Structure
Folsom Vicinity	
	Folsom Powerhouse, Adjacent to American River, Folsom vicinity, Sacramento, CA
	Keefe-McDerby Mine Ditch, East of East Bidwell Street between Clarksville Road & Highway 50, Folsom vicinity, Sacramento, CA
	Natomas Ditch System, Blue Ravine Segment, Juncture of Blue Ravine & Green Valley Roads, Folsom vicinity, Sacramento, CA
Folsom	
	Folsom Powerhouse, Adjacent to American River, Folsom vicinity, Sacramento, CA.
	Guiseppe Murer House, 1121 Folsom Boulevard, Folsom, Sacramento, CA
	House, Folsom, Sacramento, CA
	Keefe-McDerby Mine Ditch, East of East Bidwell Street between Clarksville Road & Highway 50, Folsom vicinity, Sacramento, CA
	Methodist Episcopal Church, Folsom, Sacramento, CA
	Natomas Ditch System, Blue Ravine Segment, Juncture of Blue Ravine & Green Valley Roads, Folsom vicinity, Sacramento, CA
	Natomas Ditch System, Rhodes Ditch, West of Bidwell Street, north of U.S. Highway 50, Folsom, Sacramento, CA
	Trinity Episcopal Church, Folsom, Sacramento, CA
	Wells Fargo & Company Building, Folsom, Sacramento, CA

Source: The Library of Congress, American Memory, http://memory.loc.gov/ammem/collections/habs_haer/

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

In addition to the registered sites, there are several assets within Folsom that define the community and represent the City's history. Some of the historical sites of importance to Folsom are listed below.

- Gold Creek Bridge (formerly part of Lincoln Highway)
- Hinkle Creek Nature Area (prehistoric archeological site)

Growth and Development Trends

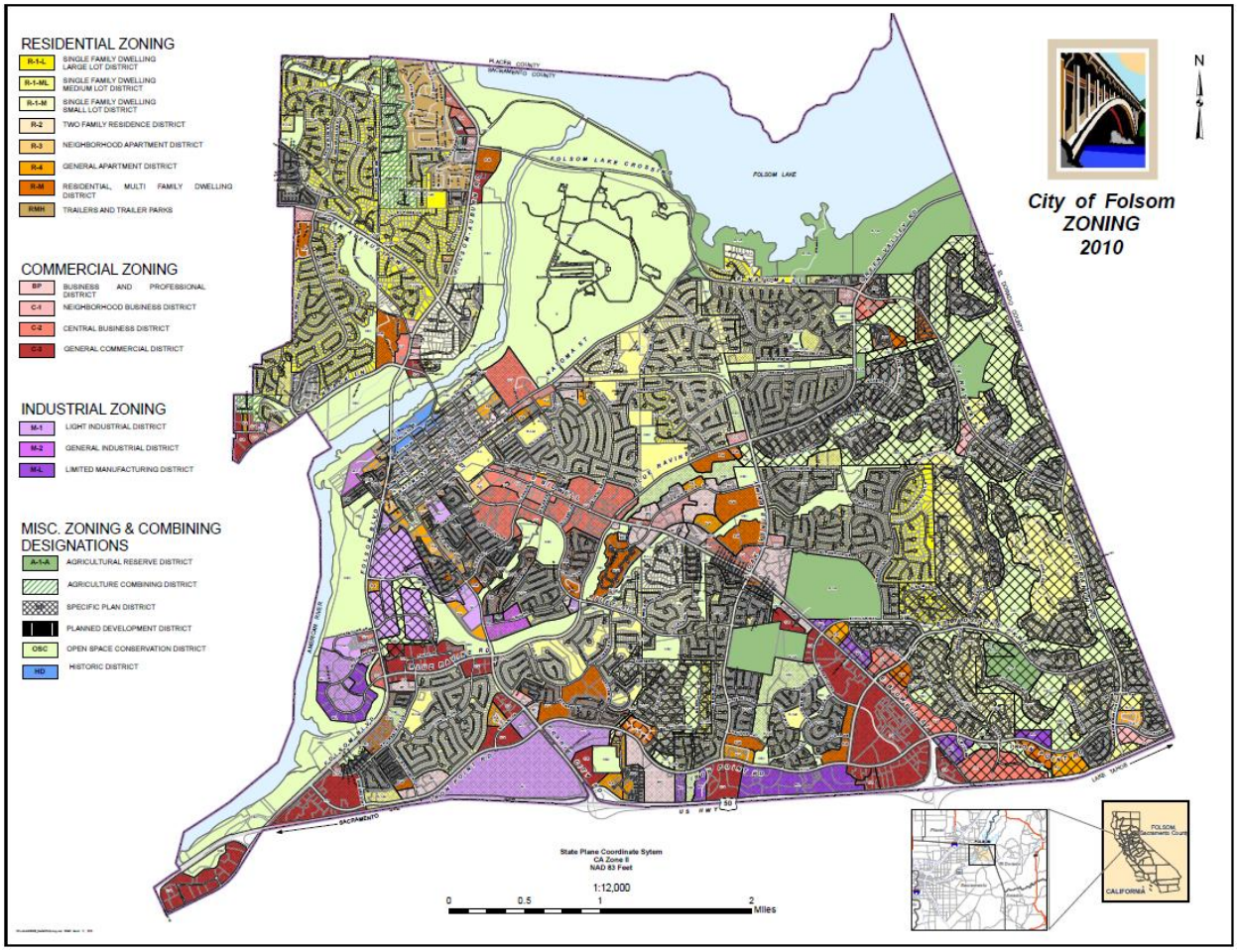
Growth within the City of Folsom has been strong and steady. Past growth is shown in Table C-14. Current zoning for the City is shown on Figure C-3.

Table C-14 City of Folsom Population 1990 to 2010

Date	1990	2000	2010
Population	29,802	51,884	72,203

Source: California Department of Finance

Figure C-3 City of Folsom Zoning Map



Source: City of Folsom

Development since 2011 Plan

As shown in Table C-15, Folsom has seen a growth of 3.7% of population between 2010 and January 1, 2015.

Table C-15 City of Folsom Population Changes Since 2011

Year	Population	Change	% Change
2010[1]	72,203	–	–
2015[2]	74,909	2,706	3.7%

Source: [1]US Census Bureau, [2]California Department of Finance

The Folsom Building Department and Planning Department tracked total building permits issued since 2011 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table C-16 and Table C-17. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people living in the area potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the City to identified priority hazards.

Table C-16 City of Folsom Total Development Since 2011

Property Use	2011	2012	2013	2014	2015
Residential	71	166	332	279	242
Commercial	3	7	3	2	2
Industrial	1	2	0	1	0
Other	0	0	0	0	0
Total	75	175	335	282	244

Source: City of Folsom

Table C-17 City of Folsom Development in Hazard Areas since 2011

Property Use	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Residential	1	0	1,090	0
Commercial	1	0	17	0
Industrial	0	0	4	0
Other	0	0	0	0
Total	**2**	**0**	**1,111**	**0**

Source: City of Folsom

[1]Moderate or higher wildfire risk area

Future Development

The Sacramento Council on Governments (SACOG) modeled population projections for the City of Folsom and other areas of the region in 2012 for a Metropolitan Transportation Plan/Sustainable Communities Strategy report. This forecast uses a 2008 base year estimate with projections to 2020 and 2035 for population, housing units, households and employment. SACOG estimated the City population in 2020 and 2035 to be 74,664 and 78,689 respectively.

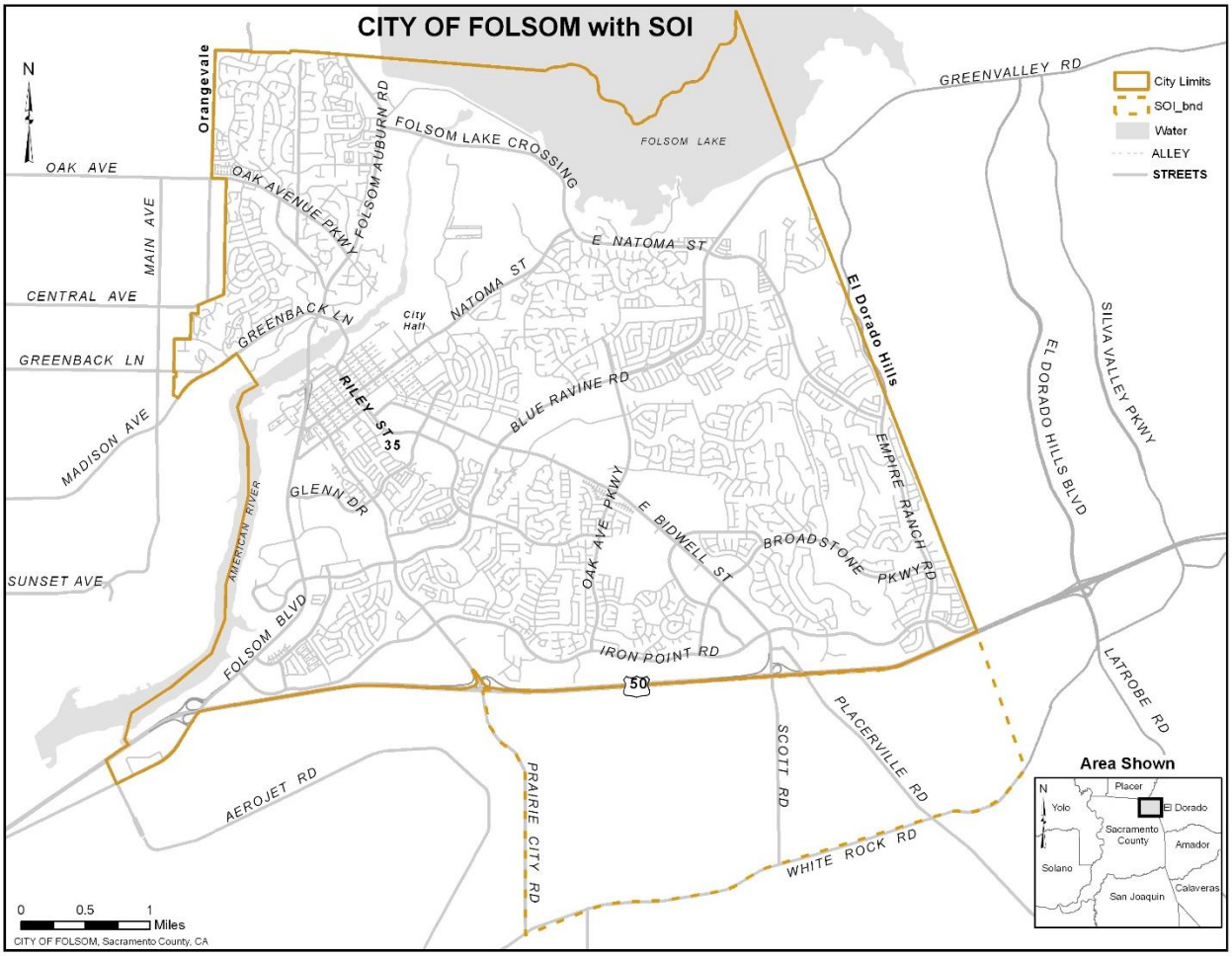
In June 2005, the City Council selected a preferred land use plan for the Folsom Plan Area (FPA), formerly known as the Sphere of Influence (SOI), area located south of Highway 50. and directed staff to prepare the environmental documents required for annexation. The SOI FPA encompasses 3,600 acres bounded by Highway 50, Prairie City Road, White Rock Road and the El Dorado County line. In June 2006, the landowners for the SOI FPA area unveiled their proposed land use plan. The plan includes over 1,000 acres for open space, 130 acres of parks, 500 acres designated for commercial, office, and retail use, and over

1,400 acres set aside for residential use. (see Figure C-4 and Figure C-5). Approximately 30 percent of the area would be maintained as open space to preserve oak woodlands and creek corridors.

Folsom Plan Area Land Uses

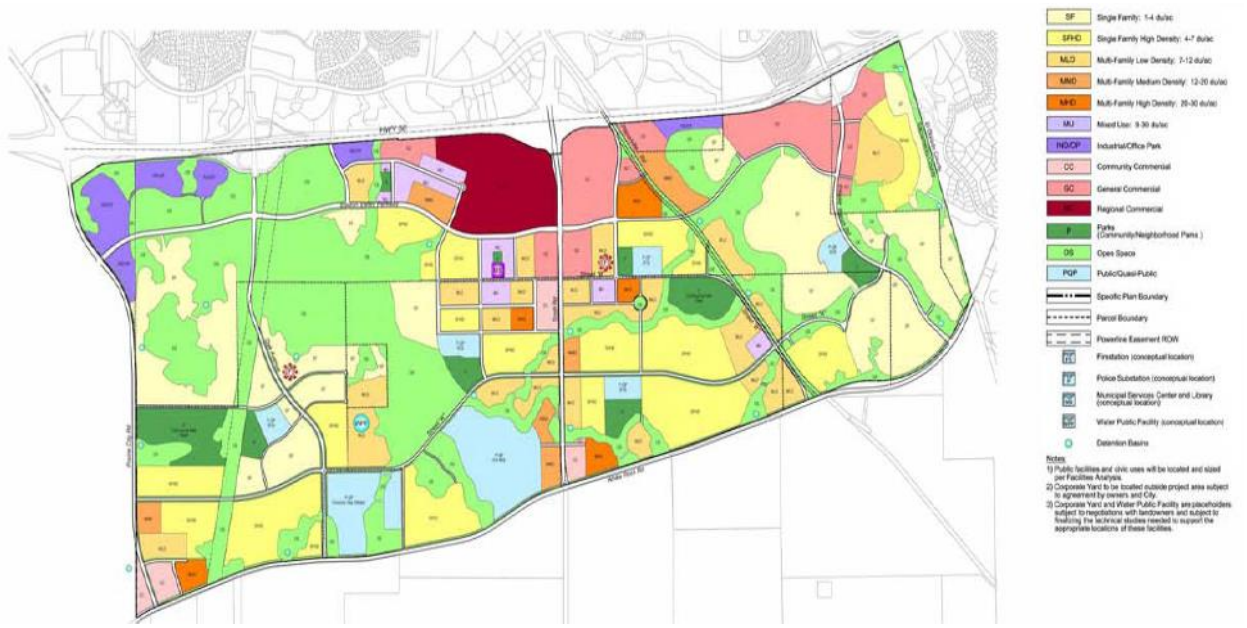
- Residential (units cap) 10,045
- Open Space (acres) 1,046
- Parks (acres) 165
- Schools/Civic Uses (acres) 179
- Commercial/Retail (acres) 340
- Mixed-Use (acres) 41
- Office Park (acres) 106

Figure C-4 City of Folsom Future Development Areas



Source: City of Folsom GIS

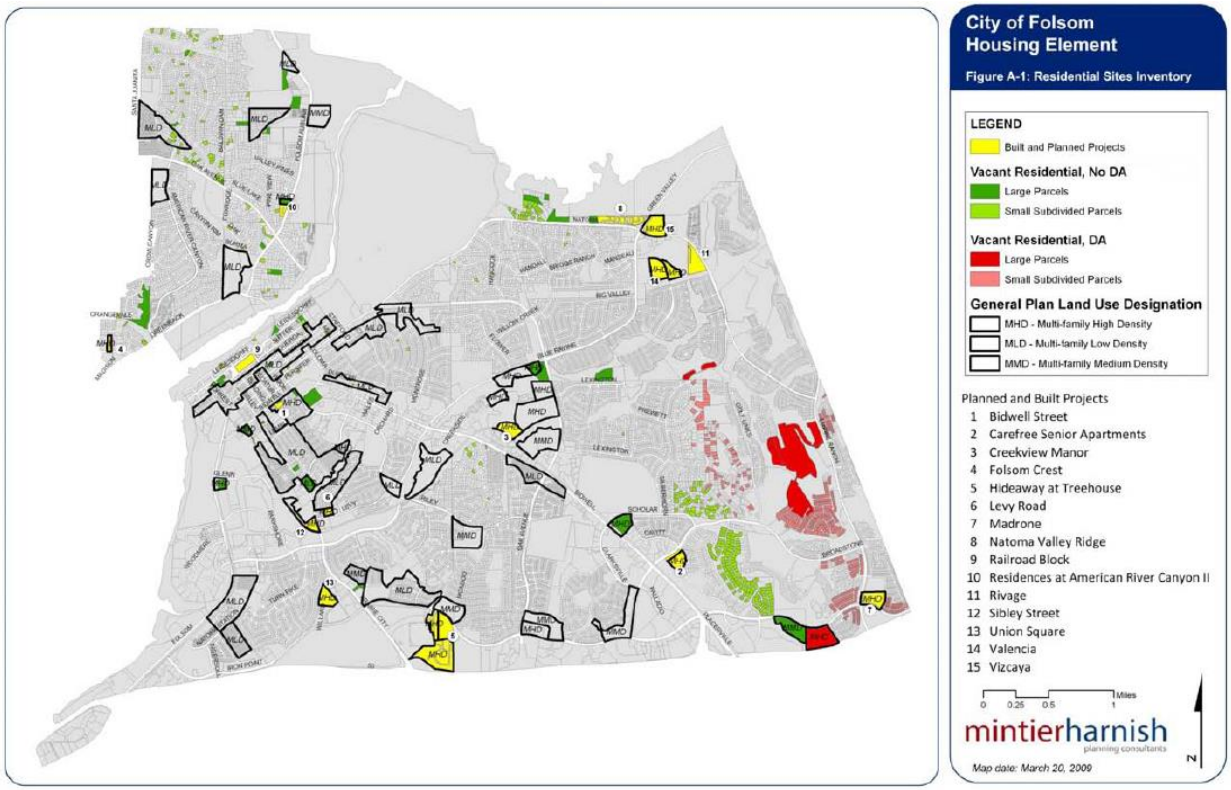
Figure C-5 Folsom Plan Area Land Use Diagram



Source: City of Folsom Housing Element Background Report

During the planning process for the City of Folsom Housing Element, an assessment was conducted of the vacant land suitable for residential development within the City of Folsom. The data was compiled by City staff and mapped. The inventory includes some vacant sites that were in the discussion or pre-application stages in the City of Folsom development project approval process as of the effective date of the inventory (January 1, 2009), but were not included in the inventory of built and planned projects. These locations are shown in Figure C-6.

Figure C-6 City of Folsom Future Growth Areas



Source: City of Folsom Housing Element

C.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table C-8 as high or medium significance hazards and primary hazards to the State of California. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the Base Plan. In general, the most vulnerable structures are those located within the flood risk areas, wildfire risk areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–High

Hazard Profile and Problem Description

Dam failures can result from a number of natural or man-made causes such as earthquakes, erosion of the face or foundation, improper siding, rapidly rising flood waters, structural/design flaws, and deliberate human actions. A dam failure can cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to electric generating facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas.

A catastrophic dam failure, depending on size of dam and population downstream, could exceed the response capability of local communities. Damage control and disaster relief support would be required from other local governmental and private organizations, and from state and federal governments.

Warning ability is generally determined by the frequency of inspections for structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate. The existence and frequency of updating and exercising an evacuation plan that is site-specific assists in warning and evacuation functions.

Folsom Dam, owned by the US Bureau of Reclamation, is the primary dam of concern which has the potential to affect the Sacramento County Planning Area and the local jurisdictions and populations in the inundation areas. Figure 4.75 in Section 4.3.6 in the Base Plan shows the areas of Sacramento County at risk to a dam failure of the Folsom Dam.

Past Occurrences

On the morning of July 17, 1995, spillway gate 3 failed at the Folsom Dam. The failure resulted in an uncontrolled release of nearly 40 percent of Folsom Lake at a peak rate of approximately 40, 000 cubic feet per second. The failure caused no fatalities.

There has been no new occurrence of a dam failure since the 2011 update to the Sacramento County Local Hazard Mitigation Plan.

Vulnerability to Dam Failure

A failure of the Folsom or other high or significant hazard dam can cause significant loss of life, property damage, loss of critical facilities and infrastructure, and displacement of city residents.

Mass evacuation of the inundation area may be essential to save lives, if warning time should permit. Extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food, and temporary shelter would be required for injured or displaced persons. Identification and burial of many dead persons would pose difficult problems; public health would be a major concern. Many families would be separated, particularly if the failure should occur during working hours, and a personal inquiry or locator system would be essential. These and other emergency operations could be seriously hampered by the loss of communications, damage to transportation routes, and the disruption of public utilities and other essential services.

Governmental assistance could be required and may continue for an extended period. These efforts would be required to remove debris and clear roadways, demolish unsafe structures, assist in re-establishing public services and utilities, and provide continuing care and welfare for the affected population including, as required, temporary housing for displaced persons.

Values at Risk

Sacramento County provided inundation as a GIS layer for the Folsom Dam system, as part of the following breaks:

- Folsom Right Wing
- Folsom Mormon
- Folsom Dike 4
- Folsom Dike 5
- Folsom Dike 6
- Folsom Dike 7
- Folsom Dike 8
- Folsom Dam

GIS was used to determine the possible impacts of dam failure flooding within the City of Folsom. The methodology described in Section 4.3.6 of the Base Plan was followed in determining structures and values at risk in potential dam inundation areas. Table C-18 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in an inundation zone in the City.

Table C-18 City of Folsom– Count of Parcels and Values in Dam Inundation Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	2	0	$594,274	$0	$594,274
Care / Health	32	27	$30,215,669	$139,628,498	$169,844,167
Church / Welfare	33	29	$8,570,498	$46,000,192	$54,570,690

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Industrial	36	32	$22,437,499	$87,959,365	$110,396,864
Miscellaneous	491	0	$211,523	$0	$211,523
Office	207	189	$113,012,184	$649,471,037	$762,483,221
Public / Utilities	349	0	$0	$0	$0
Recreational	12	10	$6,397,301	$22,547,552	$28,944,853
Residential	15,349	15,082	$1,710,264,456	$4,148,956,987	$5,859,221,443
Retail / Commercial	298	285	$230,937,623	$565,346,544	$796,284,167
Vacant	272	7	$51,750,518	$210,721	$51,961,239
No Data	0	0	$0	$0	$0
Total	**17,081**	**15,661**	**$2,174,391,545**	**$5,660,120,896**	**$7,834,512,441**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Table C-19 shows potential losses from a Folsom Dam failure with loss estimate and loss ratios for the City. The loss ratio is the loss estimate (i.e., total of improved and contents value for all parcels located in the dam inundation zone in the City) divided by the total potential exposure and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3-foot flood depth (30% damage), 6-foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table C-19 City of Folsom – Dam Inundation Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
Folsom Dam Inundation	15,661	$5,660,120,896	$3,629,411,364	$9,289,532,260	$2,786,859,678 $5,573,719,356 $9,289,532,260	25.7% 51.3% 85.6%

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table C-18 and Table C-19, the City of Folsom has 15,626 improved parcels and roughly $9.3 billion of structure and contents value in the Folsom Dam inundation area. The 3-foot loss ratio of 25.7%, the 6-foot loss ratio of 51.3%, and the total loss ratio of 85.6% indicates that the City has very large amounts of assets at risk to a possible Folsom Dam failure.

Population at Risk

The dam inundation zones were overlayed on the parcel layer using GIS. Those residential parcel centroids that intersect the dam inundation zones were counted and multiplied by the 2010 Census Bureau average household factors for the City. According to this analysis, there is a total population of 40,061 residents of the City at risk to dam inundation. This is shown in Table C-25.

Table C-20 City of Folsom – Count of Improved Residential Parcels and Population in Dam Inundation Zones

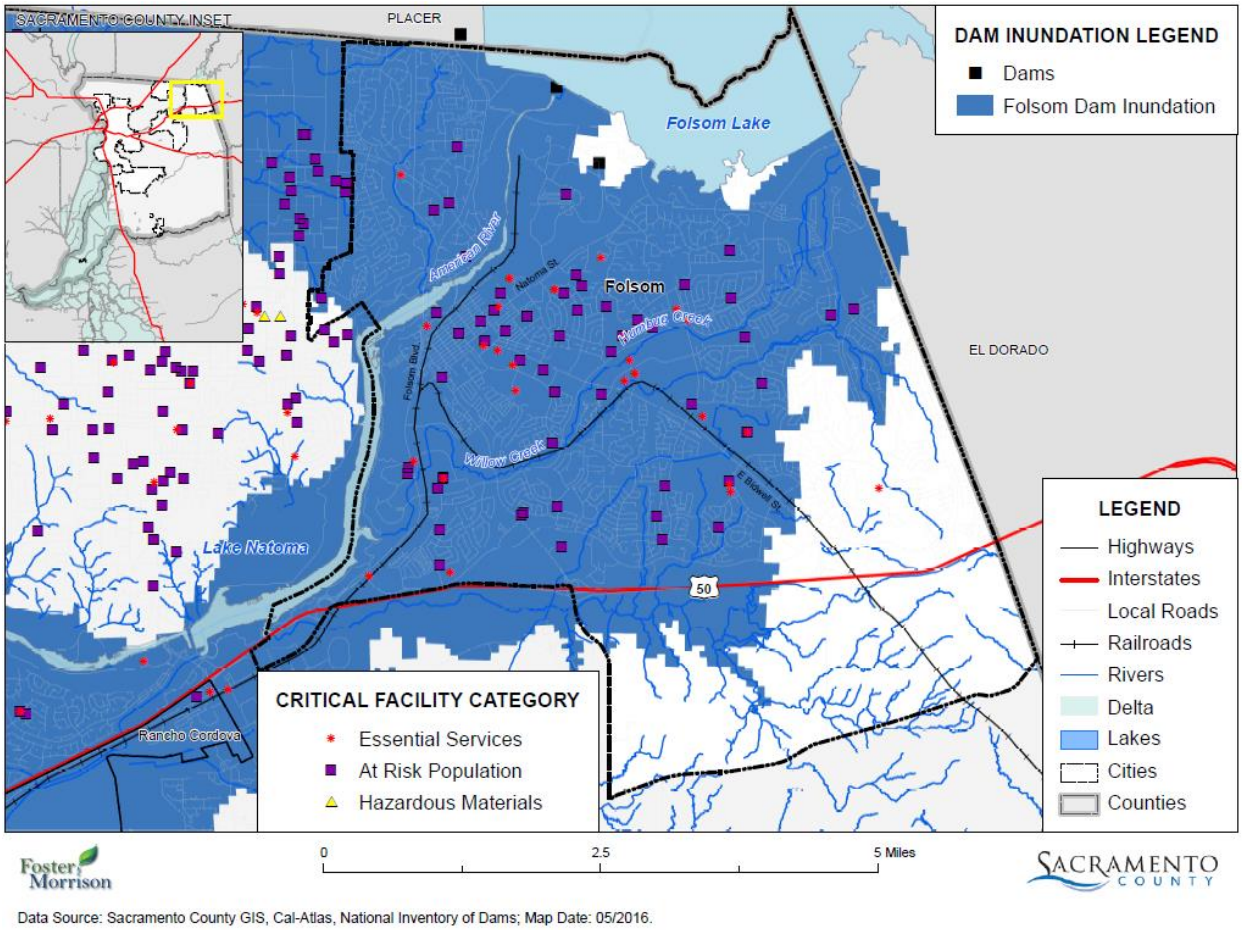
Improved Residential Parcels	Population*
15,082	39,364

Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data, 2010 US Census Bureau
* Average household populations from the 2010 US Census were used: Folsom – 2.61.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in the City of Folsom in identified Folsom Dam inundation zones. GIS was used to determine whether the facility location intersects the inundation area. Details of critical facilities in the inundation area in the City of Folsom are shown in Figure C-7 and Table C-21. As shown on the table and figure, Folsom has 91 critical facilities located in the Folsom Dam inundation areas. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure C-7 City of Folsom – Critical Facilities in Dam Inundation Zones



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table C-21 City of Folsom – Critical Facilities in Dam Inundation Zones

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Emergency Evacuation Shelter	8
	Fire Station	4
	General Acute Care Hospital	2
	Government Facilities	3
	Light Rail Stop	3
	Medical Health Facility	5
	Police	1
	Water Treatment Plant	1
	Total	27
At Risk Population Facilities	Adult Residential	1
	Charter School	1
	College/University	1
	Day Care Center	20
	Hotel	1
	Infant Center	2
	Prison	1
	Private Elementary School	6
	Private High School	1
	Public Continuation High School	1
	Public Elementary School	9
	Public High School	1
	Public Middle School	2
	Residential Care/Elderly	17
	Total	**64**
Total		**91**

Source: Sacramento County GIS

Future Development

There is future development within the Folsom Dam inundation zone.

Drought

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Past Occurrences

From 2012 to 2015, the City of Folsom experienced a drought, which affected water supply. During that period, water agencies implemented conservation efforts and Folsom Lake reached record low water levels.

Vulnerability to Drought

Based on historical information, the occurrence of drought in California, including the City of Folsom, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability of the City of Folsom to drought is City-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels.

Future Development

The City of Folsom has the capacity in their water rights appropriations to supply water to the Folsom Plan Area. Conservation efforts were put in place to account for the projected increase in water demand due to the development.

As the population in the area continues to grow, so will the demand for water. Water shortages in the future may be worsened by drought, as the City relies on surface water for its water source. Increased planning will be needed to account for population growth and increased water demands.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

The City of Folsom is traversed by several stream systems and is at risk to both riverine flooding and localized stormwater flooding. As previously described in Section 4.2.10 of the Base Plan, the Sacramento

County Planning Area and the City of Folsom have been subject to previous occurrences of flooding. In the City of Folsom, much of the flood damage occurs in the floodplains of the American River, Willow Creek, and Humbug Creek.

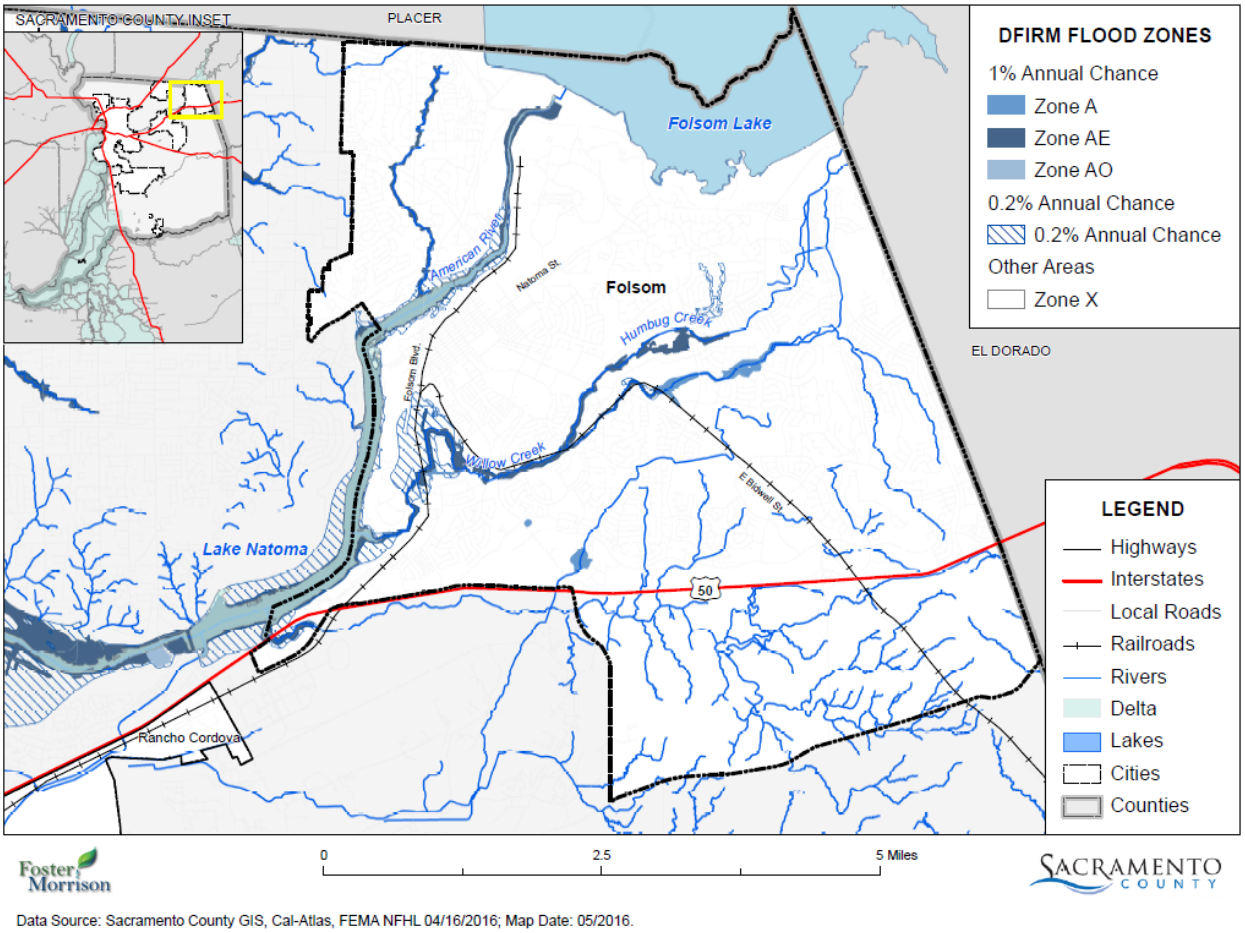
Past Occurrences

There have been no new flooding due to the 100-, 200-, 500-year storm events since the 2011 update to the Sacramento County Hazard Mitigation Plan.

Flood Zones

A small portion of the City is located inside of the 100 year flood zone as defined by the Federal Emergency Management Agency (FEMA). his is seen in Figure C-8.

Figure C-8 City of Folsom – FEMA DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Vulnerability to Flood

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Folsom. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table C-22 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a floodplain in the City.

Table C-22 City of Folsom – Count and Improved Value by Property Use and Detailed Flood Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Zone A						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	1	0	$1,784,965	$0	$1,784,965	$3,569,930
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	2	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	2	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**5**	**0**	**$1,784,965**	**$0**	**$1,784,965**	**$3,569,930**
Zone AE						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	5	0	$39	$0	$39	$78
NO DATA	0	0	$0	$0	$0	$0
Office	1	1	$185,000	$385,000	$185,000	$755,000

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Public / Utilities	9	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	7	7	$585,406	$1,972,379	$292,703	$2,850,488
Retail / Commercial	1	0	$1,100,000	$0	$1,100,000	$2,200,000
Vacant	3	0	$6,602	$0	$0	$6,602
Total	**26**	**8**	**$1,877,047**	**$2,357,379**	**$1,577,742**	**$5,812,168**
Zone AH						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone AO						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone A99						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Total 1%	**31**	**8**	**$3,662,012**	**$2,357,379**	**$1,371,190**	**$7,390,581**
0.2% Annual Chance Flood Zone*						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	1	1	$261,369	$699,873	$261,369	$1,222,611
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	2	2	$4,162,241	$31,692,307	$6,243,362	$42,097,910
Miscellaneous	22	0	$1,598	$0	$1,598	$3,196
NO DATA	0	0	$0	$0	$0	$0
Office	32	29	$20,862,785	$77,933,202	$20,862,785	$119,658,772
Public / Utilities	16	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	99	76	$12,631,115	$22,656,437	$6,315,558	$41,603,110
Retail / Commercial	14	14	$14,066,273	$20,143,632	$14,066,273	$48,276,178

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Vacant	8	0	$5,084,060	$0	$0	$5,084,060
Total	**194**	**122**	**$57,069,441**	**$153,125,451**	**$47,750,944**	**$257,945,836**
X Protected by Levee Zone						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone X						
Agricultural	17	0	$56,930,100	$0	$56,930,100	$113,860,200
Care / Health	31	26	$28,526,328	$138,928,625	$28,526,328	$195,981,281
Church / Welfare	34	30	$9,231,139	$50,689,315	$9,231,139	$69,151,593
Industrial	37	32	$24,407,301	$65,667,667	$36,610,952	$126,685,920
Miscellaneous	656	1	$634,001	$65,000	$634,001	$1,333,002
NO DATA	0	0	$0	$0	$0	$0
Office	185	169	$127,584,880	$685,470,648	$127,584,880	$940,640,408
Public / Utilities	397	0	$0	$0	$0	$0
Recreational	17	13	$15,543,139	$38,863,089	$15,543,139	$69,949,367
Residential	20,327	19,847	$2,362,844,169	$5,853,242,543	$1,181,422,085	$9,397,508,797
Retail / Commercial	347	331	$274,464,876	$692,734,116	$274,464,876	$1,241,663,868
Vacant	799	18	$213,159,053	$2,499,240	$0	$215,658,293
Total	**22,847**	**20,467**	**$3,113,324,986**	**$7,528,160,243**	**$1,730,947,499**	**$12,372,432,728**

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Table C-23 summarizes Table C-22 above and shows City of Folsom loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table C-23 City of Folsom – Flood Loss Summary

Flood Zone	Improved Parcel Count	Total Improved Value	Estimated Contents Value	Total Improved/ Contents Value	Loss Estimate	Loss Ratio
1% Annual Change	8	$2,357,379	$1,371,190	$3,728,569	$745,713.80	0.0004%
0.2% Annual Chance*	122	$153,125,451	$157,643,386	$310,768,837	$62,153,767.40	3.97%

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data
*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

According to Table C-22 and Table C-23, the City of Folsom has 8 improved parcels and $3,728,569 of structure and contents value in the 1% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a 1% chance in any given year of a flood event causing roughly $745,713.80 in damage in the City of Folsom. The City of Folsom has 122 improved parcels and $310,768,837 of structure and contents value in the 0.2% annual chance floodplain. Applying the 20 percent damage factor as previously described in, there is a 0.2% chance in any given year of a flood event causing roughly $62.2 million in damage in the City of Folsom. A loss ratio of 0.004% indicates that losses in Folsom to a 1% chance flood would be relatively minor; however, a loss ratio of 3.97% indicates losses in Folsom to a 0.2% annual chance flood would be more significant.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.10 of the Base Plan, was used for the City of Folsom as well as for the County as a whole. Table C-24 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table C-24 City of Folsom – Flooded Acres

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
A	Agricultural	0	0	0.00%
	Care / Health	1.24	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0.34	0	0.00%
	No Data	0	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Office	0	0	0.00%
	Public / Utilities	32.05	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**33.63**	0	**0.00%**
AE	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	21.29	0	0.00%
	No Data	0	0	0.00%
	Office	0.09	0.09	4.01%
	Public / Utilities	37.28	0	0.00%
	Recreational	0	0	0.00%
	Residential	2.15	2.15	95.99%
	Retail / Commercial	1.02	0	0.00%
	Vacant	14.75	0	0.00%
	Total	**76.58**	**2.24**	**100.00%**
AH	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
AO	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
A99	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
	Total 1%	**110.21**	**2.24**	**100.00%**
Shaded X (0.2% Annual Chance)*	Agricultural	0	0	0.00%
	Care / Health	1.16	1.16	1.26%
	Church / Welfare	0	0	0.00%
	Industrial	19.01	19.01	20.51%
	Miscellaneous	7.88	0	0.00%
	No Data	0	0	0.00%
	Office	46.36	41.76	45.07%
	Public / Utilities	61.21	0	0.00%
	Recreational	0	0	0.00%
	Residential	13.55	12.25	13.22%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Retail / Commercial	18.48	18.48	19.94%
	Vacant	9.49	0	0.00%
	Total	**177.15**	**92.67**	**100.00%**
X Protected by Levee	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	0.00%
Zone X	Agricultural	1,603.51	0	0.00%
	Care / Health	81.07	76.25	1.30%
	Church / Welfare	75.64	74.68	1.27%
	Industrial	93.49	90.03	1.53%
	Miscellaneous	1,034.27	1.71	0.03%
	No Data	0	0	0.00%
	Office	458.82	421.89	7.18%
	Public / Utilities	2,953.47	0	0.00%
	Recreational	231.15	118.39	2.01%
	Residential	4,871.63	4,536.14	77.17%
	Retail / Commercial	599.81	550.14	9.36%
	Vacant	1,929.84	8.95	0.15%
	Total	**13,932.70**	**5,878.17**	**100.00%**

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2010 Census Bureau average household factors for

Folsom. According to this analysis, there is a total population of 216 residents of the City at risk to flooding, 18 in the 1% annual chance and 198 in the 0.2% floodplain. This is shown in Table C-25.

Table C-25 City of Folsom – Count of Improved Residential Parcels and Population by Flood Zone

Flood Zone	Improved Residential Parcels	Population*
1% Annual Chance	7	18
0.2% Annual Chance*	76	198
Total	**83**	**216**

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data, US Census Bureau

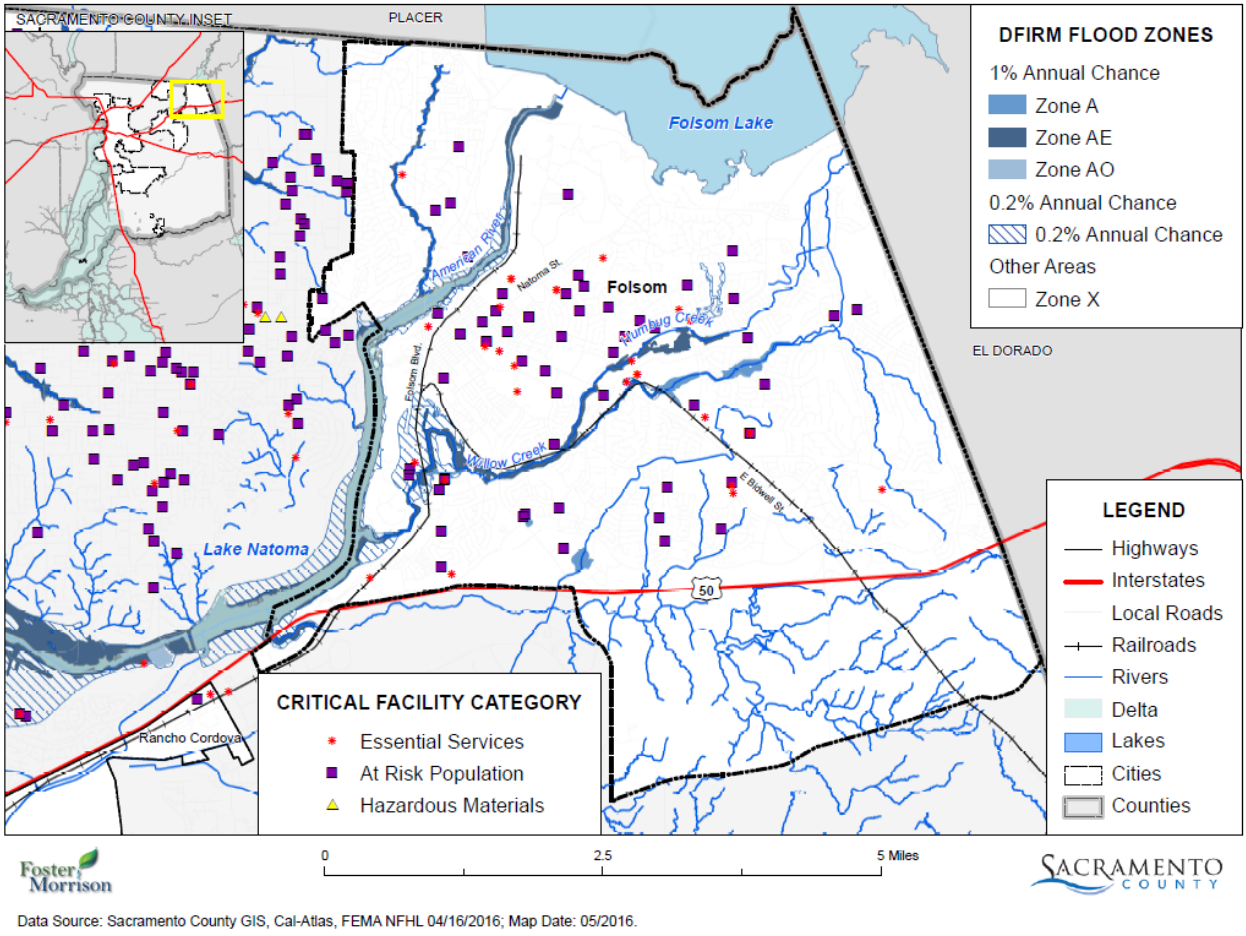
* Average household populations from the 2010 US Census were used: Folsom– 2.61.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Folsom in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersects a DFIRM flood hazard areas, and if so, which zone it intersects. Details of critical facilities in the floodplain in the City of Folsom are shown in Figure C-9 and Table C-26. As shown on the table and figure, Folsom has 0 critical facilities located in 1% annual chance and 5 critical facilities in the 0.2% annual chance DFIRM flood zones. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure C-9 City of Folsom – Critical Facilities and Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table C-26 City of Folsom – Critical Facilities and Flood Zones

Critical Facility Category	Facility Type	Facility Count
0.2% Annual Chance		
Essential Services Facilities	Light Rail Stop	1
	Medical Health Facility	1
	Total	**2**
At Risk Population Facilities	Day Care Center	1
	Hotel	1
	Private Elementary School	1
	Total	**3**
0.2% Annual Chance Total*		**5**
Zone X		
Essential Services Facilities	Emergency Evacuation Shelter	9
	Fire Station	4

Critical Facility Category	Facility Type	Facility Count
	General Acute Care Hospital	2
	Government Facilities	3
	Light Rail Stop	2
	Medical Health Facility	4
	Police	1
	Water Treatment Plant	1
	Total	**26**
At Risk Population Facilities	Adult Residential	1
	Charter School	1
	College/University	1
	Day Care Center	19
	Infant Center	2
	Prison	1
	Private Elementary School	5
	Private High School	1
	Public Continuation High School	1
	Public Elementary School	9
	Public High School	1
	Public Middle School	2
	Residential Care/Elderly	17
	Total	**61**
Zone X Total		**87**
Grand Total		**92**

Source: FEMA 6/16/2015 DFIRM, Sacramento County GIS

*This count only includes those critical facilties in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all critical facilities in the 1% annual chance floodplain.

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Folsom joined the National Flood Insurance Program (NFIP) on January 6, 1982. The City does not participate in the CRS program.

NFIP data indicates that as of February 16, 2016, there were 293 flood insurance policies in force in the City with $94,778,400 of coverage. Of the 293 policies, 286 were residential (single-family homes) and 7 were nonresidential; 13 of the policies were in A zones (the remaining 280 were in B, C, and X zones). The GIS parcel analysis detailed above identified 7 parcels in the 100-year flood zone. 13 policies for 7 parcels in the 100-year floodplain (A zones) equates to insurance coverage of 100 percent.

There have been 14 historical claims for flood losses totaling $403,345.45. 11 of these were for pre-FIRM structures; 3 were for post-FIRM structures. There has been one substantial damage claim since 1978.

NFIP data further indicates that there are 3 repetitive loss (RL) buildings, with 0 RL buildings being insured. There has been a total of 7 RL losses, with total payments of $348,648.23. This represents the majority of claim costs in the City of Folsom. None of the insured RL buildings has incurred 4 or more losses. All of the properties are located outside of the 100- and 500-year floodplain in the B, C, or X zones. The RL properties are located in an older, built-out residential neighborhood with older infrastructure. Recent drainage improvements in the area may have alleviated some of the flooding issues to these RL structures.

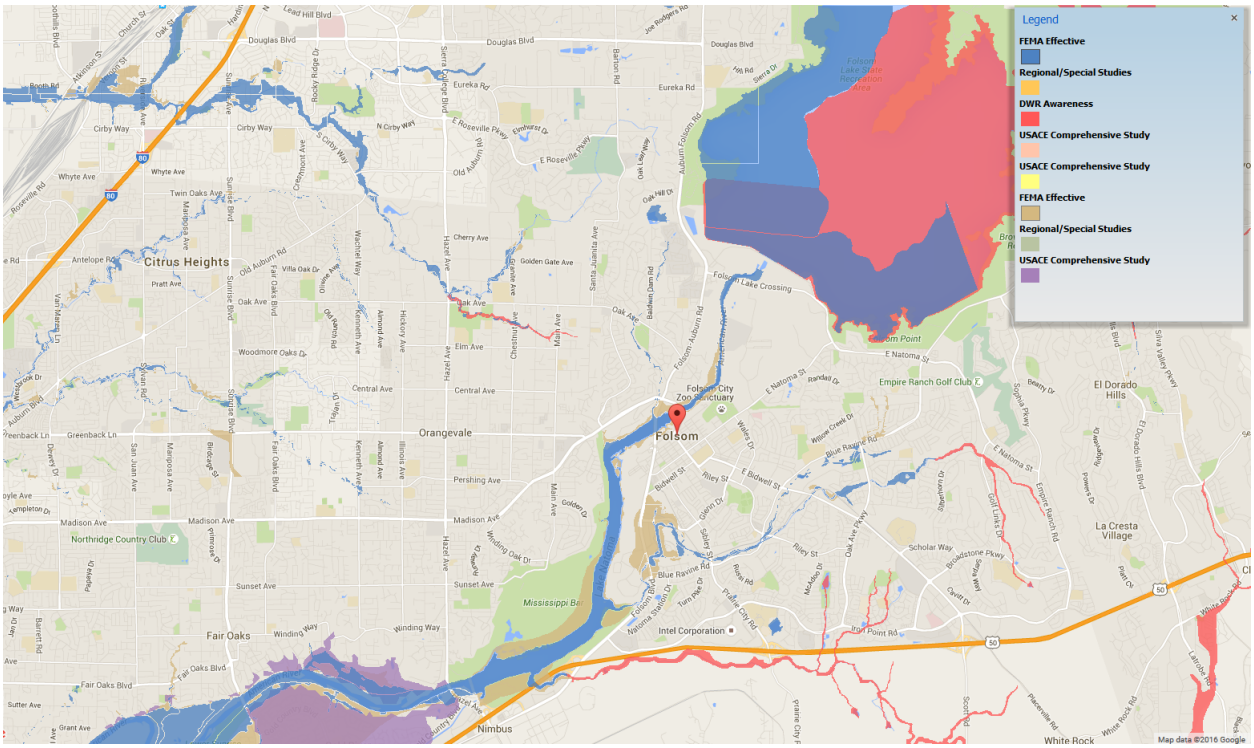
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Sacramento County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency, however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. The BAM map for Folsom is shown in Figure C-10.

Figure C-10 City of Folsom Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 100-Year, Orange – Local 100-Year (developed from local agencies), Red – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), Pink – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), Purple – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Natural Resources at Risk

Various natural resources (i.e. vegetation communities, special status animal species, special status plant species) would be at risk during a flood. Flooding conditions may wash out the above natural resources.

Historic and Cultural Resources at Risk

Two historic sites are located with the 100- and 200-year floodplain; Coloma Road at Nimbus Dam and the old Folsom Powerhouse.

Future Development

The City enforces the floodplain ordinance. If any development is to occur in the floodplain, it would have to conform to the elevation standards of the floodplain ordinance. No development is expected in the floodplain in the future.

Alder Creek is located in the Folsom Plan Area development. The City of Folsom is currently developing the 100-year floodplain for this portion of Alder Creek. Structures within the new development will not

encroach within the floodplain. Development that affects the floodplain boundaries will provide Conditional Letter of Map Revision (CLOMR) and/or Letter of Map Revision (LOMR) reports.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding and other issues caused by severe weather events, primarily heavy rains and thunderstorms, can often pose a risk to the community. Primary concerns include impacts to infrastructure that provides a means of ingress and egress throughout the community.

Past Occurrences

There are areas of localized flooding within the City. Most have been addressed with capital improvement projects and adjustments in maintenance activities.

Vulnerability to Localized Flooding

Table C-27 identifies known and past occurrences of such areas and the associated problems encountered. This list is an initial inventory of key problem areas and is not intended to be a complete inventory of all problems and locations associated with severe weather events and localized flooding in the City of Folsom.

Table C-27 City of Folsom's Road List of Localized Flooding Problem Areas

Road Name	Flooding	High Water/Creek Crossing	Flooded by Runoff from Neighboring Property	Damaged/ Insufficient Storm Drain System
Blue Ravine/Folsom Blvd.	X			X
Humbug Creek Drive		X		
Orchard Terrace Court			X	
N. American River Canyon Drive	X			X
Bayline Circle			X	
Pinegrove Way	X			X
Ruth Court	X		X	
Ballard Court		X		
Parkshore	X			X
Hollyann & Handford				X
Berma Road	X	X		
Bittercreek	X		X	X
Redevelopment Area				

Road Name	Flooding	High Water/Creek Crossing	Flooded by Runoff from Neighboring Property	Damaged/ Insufficient Storm Drain System
Rumsey Way	X			X
Duchow	X			X
Price	X			X
Coloma	X			X
Sibley Street	X			X
Wool Street	X			X
Glenn Drive & Lembi Drive	X		X	
Morman Street	X			X

Source: City of Folsom

Future Development

Future development in the City will add more impervious surfaces and need to drain those waters. The City's design standards will ensure future development transportation and drainage facilities are designed to prevent local flooding. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses.

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the City of Folsom. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past.

Past Occurrences

The storms in February 1986 caused the Folsom dam to exceed its design capacity. Heavy rains affected Sacramento County and the other areas of the American River drainage basin. Rainfalls of up to 29″ fell between February 11 and 20. The Folsom Dam did not fail, but Folsom Lake was 1.56 ft into surcharge storage, holding 18,200 acre-feet more than design capability. Dam improvements since 1986 have and will increase capacity of the dam.

Vulnerability to Severe Weather: Heavy Rain and Storms

Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees. Table C-27 presented above in the discussion of the flood hazard details those areas within the City that are most often affected during these heavy storm events. Heavy rains and storms can cause flooding from dam failure. Record heavy rains, in addition to causing localized flooding, could cause the dam to overtop as well, inundating Folsom.

Future Development

New critical facilities such as communications towers should be built to withstand hail damage, lightning, and heavy rains.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Major fires are generally categorized as either a conflagration or wildland/forestland. A conflagration may involve residential or commercial areas and spreads across both natural and constructed barriers. Wildland is associated with open range grasslands and into the foothills of a particular area. Because of development in rural areas adjacent to and within the Folsom community, the Wildland Urban Interface (WUI) fire is of increasing concern. The WUI fire can burn along the urban/rural interface resulting in major losses of property and structures.

A number of factors affect the behavior of wildland and interface fires, including terrain, weather, wind, fuels and seasons. It is well known that fire travels faster uphill than down and is more difficult to fight on steep slopes than on level ground. When weather is hot and the humidity is low, wildland fires can explode with intensity of rapid combustion. Even in the absence of strong winds, a fast-moving fire can generate its own updrafts, particularly in canyons, causing burning brands to be carried high in the air and drop a long distance ahead. This results in spot fires over a wide radius as the wind changes its direction.

The City of Folsom is not immune to numerous types of grass and brush fires and any one of them may accelerate into a large urban interface wildfire. Such a situation could lead to evacuation of large portions of the population and the potential for significant loss of personal property, structures and rangeland. The natural fuels available in the City vary greatly in the rate and intensity of burning. Fires in heavy brush and stands of trees burn with great intensity but more slowly than in dry grass and leaves. Dense fuels will propagate fire better than sparse fuels. The local fire season generally extends from June through late September or early October.

During extremely windy conditions, both small and large-scale fires will generate enough smoke to necessitate the closing of key transportation routes, including US Route 50. It may be necessary to close streets and/or re-route traffic to maintain traffic lanes and access for firefighting apparatus. Large parking

areas may be cordoned off for the staging of various types of resources needed during large-scale emergencies.

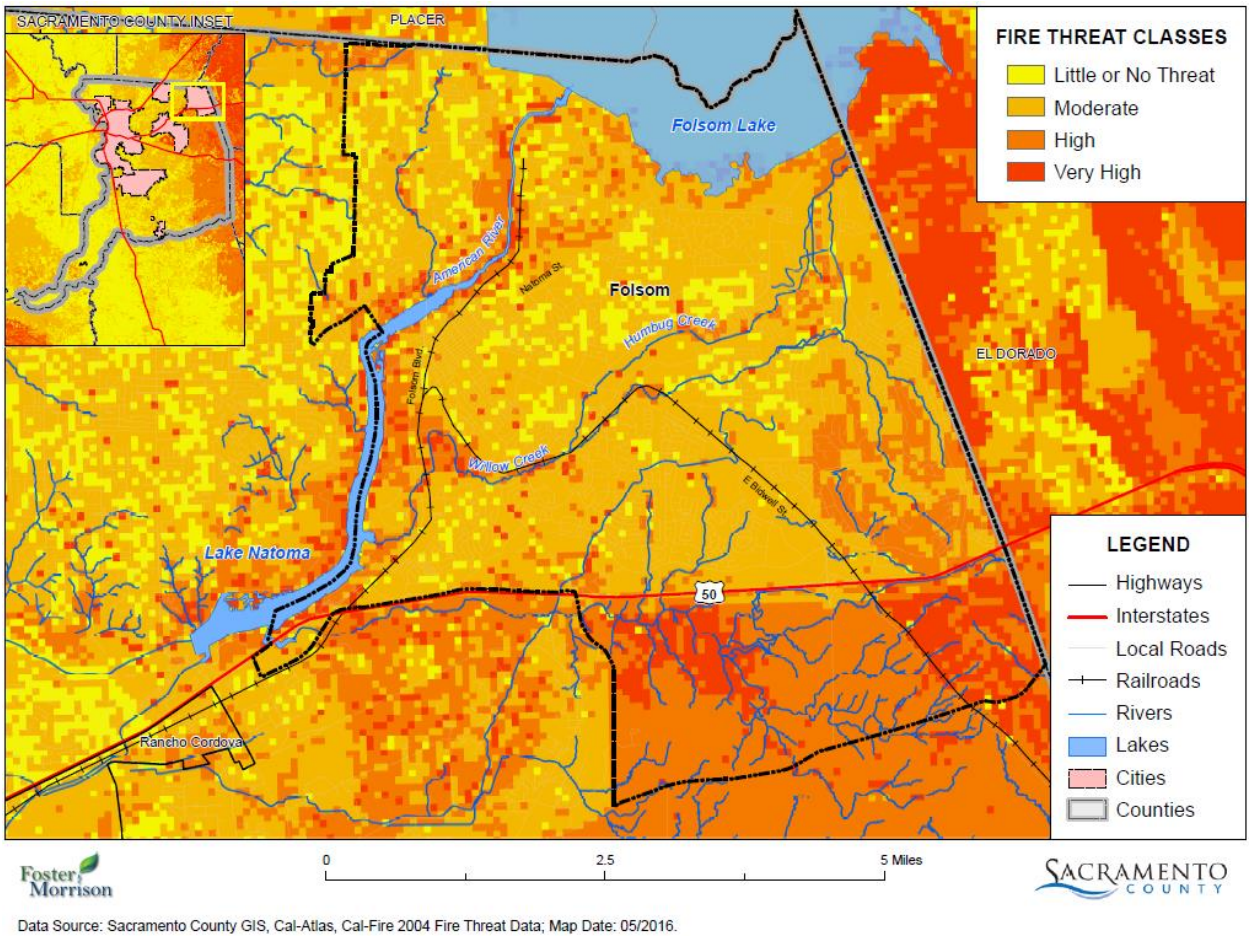
Past Occurrences

There is no history of wildfires near the City of Folsom. The closest occurrence being the King Fire in the City of Pollock Pines located in the neighboring El Dorado County

Vulnerability to Wildfire

Following the methodology described in Section 4.3.2 Vulnerability of Sacramento County to specific hazards, a wildfire map for the City of Folsom was created (see Figure C-11). Wildfire threat within the City ranges from moderate to very high.

Figure C-11 City of Folsom's Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

The City has many areas that are susceptible to small fires that could grow into some form and size of urban interface fire. These areas can be divided into four main areas: the American River/Lake Natoma corridor, the various parkways and easements, natural areas involving wetlands and dredger tailings, and open fields and rangelands.

American River/Lake Natoma Corridor

The American River flows from the base of Folsom Dam into the Lake Natoma Recreation area. The property adjacent to the river is owned by the State of California, maintained by the State of California Parks and Recreation Department. The area is mostly natural habitat accessed through limited roadways, a bicycle/horse trail and numerous footpaths. These means of ingress provide access to remote areas in which fires can begin and access for fire equipment is difficult.

The area upstream from the Rainbow Bridge is mostly rough and steep terrain with very limited access. This creates an opportunity for fires to grow at a rapid rate and gain momentum while continuing to burn towards the residential structures that are scattered about the edge of the beltway. The natural growth, type of construction, and roofing materials provide ample opportunity for fire to spread into residential areas. Negro Bar, Folsom Powerhouse, and Willow Creek Recreation areas are downstream of the bridge. At the west end of Negro Bar are bluffs that are 300 feet high in some locations.

Adjacent to the Negro Bar area is the bluff area on Greenback Lane and an area known as the Orangevale cut. Both of these locations have very steep terrain with dry, flashy, rapid burning fuels. They directly interface with residential and multi-family structures with wood shake roofs. These areas have occasional fires throughout the fire season and require continuous monitoring and aggressive fire suppression activities to prevent a catastrophic event from occurring.

Parkways & Easements

Throughout the City, there exist numerous un-maintained alleyways, easements, and rights-of-way. In many locations, these provide easy access to residential structures or other types of vegetation, which could increase the likelihood that a fire may rapidly spread beyond the capabilities of responding units. Areas of concern include the Hinkle Creek, Willow Creek, Humbug Creek and Blue Ravine Parkway beltways.

Natural Areas, Wetlands, and Dredger Tailings

Continuous development of the City has created many landlocked areas, mandatory wetland areas and the preservation of pre-existing dredger tailings. Areas of this nature tend to be surrounded by residential developments and are difficult to access. Their proximity to development provides an opportunity for ideal fire conditions to spread fire via flying brands and consumption of small stands of trees.

Open Fields and Rangelands

The east areas of Folsom provide the greatest opportunity for a large-scale fire to start and spread uncontrollably into developed areas or into the foothills of El Dorado Hills. This undeveloped area is considered a Local Response Area (LRA) because it is within the city limits. The land south of U.S. 50 is within the State Response Area (SRA) and a fire in this area, pushed by a southerly or westerly wind, could severely impact the City of Folsom. This LRA is also classified as a Mutual Threat Zone by the California Department of Forestry and Fire Protection, thereby requiring their fire response due to the potential of a major fire. The hilly, rocky terrain with its numerous rock outcroppings around developed areas and along the Sacramento/El Dorado County line makes it very difficult to contain a fire before it rapidly grows and threatens structures. This portion of the City is also where numerous transmission towers and repeater

antennas are located on the ridge tops. They can be both a source of ignition for a wildland fire and an exposure from a fire starting in lowlands.

Values at Risk

Analysis results for Folsom are shown in Table C-28, which summarizes total and improved parcel counts and their land and structure values by property use.

Table C-28 City of Folsom – Count and Value of Parcels by Property Use and Fire Threat Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Little or No Threat					
Care / Health	3	$3,020,797	3	$1,606,330	$4,627,127
Church / Welfare	3	$212,908	2	$493,333	$706,241
Industrial	4	$1,997,118	4	$3,270,741	$5,267,859
Miscellaneous	70	$61,745	0	$0	$61,745
Office	12	$4,606,007	11	$9,587,141	$14,193,148
Public / Utilities	58	$0	0	$0	$0
Recreational	1	$12,364	1	$21,597	$33,961
Residential	3,038	$320,096,776	3,000	$730,584,313	$1,050,681,089
Retail / Commercial	22	$10,893,723	19	$22,121,160	$33,014,883
Vacant	27	$5,003,878	1	$884	$5,004,762
Total	**3,238**	**$345,905,316**	**3,041**	**$767,685,499**	**$1,113,590,815**
Moderate					
Agricultural	2	$594,274	-	$0	$594,274
Care / Health	27	$24,190,163	23	$79,998,459	$104,188,622
Church / Welfare	29	$7,463,346	26	$43,580,327	$51,043,673
Industrial	30	$20,258,959	26	$56,321,087	$76,580,046
Miscellaneous	478	$559,290	1	$65,000	$624,290
Office	168	$119,882,386	154	$651,873,404	$771,755,790
Public / Utilities	278	$0	0	$0	$0
Recreational	15	$15,190,775	11	$37,181,492	$52,372,267
Residential	15,278	$1,774,490,202	14,991	$4,396,363,782	$6,170,853,984
Retail / Commercial	326	$269,962,341	312	$673,781,110	$943,743,451
Vacant	429	$103,430,629	13	$1,717,809	$105,148,438
Total	**17,060**	**$2,336,022,365**	**15,557**	**$5,940,882,470**	**$8,276,904,835**
High					

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Agricultural	12	$47,685,790	0	$0	$47,685,790
Care / Health	3	$3,361,702	1	$58,023,709	$61,385,411
Church / Welfare	1	$451,353	1	$877,638	$1,328,991
Industrial	5	$6,313,465	4	$37,768,146	$44,081,611
Miscellaneous	114	$13,525	0	$0	$13,525
Office	38	$24,144,272	34	$102,328,305	$126,472,577
Public / Utilities	66	$0	0	$0	$0
Recreational	1	$340,000	1	$1,660,000	$2,000,000
Residential	1,755	$238,711,540	1,594	$648,601,933	$887,313,473
Retail / Commercial	9	$6,526,215	9	$11,428,613	$17,954,828
Vacant	344	$97,530,881	4	$780,547	$98,311,428
Total	**2,348**	**$425,078,743**	**1,648**	**$861,468,891**	**$1,286,547,634**
Very High					
Agricultural	3	$8,650,036	0	$0	$8,650,036
Church / Welfare	1	$1,103,532	1	$5,738,017	$6,841,549
Miscellaneous	23	$1,078	0	$0	$1,078
Public / Utilities	22	$0	0	$0	$0
Residential	362	$42,762,172	345	$102,321,331	$145,083,503
Retail / Commercial	5	$2,248,870	5	$5,546,865	$7,795,735
Vacant	10	$12,284,327	0	$0	$12,284,327
Total	**426**	**$67,050,015**	**351**	**$113,606,213**	**$180,656,228**
Grand Total	**23,072**	**$3,174,056,439**	**20,597**	**$7,683,643,073**	**$10,857,699,512**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data, CAL FIRE

Population at Risk

The Fire Threat dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the threat zones were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction and unincorporated area. Results were tabulated by jurisdiction. According to this analysis, there is a total population of 44,187 residents of Folsom at risk to moderate or higher wildfire risk. This is shown in Table C-29.

Table C-29 City of Folsom – Count of Improved Residential Parcels and Population by Fire Threat Zone

Fire Threat Zone	Improved Residential Parcels	Population*
Little or No Threat	3,000	7,830
Moderate	14,991	39,127
High	1,594	4,160
Very High	345	900
Total	**19,930**	**52,017**

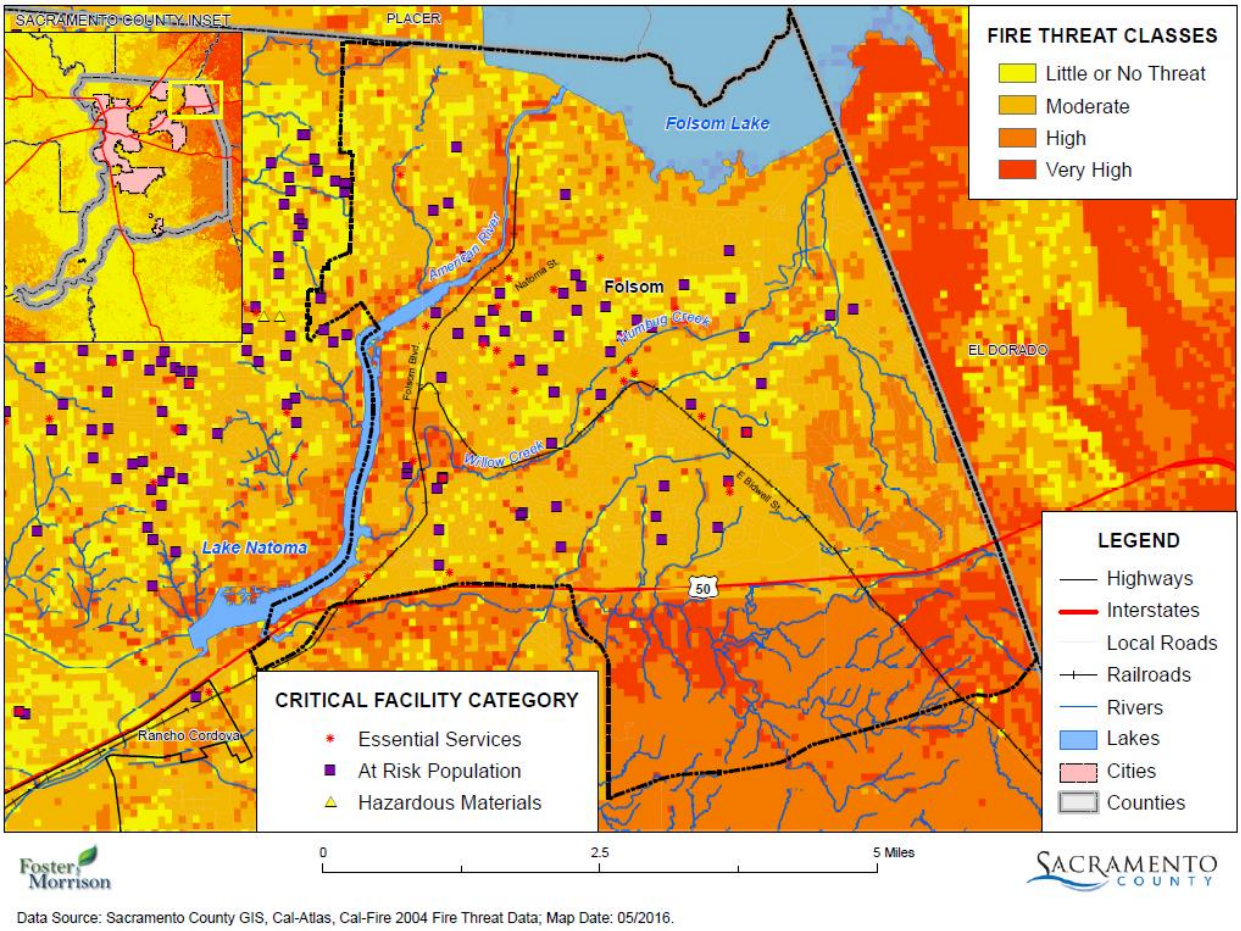
Source: Sacramento County 2015 Parcel/Assessor's Data, CAL FIRE

* Average household populations for Folsom (2.61) from the 2010 US Census were used

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect a fire threat zone provided by CAL FIRE, and if so, which zone it intersects. There are seven facilities in the moderate or higher fire threat zone in the City. These are shown in Figure C-12 and detailed in Table C-30. Details of critical facility definition, type, name and address and jurisdiction by fire threat zone are listed in Appendix E.

Figure C-12 City of Folsom – Critical Facilities in the Fire Threat Zone



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table C-30 City of Folsom – Critical Facilities in the Fire Threat Zone

Critical Facility Category	Facility Type	Facility Count
Little or No Threat		
Essential Services Facilities	Emergency Evacuation Shelter	1
	Government Facilities	1
	Light Rail Stop	2
	Police	1
	Total	**5**
At Risk Population Facilities	Adult Residential	1
	Day Care Center	2
	Hotel	1
	Public Continuation High School	1
	Public Elementary School	4
	Public Middle School	2

Critical Facility Category	Facility Type	Facility Count
	Residential Care/Elderly	3
	Total	**14**
Little or No Threat Total		**19**
Moderate		
Essential Services Facilities Total	Emergency Evacuation Shelter	7
	Fire Station	4
	General Acute Care Hospital	1
	Government Facilities	2
	Light Rail Stop	1
	Medical Health Facility	4
	Water Treatment Plant	1
	Total	**20**
At Risk Population Facilities	Charter School	1
	College/University	1
	Day Care Center	18
	Infant Center	2
	Prison	1
	Private Elementary School	6
	Private High School	1
	Public Elementary School	5
	Residential Care/Elderly	13
	Total	**48**
Moderate Total		**68**
High		
Essential Services Facilities	General Acute Care Hospital	1
	Medical Health Facility	1
	Total	**2**
At Risk Population Facilities	Public High School	1
	Total	**1**
High Total		**3**
Very High		
Essential Services Facilities	Emergency Evacuation Shelter	1
	Total	**1**
At Risk Population Facilities	Residential Care/Elderly	1
	Total	**1**
Very High	**Total**	**2**

Critical Facility Category	Facility Type	Facility Count
Grand Total		**92**

Source: CAL FIRE, Sacramento County GIS

Natural Resources at Risk

The American River/Lake Natoma corridor, and the City's parkways, easements, natural areas, wetlands, and dredger tailings areas contains various types of vegetation, plant, and animal species that would be susceptible to wildfire risk.

Historic and Cultural Resources at Risk

Along the American River/Lake Natoma Corridor are multiple historic resources that are susceptible to wildfire. These include: Chung Wah Cemetery, Young Wo Cemetery, Coloma Road at Nimbus Dam, Folsom Powerhouse, and Negro Bar.

The Chinese Diggings site is located in a natural area with some areas of dredger tailings. Due to the amount of vegetation, the site is susceptible to wildfires.

Future Development

Development may occur in the moderate or higher wildfire threat areas; however, City ordinances for building in these areas are enforced. As population increases, specifically in the Folsom Plan Area, the vulnerability to wildfire will increase due to the presence of parkways and easements. Also, the Folsom Plan Area will be surrounded by open fields and rangelands.

C.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

C.6.1. Regulatory Mitigation Capabilities

Table C-31 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Folsom.

Table C-31 City of Folsom's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y 1998	General Plan map is available on the City's website. The General Plan document is available for viewing or purchase at the City's Planning Department. Economic Development and Transportation is addressed in the General Plan.
Capital Improvements Plan	Y	The fiscal Operating Budget and Capital Improvement Plan is available on the City's website.
Economic Development Plan	Y	
Local Emergency Operations Plan	Y	
Continuity of Operations Plan		
Transportation Plan		
Stormwater Management Plan/Program	Y	
Engineering Studies for Streams		
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y	Open Space Mitigation Plan – Covers the Folsom Plan Area and include Oak Tree Mitigation Plan and Wildfire Protection Plan.
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: 2013
Building Code Effectiveness Grading Schedule (BCEGS) Score	Y	Score: 2
Fire department ISO rating:	Y	Rating: 3
Site plan review requirements	Y	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	
Subdivision ordinance	Y	
Floodplain ordinance	Y	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Weed/Brush Hazard Abatement/Fuel Modification (FMC 8.36 and 8.37) Stormwater Management and Discharge Control Ordinance (FMC 8.70) Hillside Development Standards Ordinance (FMC 14.33)
Flood insurance rate maps	Y	
Elevation Certificates	Y	
Acquisition of land for open space and public recreation uses		

Erosion or sediment control program	Y
Other	
How can these capabilities be expanded and improved to reduce risk?	

Source: City of Folsom

General Plan

Folsom's General Plan is a long term policy guide for the physical, economic, and environmental growth of the City. It is comprised of goals, policies, and implementation programs which are based on an assessment of current and future needs and available resources.

Folsom's General Plan is strongly oriented toward physical development of land uses, a circulation network, and supporting facilities and services. Because of this, the General Plan document is the principle tool for City use in evaluating public and private building projects and municipal service improvements.

Emergency Operations Plan

The City of Folsom Emergency Operations Plan (EOP) addresses the planned response for the City of Folsom to emergencies associated with disasters, technological incidents, or other dangerous conditions created by either man or nature. It provides an overview of operational concepts, identifies components of the City emergency management organization, and describes the overall responsibilities of local, state, and federal entities.

Ordinances

The City of Folsom has ordinances related to mitigation. Specific ordinances directly related to mitigation from the City of Folsom municipal code are:

Zoning Code (Title 17)

There is adopted a zoning enabling plan for the City, which constitutes a precise plan based upon the adopted master plan of the City. The plan is adopted to provide reasonable protective regulations designed to promote and protect the health, safety, peace, morals, comfort, convenience and general welfare, and:

- To protect the established character and the social and economic stability of agricultural, residential, commercial, industrial and other types of improved areas; and
- To assist in providing a definite comprehensive plan for sound and orderly development, and to guide and regulate such development in accordance with the master plan and the objectives and standards set forth therein

The zoning plan consists of the establishment of various districts within some, all, or none of which shall it be lawful, and within some, all or none of which it shall be unlawful to erect, construct, alter, move, locate or maintain certain buildings or to carry on certain trades or occupations or conduct certain uses of land or of buildings; within which the height and bulk of future buildings shall be limited; within which certain open spaces shall be required about future buildings and consisting further of appropriate additional

regulations to be enforced in such districts. The zoning plan is intended to apply to all private, public, quasi-public, institutional, and public utility properties and all other lands, buildings and structures within the incorporated area of the City.

Subdivision Ordinance (Title 16)

It is the purpose of this title to regulate and control the division of land within the City and to supplement the provisions of the Subdivision Map Act concerning the design, improvement and survey data of subdivisions, the form and content of all required maps provided by the Subdivision Map Act, and the procedure to be followed in securing the official approval of the City regarding the maps. To accomplish this purpose, the regulations contained in this title are determined to be necessary to preserve the public health, safety and general welfare; to promote orderly growth and development and to promote open space, conservation, protection and proper use of land; and to ensure provision for adequate traffic circulation, utilities and other services in the City.

Building Code (Chapter 14.02)

The chief building official of the City is designated to be the authority having jurisdiction of the Folsom construction codes. The California Building Code, 2010 Edition, based on the 2009 International Building Code, including Appendix Chapters H, J, and K, published as Parts 1 and 2, Title 24, C.C.R., published by the International Code Council, is adopted and made part of this title as though fully set forth herein to provide technical requirements and the procedures for administration and enforcement of the provisions of the Folsom construction codes. The purpose of the Folsom Building Code is to provide minimum standards to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, installation, quality of materials, use and occupancy, location and maintenance of all buildings and structures within this jurisdiction, and certain equipment specifically regulated herein, and to provide procedures for administration and enforcement of the provisions of the Folsom construction codes and to adopt and enforce rules and regulations supplemental to this code as may be deemed necessary to clarify the application of the provisions of this code.

Floodplain Ordinance (Chapter 14.323)

The flood hazard areas of the City are subject to periodic inundation which may result in losses of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare. These flood losses are caused by the cumulative effect of obstructions in areas of special flood hazards which increase flood heights and velocities and, when inadequately anchored, damage uses in other areas. Uses that are inadequately flood proofed, elevated, or otherwise protected from flood damage also contribute to the flood loss. It is the purpose of this chapter to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood-control projects;
- Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

- Minimize prolonged business interruptions;
- Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- Help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
- Insure that potential buyers are notified that property is in an area of special flood hazard; and
- Insure that those who occupy the areas of special flood hazard assume responsibility for their actions.

In order to accomplish its purposes, this chapter includes methods and provisions for:

- Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Controlling filling, grading, dredging, and other development which may increase flood damage; and
- Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas

In all areas of special flood hazards the following standards are required:

- Anchoring.
  - ✓ All new construction and substantial improvements shall be adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
  - ✓ All manufactured homes shall meet the anchoring standards of Section 14.32.050(D).

- Construction Materials and Methods. All new construction and substantial improvements shall be constructed:
  - ✓ With materials and utility equipment resistant to flood damage;
  - ✓ Using methods and practices that minimize flood damage;
  - ✓ With electrical, heating, ventilation, plumbing and air-conditioning equipment and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;
  - ✓ For all new construction and substantial improvements, fully enclosed areas below the lowest floor that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit to floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria: A minimum of 2 openings having total net area of not less than 1 square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one 1 foot above grade. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

- Elevation and flood proofing.
  - ✓ Residential construction, new or substantial improvement, shall have the lowest floor, including basement, elevated at least 2 feet above the base flood elevation as determined by this community.

Upon completion of the structure, the elevation of the lowest floor including basement shall be certified by a California registered professional engineer or land surveyor and verified by the chief building official for the City to be properly elevated. Such certification and verification shall be provided to the floodplain administrator.

- ✓ Nonresidential construction, new or substantial improvements, shall either meet the standards in subsection (A)(3)(a) of this section or together with attendant utility and sanitary facilities:
  - Be floodproofed below the elevation recommended in subsection (A)(3)(a) of this section so that the structure is watertight with walls substantially impermeable to the passage of water;
  - Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
  - Be certified by a California registered professional engineer or architect that standards of this subsection (A)(3)(b) are satisfied. Such certification shall be provided to the floodplain administrator.
- ✓ All new construction and substantial improvement with fully enclosed areas below the lowest flow (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding, shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of flood-water. Designs for meeting this requirement must meet or exceed the following minimum criteria:
  - Be certified by a California registered professional engineer or architect; or
  - Have a minimum of 2 openings having a total net area of not less than 1 square inch for every square foot of enclosed area subject to flooding. The bottom of all openings shall be no higher than 1 foot above grade. Openings may be equipped with screens, louvers, valves or other coverings or devices provided that they permit the automatic entry and exit of floodwater.
- ✓ Manufactured homes shall meet the above standards and also the standards for manufactured home parks or subdivisions. (See subsection D of this section).

- ➢ Standards For Utilities.
  - ✓ All new and replacement water supply and sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from systems into floodwaters;
  - ✓ On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

- ➢ Standards For Subdivisions.
  - ✓ All preliminary subdivision proposals shall identify the flood hazard area and the elevation of the base flood.
  - ✓ All final subdivision plans will provide the elevation of proposed structure(s) and pad(s). If the site is filled above the base flood, the final pad elevation shall be certified by a California registered professional engineer or land surveyor and provided to the floodplain administrator.
  - ✓ All subdivision proposals shall be consistent with the need to minimize flood damage.
  - ✓ All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.
  - ✓ All subdivisions shall provide adequate drainage to reduce exposure to flood damage.

- ➢ Standards for Manufactured Homes.

- ✓ All manufactured homes that are placed or substantially improved, within Zones A and A1-A30 on the community's flood insurance rate maps, on sites located outside of a manufactured home park or subdivision, in a new manufactured home park or subdivision, in an expansion to an existing manufactured home park or subdivision or in an existing manufactured home park or subdivision on a site upon which a manufactured home has incurred "substantial damage" as a result of a flood, shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated 2 feet above the base flood elevation and securely fastened to an adequately anchored foundation system to resist flotation collapse and lateral movement.
- ✓ All manufactured homes that are placed or substantially improved on sites in an existing manufactured home park or subdivision within Zones A or A1-A30 on the communities flood insurance rate maps that are not subject to provisions of Section 14.32.050(D)(1) will be securely fastened to an adequately anchored foundation system to resist flotation collapse, and lateral movement and be elevated so that either the lower floor of the manufactured home is 2 feet above the base flood elevation or the manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than 36 inches in height above grade.

- ➢ Standards for Recreational Vehicles. All recreational vehicles placed on sites within Zones A or A1-30 on the communities flood insurance rate maps will either be on the site for fewer than 180 consecutive days, and be fully licensed and ready for highway use (a recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick disconnect type utilities and security devices, and has no permanently attached additions) or meets the permit requirements of Section 14.32.040 of this chapter and the elevation and anchoring requirements for manufactured homes in Section 14.32.050(D)(1) of this chapter.

- ➢ Floodways. Located within areas of special flood hazard established in subsection B of Section 14.32.030 are areas designated as floodways. Since the floodway is an extremely hazardous area due to the velocity of floodwaters which carry debris, potential projectiles, and erosion potential, the following provisions apply:
  - ✓ Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer or architect is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge;
  - ✓ If subsection (F)(1) of this section is satisfied, all new construction, substantial improvement and other proposed new development shall comply with all other applicable flood hazard reduction provisions of Section 14.32.050, Provisions for flood hazard reduction;
  - ✓ If no floodway is identified, then a setback of 20 feet from the bank(s) of the watercourse will be established, where encroachment will be prohibited.

Fire Code (Section 8.36)

This chapter adopts the 2009 Edition of the International Fire Code with amendments adopted by the California Building Standards Commission and published as the 2010 Edition of the California Fire Code, together with Appendices B, C, H, I, J and K, and all other chapters, supplements and errata with the express purpose of prescribing regulations governing the safeguarding of life and property from fire and explosion

hazards arising from the storage, handling and use of hazardous substances, materials and devices, and from conditions hazardous to life or property in the occupancy of buildings and premises.

Grading and Erosion Control (Chapter 14.29)

This chapter establishes standards for the preparation of sites and construction activities to protect the health, safety and general welfare of those working or living on or near the site by protecting against unwarranted or unsafe grading, drainage works or other aspects of site development as follows:

- To establish standards and procedures for grading and excavation so as to minimize hazards to life and limb, protect against erosion, maintain the natural environment, and protect the safety, use and stability of public rights-of-way and drain-age channels;
- To assure that projects approved under this chapter will be free from harmful effects of runoff, including inundation and erosion, and that neighboring and downstream properties will be protected from drainage problems resulting from new development;
- To assure proper restoration of vegetation and soil systems disturbed by grading or fill activities authorized under this chapter. It is intended through this chapter to maintain an attractive and healthy landscape and to control against dust and erosion and their consequent effects on soil structure and water quality.

C.6.2. Administrative/Technical Mitigation Capabilities

Table C-32 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Folsom.

Table C-32 City of Folsom's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	
Mitigation Planning Committee		
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	There are various maintenance programs in place to reduce risks.
Mutual aid agreements	Y	California Master Mutual Aid Agreement, Law Enforcement Mutual Aid Agreement, Fire and Rescue Mutual Aid Agreement, Public Works Mutual Aid Agreement, County of Sacramento Operational Area Council, U.S. Army Corps of Engineers Rehabilitation Inspection PL84-99 Program, NFIP, County of Sacramento OES, County of Sacramento EMD.
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.

Floodplain Administrator	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
Emergency Manager	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
Community Planner (Community Development/Public Works Director)	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
Civil Engineer	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
GIS Coordinator	Y FT	Staff is adequate to enforce regulations. Staff is trained on hazards and mitigations. There is coordination between agencies and staff and it is effective.
Other		
Technical		**Comments**
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Reverse 911/City-owned AM station/SMS messaging (Nixle)
Hazard data and information		
Grant writing	Y	
Hazus analysis		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: City of Folsom

C.6.3. Fiscal Mitigation Capabilities

Table C-33 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table C-33 City of Folsom's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	There are funding resources that have been used in the past and can be used in the future.
Authority to levy taxes for specific purposes	Y	There are funding resources that have been used in the past and can be used in the future.
Fees for water, sewer, gas, or electric services	Y	There are funding resources that have been used in the past and can be used in the future.
Impact fees for new development	Y	There are funding resources that have been used in the past and can be used in the future.

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	Y	
Community Development Block Grant	Y	There are funding resources that have been used in the past and can be used in the future.
Other federal funding programs	Y	FEMA, U.S. Army Corps of Engineers Rehabilitation Inspection PL84-99 Program
State funding programs	Y	Cal OES
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: City of Folsom

C.6.4. Mitigation Education, Outreach, and Partnerships

Table C-34 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information. More information can be found below the table.

Table C-34 City of Folsom's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	City of Folsom Community Emergency Response Team.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Ongoing public outreach material regarding water conservation, household hazardous waste pickup, emergency preparedness, fire safety,
Natural disaster or safety related school programs	Y	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	Y	Frequent training with regional partners such as SMUD, PG&E, County of Operational Emergency Services, Sacramento County Water Agency, and Department of Homeland Security.
Other		

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
How can these capabilities be expanded and improved to reduce risk?		

C.6.5. Other Mitigation Efforts

The City of Folsom maintains many annual programs to mitigate against natural hazards:

- Fuel modification program (fire management for open space)
- Annual weed hazard abatement program
- Creek/outfall vegetation maintenance
- Public education/outreach for extreme weather
- Routine storm drain operations and maintenance
- Wildfire prevention outreach
- Wildfire Hazard Identification
- Detention Basin Maintenance and Operation
- Stream and Creek Routine Maintenance Agreement with California Department of Fish and Wildlife

C.7 Mitigation Strategy

C.7.1. Mitigation Goals and Objectives

The City of Folsom adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

C.7.2. NFIP Mitigation Strategy

As a participant in the Regular Phase of the National Flood Insurance Program (NFIP), the City of Folsom has administered floodplain management regulations that meet the minimum requirements of the NFIP. In our compliance with the NFIP, the City's management program objective is to protect people and property within the City of Folsom. The City of Folsom will continue to comply with the requirements of the NFIP in the future.

The City's regulatory activities apply to existing and new development areas of the City; implementing flood protection measures for existing structures and maintaining drainage systems. The goal of our program is to enhance public safety, and reduce impacts and loses while protecting the environment.

The City of Folsom Community Development Department provides public outreach activities which include map information services, public awareness, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current and accurate flood mapping. Information about our stormwater management program and up-to-date information related to the maintenance of our drainage system may be found through our Public Works Department.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Folsom will evaluate the benefits that joining the CRS may have on our community.

More information about the floodplain administration in the City of Folsom can be found in Table C-35.

Table C-35 City of Folsom Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	293 $119,594 $94,778,400
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	14 $403,345.45 1
How many structures are exposed to flood risk within the community?	8 (1%) 122 (0.2%)
Describe any areas of flood risk with limited NFIP policy coverage	None
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	No
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review, GIS, education or outreach, inspections, engineering capability, Storm Drainage and Flood Control Management Program
What are the barriers to running an effective NFIP program in the community, if any?	None
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	
Is a CAV or CAC scheduled or needed?	
Regulation	
When did the community enter the NFIP?	January 6,1982
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes, General Plan and Floodplain Policy strongly discourages building in the floodplain, unless it can be mitigated

NFIP Topic	Comments
Provide an explanation of the permitting process.	Plans are reviewed to determine flood zone information
Community Rating System	
Does the community participate in CRS?	No
What is the community's CRS Class Ranking?	N/A
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

C.7.3. Mitigation Actions

The planning team for the City of Folsom identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: All hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: City of Folsom Planning Department

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Stormwater Basin Maintenance and Operation Project

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The detention basins within the City have significant natural growth, causing the design capacities to decrease. A regular maintenance and operational schedule was necessary to ensure the field conditions of each detention basin is consistent with the design capacities.

Project Description: Rehabilitation of 22 City-maintained storm drainage detention basins throughout the City of Folsom.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department

Responsible Office/Partners: Public Works Department

Project Priority: Medium

Cost Estimate: $1.05 Million

Benefits (Losses Avoided): Potential losses avoided including residential, commercial, and public infrastructures.

Potential Funding: Fund is provided by the General Fund until a stormwater utility fee is adopted.

Timeline: Ongoing – funding constrained.

Action 3. Alder Creek Watershed Council

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: In 2010 the City of Folsom and the Alder Creek Watershed Stakeholders completed the Alder Creek Watershed Management Action Plan. A recommended action item within the Plan is to establish a watershed stewardship group and coordinator position. Currently the majority of the watershed is undeveloped with development plans underway. A regional watershed council is needed to bring together resources for comprehensive planning and decision making to ensure implementation of the Plan. Funding is needed to establish the Watershed Council and Coordinator position.

Project Description: A regional watershed council for comprehensive planning and decision making to ensure implementation of the Alder Creek Watershed Management Action Plan.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: City of Folsom/Public Works and Sacramento County

Project Priority: Medium

Cost Estimate: $100,000

Benefits (Losses Avoided): Life safety; reduction of property loss, improved planning

Potential Funding: Grants, local government, landowners

Timeline: Ongoing

Action 4. Drainage System Maintenance Tax Assessment

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Folsom does not have a dedicated stormwater utility to fund operation and maintenance of the storm drainage system or implementation of its Stormwater Quality Program. Funds are needed for maintenance of the drainage system including, pipes, structures, detention basins and creeks/streams and water quality protection. Due to current California Law a ballot measure is required to assess taxes for a stormwater utility. In 2006 the City completed a Funding Feasibility Study; next steps include an opinion research and survey, fee development, ballot measure development and fee implementation.

Project Description: Implementation of a dedicated stormwater utility to fund operation and maintenance of the storm drainage system.

Other Alternatives: Continue an underfunded program and/or reduce services.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department Administration.

Responsible Office/Partners: Folsom Public Works/Utilities Department

Project Priority: High

Cost Estimate: $100,000

Benefits (Losses Avoided): Improved maintenance, increase reliability, reduction of property loss

Potential Funding: City of Folsom budget

Timeline: Ongoing

Action 5. Floodplain Mapping

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Current floodplain maps for the Humbug and Willow Creek watersheds do not reflect as built conditions for structures built within the floodplain. As built surveys are needed to accurately define the base flood elevations and map the limits of the current floodplain within each watershed.

Project Description: Complete as built surveys for structures built within the floodplain such as creek crossings. Update floodplain maps for the Humbug/Willow Creek Watersheds. Develop new floodplain maps for the Alder Creek and Hinkle Creek Watersheds.

Other Alternatives: Utilize the current FEMA mapping effort.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Continuation of floodplain mapping project that was suspended a few years ago due to funding issues.

Responsible Office/Partners: Folsom Community Development Department

Project Priority: High

Cost Estimate: $200,000

Benefits (Losses Avoided): Life Safety; Reduction of Property Loss, Improved Planning

Potential Funding: City of Folsom budget, grants

Timeline: Ongoing

Action 6. Redevelopment Area Drainage Improvements

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: In 2005 the City completed a Drainage Master Plan for its Redevelopment Area. The plan identifies nine drainage CIP‘s. The City has constructed one of the CIP‘s; funding is needed to construct the remaining eight drainage improvement projects.

Project Description: Capital Improvement Drainage Projects.

Other Alternatives: Establish an assessment district to obtain funding.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works CIP Program.

Responsible Office/Partners: Folsom Public Works Department

Project Priority: Medium

Cost Estimate: $8,000,000

Benefits (Losses Avoided): Life Safety; Reduction of Property Loss

Potential Funding: Redevelopment Agency, pending status. Establish an assessment district.

Timeline: Ongoing

Action 7. Stormwater Basin Maintenance and Operation Project

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The detention basins within the City have significant natural growth, causing the design capacities to decrease. A regular maintenance and operational schedule was necessary to ensure the field conditions of each detention basin is consistent with the design capacities.

Project Description: Rehabilitation of 22 City-maintained storm drainage detention basins throughout the City of Folsom.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department

Responsible Office/Partners: Public Works Department

Project Priority: Medium

Cost Estimate: $1.05 Million

Benefits (Losses Avoided): Potential losses avoided including residential, commercial, and public infrastructures.

Potential Funding: Fund is provided by the General Fund until a stormwater utility fee is adopted.

Timeline: Ongoing – funding constrained.

Action 8. Heating and Cooling Centers

Hazards Addressed: Life safety to vulnerable populations caused by severe weather, and temperature extremes.

Goals Addressed: 1, 2, 3

Issue/Background: Older adults and special needs populations are particularly vulnerable to extremes of temperature that are common throughout the Sacramento Valley. Extreme temperatures stress existing utility infrastructure causing outages that impact those populations to a higher degree.

Project Description: This project would focus on identifying locations that could be used for heating and cooling centers during severe weather. These locations would require backup power supplies in order to function during outages.

Other Alternatives: No local City provided facilities and would rely on non-governmental support or defer to County.

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: Folsom Fire Department

Project Priority: High

Cost Estimate: No cost to approximately $200,000 per identified location if an existing building requires the installation of emergency generator(s)

Benefits (Losses Avoided): Reduction of the life hazard to populations at risk during extreme weather events, which includes the very young, very old, medically fragile, cognitively-impaired, physically-impaired, and other special needs groups.

Potential Funding: Fund-raising, grant funds, public/private donations

Timeline: Ongoing

Action 9. Public Education/Outreach Extreme Weather

Hazards Addressed: Life safety to vulnerable populations caused by severe weather, and temperature extremes.

Goals Addressed: 1, 2, 3

Issue/Background: Older adults and special needs populations are particularly vulnerable to extremes of temperature that are common throughout the Sacramento Valley. Extreme temperatures stress existing utility infrastructure causing outages that impact those populations to a higher degree.

Project Description: This project would focus on preparedness and notification actions to reach out to those groups prior to and during extreme weather events.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: Folsom Fire Department

Project Priority: Medium

Cost Estimate: $15,000/yr for materials and technology for notification

Benefits (Losses Avoided): Reduction of the life hazard to populations at risk during extreme weather events, which includes the very young, very old, medically fragile, cognitively-impaired, physically-impaired, and other special needs groups.

Potential Funding: Fund-raising, grant funds, public/private donations

Timeline: Ongoing

Action 10. Weed Abatement Program

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3

Issue/Background: The primary function of this program is to reduce the danger of fires within the City by proactively establishing defensible space and to reduce / remove combustible materials on properties.

Project Description: The City of Folsom requires property owners to clear their property of all dry grass, weeds, dead trees, and noxious vegetation or rubbish that may constitute a fire hazard. The Fire Department is authorized to abate any potential fire hazard that has not been addressed by June 1, 2016 at the owner's expense. The Fire Department will conduct a second survey of your property to ensure the fire hazard has been abated on or after June 1, 2016.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Folsom Fire Department

Responsible Office/Partners: City of Folsom Fire Department

Project Priority: Medium

Cost Estimate: $2.2 Million

Benefits (Losses Avoided): Potential losses avoided including residential, commercial, and public infrastructures.

Potential Funding: Fund is provided by the General Fund with some sources from programming revenue, and State and Federal grants.

Timeline: Ongoing

Action 11. Arson Prevention and Control Outreach

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Many areas within the City of Folsom lie within a wildland-urban interface exposing them to a high risk of wildfire. Implementing an aggressive arson awareness, prevention, and control program can mitigate much of the wildfire risk.

Project Description: Arson prevention and control program aimed at mitigating wildfire hazards and reducing or preventing exposure of citizens, public agencies, private property owners and businesses to natural hazards.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Fire and Police Departments will form a joint task force to prevent and control the risk of arson-caused wildfire.

Responsible Office/Partners: Folsom Fire Department

Project Priority: Medium

Cost Estimate: Dependent on scope of project: $10,000 to $50,000/yr

Benefits (Losses Avoided): Life safety, reduction of property loss

Potential Funding: City of Folsom budget, private donation, grants

Timeline: Ongoing

Action 12. Fuel Reduction and Modification

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: The expense of removing and/or modifying materials which create a wildfire hazard can often be cost prohibitive for both private and public property owners. Encouraging joint efforts such as

volunteer cleanup days and chipper programs can reduce the cost to anyone stakeholder and facilitate mitigation efforts

Project Description: Remove and/or modify materials which create a wildfire hazard.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Community Wildfire Protection Plan through the Fire Safe Council.

Responsible Office/Partners: Folsom Fire Department and Fire Safe Council

Project Priority: High

Cost Estimate: Up to $75,000 per year

Benefits (Losses Avoided): Life safety, reduction of property loss

Potential Funding: Fund raising, private donation, grant funding

Timeline: Ongoing

Action 13. Wildfire Hazard Identification

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Land ownership and maintenance responsibilities in the City of Folsom are complicated due in part to the presence of multiple public agencies including the US Bureau of Reclamation, US Bureau of Land Management, California State Parks, and California Department of Corrections. Mitigation projects, even by private land owners, often require the review and approval of one if not all of these entities often resulting in the delay if not cancellation of the project.

Project Description: Increase communication, coordination and collaboration between private property owners and city, state, and federal agencies to address the wildfire risks and existing mitigation measures.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Fire Department and Folsom Fire Safe Council

Responsible Office/Partners: Folsom Fire Department, Community Development

Project Priority: Medium

Cost Estimate: Staff time

Benefits (Losses Avoided): Life safety, reduction of property loss

Potential Funding: Existing budget

Timeline: Ongoing

Action 14. Ignition Resistant Building Construction Upgrades

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: The expense of retrofitting existing building with ignition resistant construction in order to mitigate the effects of ember storms or direct flame impingement during a wildfire can often be cost prohibitive for private property owners. Developing a plan to identify buildings and risk and working with property owners find funding sources can reduce facilitate mitigation efforts.

Project Description: Facilitate private and public agency partnerships to upgrade/retrofit buildings in high fire hazard areas using ignition resistant building construction methods.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Folsom Community Development Dept.

Responsible Office/Partners: City of Folsom Community Development Dept.

Project Priority: Medium

Cost Estimate: $500,000 to $2,000,000 (materials & labor)

Benefits (Losses Avoided): Life safety, reduction of property loss

Potential Funding: Fund raising, private donation, grant funding

Timeline: Ongoing

Action 15. Wildfire Prevention Outreach

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Many areas within the City of Folsom lie within a wildland-urban interface exposing them to a high risk of wildfire. Educating the public as to the risk and methods of reducing the exposure is a prime component in any mitigation efforts.

Project Description: Public education

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Fire Department and Folsom Fire Safe Council currently conduct home evaluations and education programs.

Responsible Office/Partners: Folsom Fire Department

Project Priority: High

Cost Estimate: Cost of purchase and reproduction of printed materials; up to $15,000/year.

Benefits (Losses Avoided): Life Safety, Reduction of Property Loss

Potential Funding: Fire Department budget, private donation, grants

Timeline: Ongoing

Annex D City of Galt

D.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Galt, a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to the City of Galt, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this community.

D.2 Planning Process

As described above, the City of Galt followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC) and Steering Committee, the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table D-1. Additional details on plan participation and City representatives are included in Appendix A.

Table D-1 City of Galt Planning Team

Name	Position/Title	How Participated
Bill Forrest	Public Works/Senior Civil Engineer	Attended Plan preparation meetings. Annex preparer.
Chris Erias	Interim Community Development Director	Assisted in Annex preparation
Amie Mendes	City Manager Office, Economic Development Manager	Assisted in Annex preparation

D.2.1. Coordination with Other Community Planning Efforts

Coordination with other community planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the City integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table D-2. It should be noted that the City adopted its General Plan in 2009. When it is next updated, the LHMP will be incorporated into the Safety Element of the General Plan.

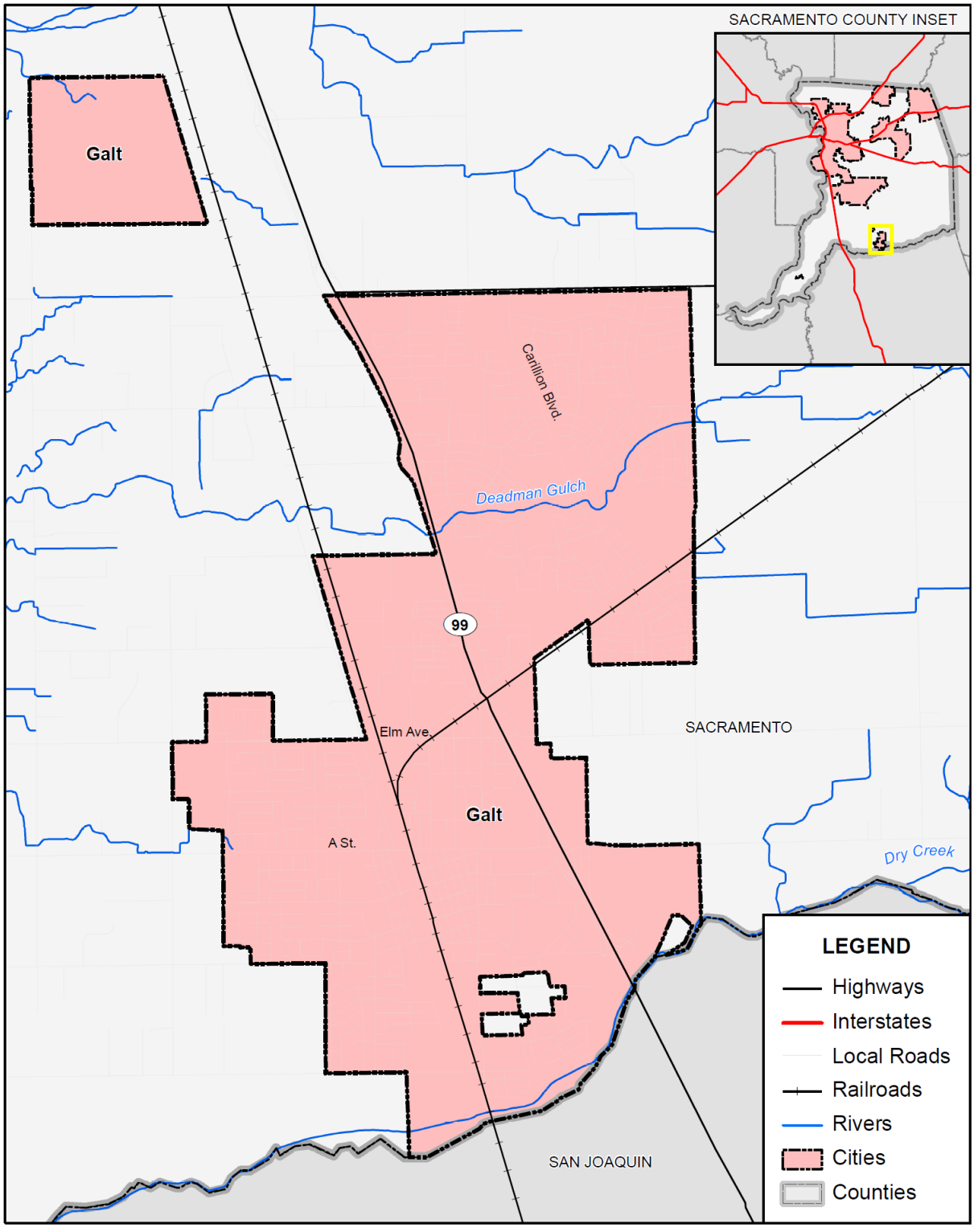
Table D-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
City of Galt Capital Improvement Program	Certain Plan mitigation measures that could be defined as a capital project

D.3 Community Profile

The community profile for the City of Galt is detailed in the following sections. Figure D-1 displays a map and the location of the City of Galt within Sacramento County.

Figure D-1 City of Galt



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

D.3.1. Geography and Climate

Galt is located on State Route 99 in southern Sacramento County between the cities of Elk Grove and Lodi. The City is located 26 miles south of the Sacramento metro area, 24 miles north of Stockton metro area, and approximately 100 miles east of the San Francisco Bay Area. The community is surrounded by agricultural lands on the north, south, and east, and the Cosumnes River Preserve on the northwest and west (approximately three miles). Galt is located at 38°15′39″N longitude and 121°18′11″W latitude (38.260842, -121.303122). The City's elevation at City Hall is 47 feet.

The City's study area is characterized by a Mediterranean-type climate with wet, cold winters, and warm, dry summers. Most of the rainfall occurs between November and April with an average annual rainfall of 17.5 inches.

D.3.2. History

Historical evidence suggests that the area around Galt has been inhabited by humans for at least 10,000 years. Plains Miwok lived primarily near the banks of major rivers, including the Cosumnes, Molekumne, and Sacramento. The Plains Miwok and other native inhabitants would relocate to the cooler foothills during the summer months to escape valley heat. The Plains Miwok first came into contact with Europeans in the latter eighteenth century when Spanish explorers entered the area. Many Plains Miwok disappeared through the combined effects of population removal to the missions and disease epidemics. Militarism, in reaction to Spanish expeditions, land seizures, and enslavement grew in the 1820s and 1830s particularly among the Plains Miwok. In the following decades, the arrival of more trappers, gold miners, and settlers exposed the Miwok to more new diseases.

The original 1850 Spanish land grant, Rancho del los Moquelumnes, was purchased in 1861 by Dr. Obed Harvey, considered today as Galt's founder. His purchase included much of the Dry Creek Township which was later established as the town of Galt in 1869 by the Western Pacific Railroad company. A prominent early settler, John McFarland, named the town after his former home in Ontario, Canada, which was named after a Scottish novelist, John Galt. The combination of favorable land for agriculture and the proximity to the railroad provided Galt with the economic support to continue to grow.

With the decline of gold mining in the Sierra Nevada foothills by the end of the eighteenth century, Galt, like many other Central Valley towns, saw the arrival of miners looking to start anew in agriculture. The City's proximity to several major rivers and the water resources of the Sacramento-San Joaquin River Delta made Galt ideal for the establishment of agriculture early in California's history.

A corollary of the vital agricultural and dairy industries was the inception of new industries in the area. With the large number of dairies in the area in need of distribution services, Fred Harvey, son of Dr. Obed Harvey, convinced the Utah Condensed Milk Company to establish a plant in Galt in 1917. In 1921, the company changed its name to the Sego Milk Products Company. After many years of prosperous service to the community, the Sego plant fell into disrepair and suffered a fire in 1992. The plant was later demolished due to the damage caused by the fire. The heritage of the dairy industry and agriculture in Galt continues to be vital to Galt's appeal and economic welfare.

America's first transcontinental highway, the Lincoln Highway, ran through Galt until it was ultimately replaced by State Route 99. Lincoln Way in central Galt is a remnant of this historic route. Galt grew around the rail depot and State Route 99 throughout the first half of the twentieth century. Improvements to State Route 99 in recent years have made Galt more accessible, which has resulted in increased population and growth to the west and northeast.

Today, Galt is at a strategic location between the growing areas of Sacramento and Stockton. The City's proximity to I-5 and SR 99 provides Galt excellent access to the rest of the Central Valley and California. Despite fast growth in the region, the City continues to maintain its small-town character while balancing the needs for housing and acknowledging its important agricultural heritage.

D.3.3. Economy and Tax Base

The largest employers in Galt are educational services, health care and social assistance. Together they employ 1,915 of the 9,711 employed in the Galt area. Manufacturing is next largest employer with 988. Retail trade is the third largest employer with 941 employees. Prominent manufacturers in the Galt area include glass, metal fabrication, and building materials distribution.

US Census estimates show economic characteristics for the City of Galt. These are shown in Table D-3 and Table D-8. Mean household income in the City was $71,298. Median household income in the City was $59,375.

Table D-3 City of Galt Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	553	5.7%
Construction	913	9.4%
Manufacturing	988	10.2%
Wholesale trade	420	4.3%
Retail trade	941	9.7%
Transportation and warehousing, and utilities	568	5.8%
Information	137	1.4%
Finance and insurance, and real estate and rental and leasing	467	4.8%
Professional, scientific, and management, and administrative and waste management services	768	7.9%
Educational services, and health care and social assistance	1,915	19.7%
Arts, entertainment, and recreation, and accommodation and food services	723	7.4%
Other services, except public administration	476	4.9%
Public administration	842	8.7%

Source: US Census Bureau American Community Survey 2010-2014 Estimates

Table D-4 City of Galt Income and Benefits

Income Bracket	Population	Percent
>$10,000	335	4.5%
$10,000 – $14,999	402	5.4%
$15,000 - $24,9999	592	7.9%
$25,000 – $34,999	804	10.7%
$35,000 – $49,999	1,054	14.1%
$50,000 – $74,999	1,564	20.9%
$75,000 – $99,999	1,323	17.7%
$100,000 – $149,999	828	11.1%
$150,000 – $199,999	434	5.8%
$200,000 or more	145	1.9%

Source: US Census Bureau, 2010

Top Galt Employers include:

- Galt Elementary School District (7 schools)
- Galt High School District (2 schools)
- Walmart
- City of Galt
- Building Material Distributors
- Cal Waste
- Cardinal Glass

The City has a wide and varied tax base. Tax base information is tracked and maintained by the Sacramento County Assessor's Office. The following tables show the tax base for the City. Table D-5 shows the secured real property value for the City if Galt. Table D-6 breaks out the City by land use.

Table D-5 City of Galt – Tax Roll Totals

Jurisdiction	2015-16 Value ($)	2016-17 Value ($)	Current Year Change	Percent of Current Roll*
Galt	1,738,795,750	1,855,626,958	6%	1

Source: Sacramento County Assessor's Office

*Percentages rounded to the nearest whole number

Table D-6 City of Galt – Summary of Property Types

Jurisdiction	Single Family with HEX*	Single Family Without HEX*	Multi-Family Residential	Vacant Land	Commercial	Agricultural	Mobile Homes	Other	Total
Galt	3,661	2,884:	193	527	204	3	361	128	7,961

Source: Sacramento County Assessor's Office

*Homeowners' Exemption

D.3.4. Population

The California Department of Finance estimated the January 1, 2015 total population for the City of Galt was 24,607.

Select demographic information from the 2014 US Census American Community Survey (the most recent data available) is shown in Table D-7.

Table D-7 City of Galt Demographic Information

Demographic Characteristic	Number	Percent
Race		
White	16,700	68.8%
Black or African American	753	3.1%
American Indian or Alaska Native	345	1.4%
Asian	769	3.2%
Hawaiian or Pacific Islander	94	0.4%
Two or more races	1,319	5.4%
Households*		
Total Households	7,262	–
Average Household Size	3.24	–

Source: US Census Bureau American Community Survey 2010-2014 Estimates; *US Census Bureau, 2010

D.4 Hazard Identification

Galt's planning team identified the hazards that affect the City and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to Galt (see Table D-8).

Table D-8 City of Galt—Hazard Identification Assessment

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Likely	Negligible	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change				
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Significant	Unlikely	Negligible	Medium
Earthquake	Significant	Likely	Negligible	Low
Earthquake: Liquefaction	Limited	Unlikely	Negligible	Low
Flood: 100/200/500-year	Limited	Occasional/Unlikely	Limited	High
Flood: Localized Stormwater Flooding	Significant	Likely	Limited	Medium
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Limited	Unlikely	Negligible	Low
River/Stream/Creek Bank Erosion	Limited	Likely	Limited	Low
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Heat	Extensive	Likely	Limited	Medium
Severe Weather: Fog	Extensive	Likely	Limited	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Likely	Limited	Medium
Severe Weather: Wind and Tornadoes	Significant	Likely	Limited	Low
Subsidence	Limited	Unlikely	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Likely	Negligible	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

D.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Galt's hazards and assess the City's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City of Galt is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City of Galt and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

D.5.1. Hazard Profile

Each hazard vulnerability assessment in Section D.5.3, includes a description as to how the hazard affects the City and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

D.5.2. Vulnerability Assessment and Total Assets at Risk

This section presents the vulnerability assessment for the City and identifies Galt's total assets at risk, including values at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Sacramento County Assessor's Office is based on the 2015 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table D-9 shows the 2015 Assessor's values (e.g., the values at risk) broken down by property type for the City of Galt.

Table D-9 City of Galt – Total Values at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	3	1	$87,192	$129,519	$216,711
Care / Health	10	10	$1,227,530	$5,202,485	$6,430,015

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Church / Welfare	18	16	$1,306,933	$12,233,873	$13,540,806
Industrial	51	42	$17,390,006	$48,781,867	$66,171,873
Miscellaneous	106	0	$122,856	$0	$122,856
Office	27	25	$3,135,756	$10,876,912	$14,012,668
Public / Utilities	118	0	$0	$0	$0
Recreational	3	2	$163,084	$330,869	$493,953
Residential	6,715	6,588	$377,380,122	$1,053,719,322	$1,431,099,444
Retail / Commercial	87	79	$28,958,505	$74,593,865	$103,552,370
Vacant	269	12	$28,541,654	$1,579,095	$30,120,749
No Data	0	0	$0	$0	$0
Total	**7,407**	**6,775**	**$458,313,638**	**$1,207,447,807**	**$1,665,761,445**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facilities and Infrastructure

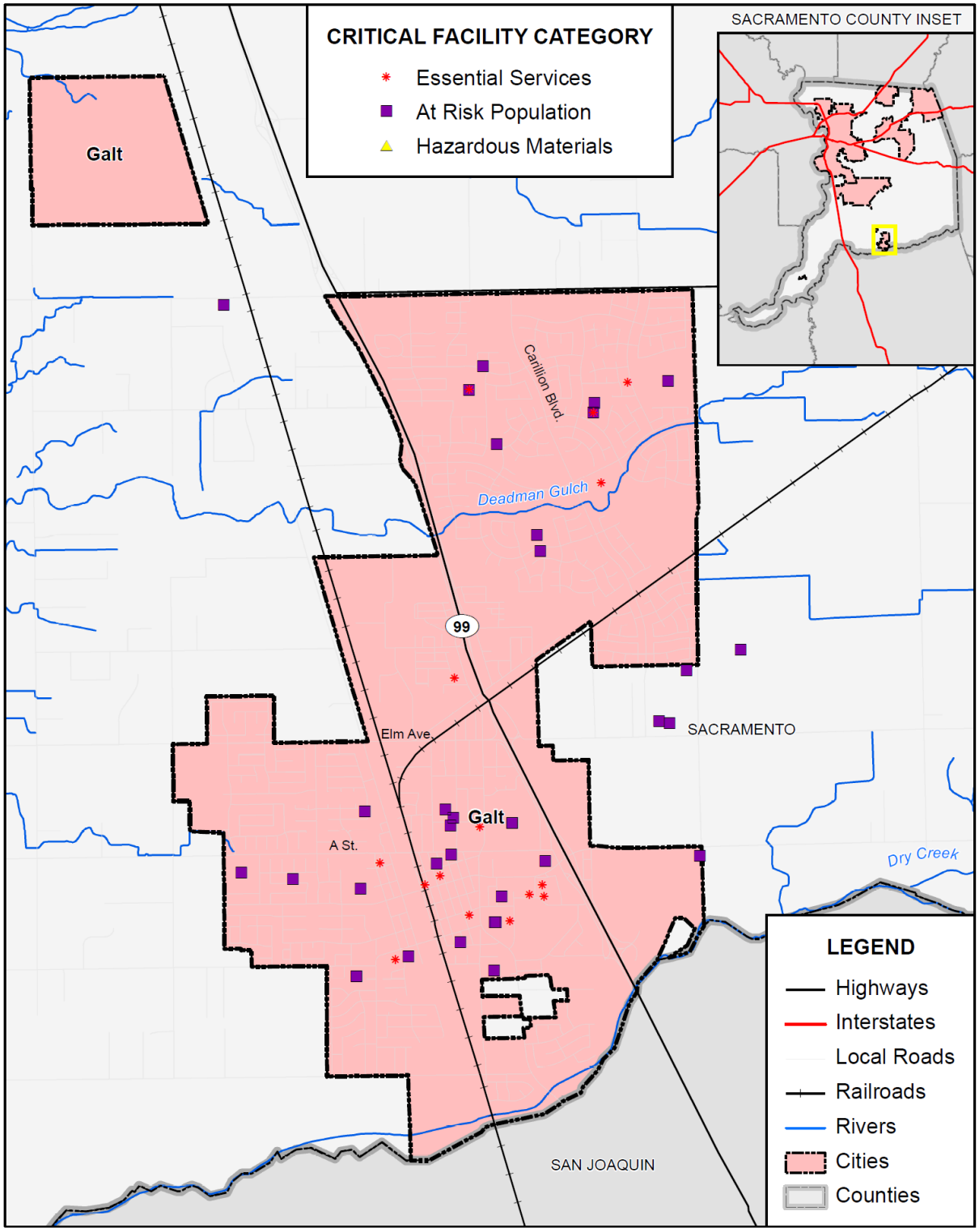
For purposes of this plan, a critical facility is defined as:

> *Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.*

This definition was refined by separating out three classes of critical facilities, that include Essential Services Facilities, At Risk Population Facilities, and Hazardous Materials Facilities, as further described in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Galt from Sacramento County GIS is shown on Figure D-2 and detailed in Table D-10. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix E.

Figure D-2 City of Galt – Critical Facilities



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

Table D-10 City of Galt – Critical Facilities Inventory

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Emergency Evacuation Shelter	8
	Fire Station	3
	Government Facilities	2
	Medical Health Facility	1
	Police	1
	Total	**15**
At Risk Population Facilities	Adult Day Care	1
	Adult Education School	1
	Adult Residential	5
	Day Care Center	5
	Private Elementary School	2
	Private K-12 School	2
	Public Continuation High School	1
	Public Elementary School	5
	Public High School	1
	Public Middle School	2
	Residential Care/Elderly	1
	School-Age Day Care Center	4
	Total	**30**
Grand Total		**46**

Source: Sacramento County GIS

Natural Resources

Biological Communities

The City of Galt has a variety of natural resources of value to the community. Habitat types are listed below, detailed in Table D-11, and depicted in Figure D-3.

- Annual Grassland (including both disturbed and vernal pool grasslands)
- Cropland
- Orchard
- Freshwater Marsh
- Open Water (including both lacustrine and riverine habitats)
- Riparian (Scrub or Woodland)
- Urban/Developed Areas
- Vernal Pools
- Vineyards

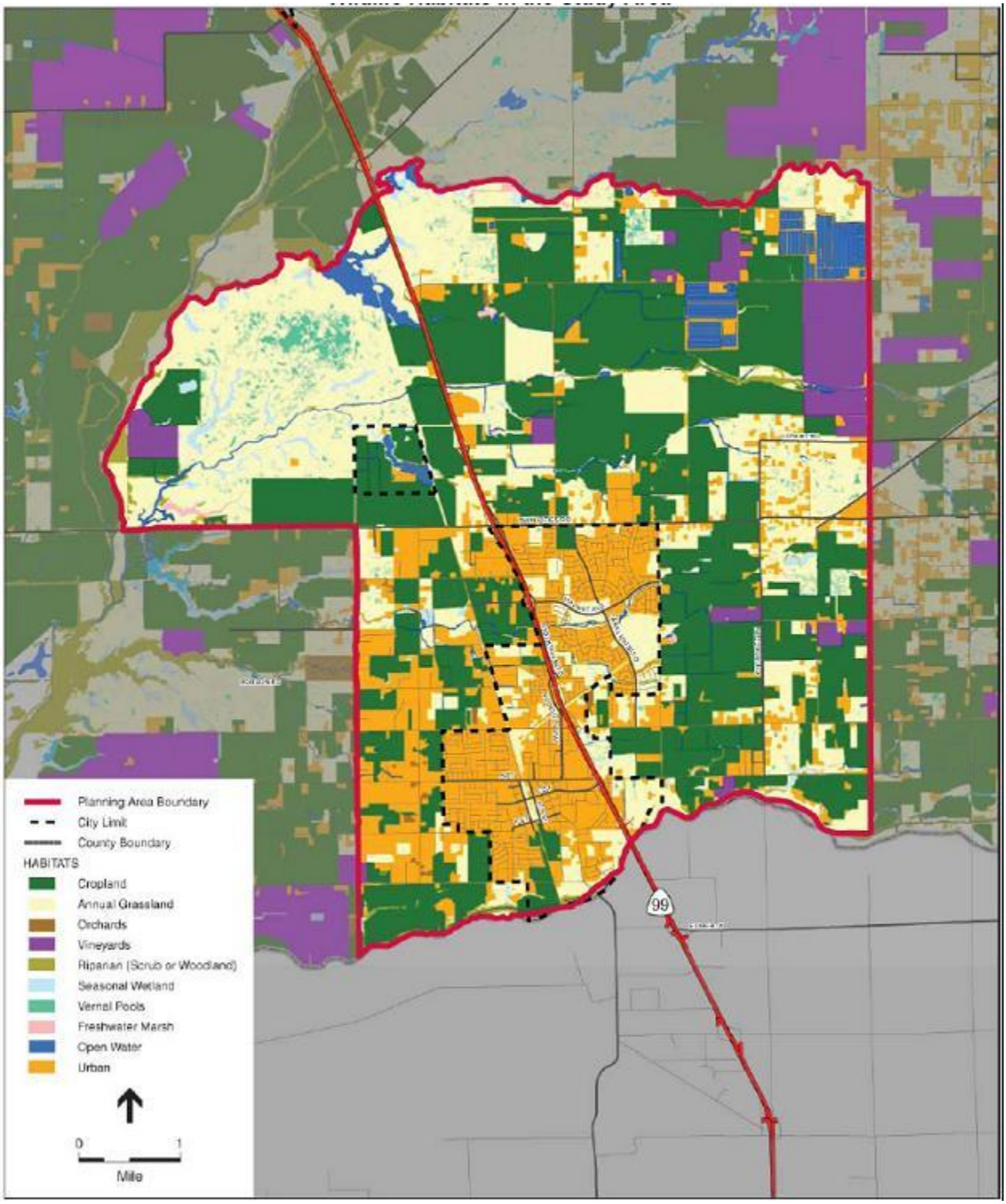
Table D-11 Habitat Types within the City of Galt

Habitat Types	Acres (Approximate)	Percent Study Area
Annual Grassland	7,550	30%
Cropland	9,276	37%
Disturbed	21	<1%
Freshwater Marsh	135	<1%
Open Water	767	3%
Orchards	51	<1%
Other	10	<1%
Riparian (Scrub or Woodland)	320	1%
Seasonal Wetland	431	2%
Urban	5,232	21%
Vernal Pools	258	1%
Vineyards	954	4%
Total	**25,006**	**100%**

Note: "Other" includes those areas designated as recreational areas, the TNC Reserve, and roads.

Source: Draft South Sacramento County Habitat Conservation Plan – vegetation data interpreted from 1997-1998 aerial photos (minimal ground-truthing)

Figure D-3 Riparian Habitats in the City of Galt



Source: City of Galt General Plan Environmental Impact Report

Special Status Species

A list of special-status plant and animal species with potential to occur within the vicinity of the study area was compiled for the Environmental Impact Report for the City of Galt's General Plan. The list was based on data from the CNDDB (2007), CNPS electronic Inventory of Rare and Endangered Plants (CNPS, 2007), the USFWS (2007), and biological literature pertaining to the region. Table D-12 lists those special-status species with at least a low likelihood for occurring within the study area. The locations of these species can be seen in Figure D-4 below.

Table D-12 Special-Status Species with Potential to Occur in the General Plan Study Area

Species/Animals/Mammals	Status: Fed/State/CNPS	General Habitat
Taxidea taxus American badger	--/CSC/--	Occurs in a wide variety of open forest, shrub, and grassland habitats that have friable soils for digging.
Birds		
Accipiter cooperii (nesting) Cooper's hawk	--/CSC/--	Nests in riparian areas and oak woodlands, forages at woodland edges.
Agelaius tricolor (nesting colony) Tricolored blackbird	---/CSC/--	Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, and other tall herbs near fresh water.
Ardea alba (rookery) Great egret	--/--/--	Fresh and salt marshes, marshy ponds and tidal flats, nests in trees or shrubs
Ardea herodias (rookery) Great blue heron	--/--/--	Groves of tall trees, especially near shallow water foraging areas such as marshes, tide-flats, lakes, rivers/streams and wet meadows
Athene cunicularia hypugaea (burrow sites) Western burrowing owl	---/CSC/--	Forages in open plains, grasslands, and prairies; typically nests in abandoned small mammal burrows.
Buteo swainsoni (nesting) Swainson's hawk	--/ST/--	Forages in open plains, grasslands, and prairies; typically nests in abandoned small mammal burrows
Dendroica petechia brewsteri (nesting) Yellow warbler	--/CSC/--	Nests in dense riparian cover
Elanus leucurus (nesting) White-tailed kite	--/CFP/--	Forages in open plains, grasslands, and prairies; typically nests in trees
Nycticorax nycticorax (rookery) Black-crowned night heron	--/--/--	Forages in marshes swamps and wooded streams; nests in thickets or reedbeds.
Phalacrocorax auritus (rookery) Double-crested cormorant	--/CSC/--	Uses wide rock ledges on cliffs; rugged slopes; and live or dead trees. Feeds underwater on fish and crustaceans
Riparia riparia (nesting) Bank swallow	--/ST/--	Banks of rivers, creeks, lakes, and seashores; nests in excavated dirt tunnels near the top of steep banks
Xanthocephalus xanthocephalus (nesting) Yellow-headed blackbird	--/--/--	Nests in freshwater emergent wetlands with dense vegetation and deep water. Often along borders of lakes or ponds. Nests only where large insects such as Odonata are abundant, nesting timed with maximum emergence of aquatic insects.

Species/Animals/Mammals	Status: Fed/State/CNPS	General Habitat
Reptiles		
Emys (=Clemmys) marmorata Western pond turtle	FSC/CSC/--	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Requires aquatic habitats with suitable basking sites. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks
Thamnophis gigas Giant garter snake	FT/ST/--	Generally inhabits marshes, sloughs, ponds, slow-moving streams, ditches, and rice fields that have water from early spring till mid-fall. Emergent vegetation (cattails and bulrushes), open areas for sunning and high ground for hibernation and cover
Amphibians		
Ambystoma californiense California tiger salamander	FT/CSC/--	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources
Rana aurora draytonii California red-legged frog	FT/CSC/--	Breeds in slow moving streams, ponds, and marshes with emergent vegetation; forages in nearby uplands within about 200 feet.
Rana boylii Foothill yellow-legged frog	--/CSC /--	Breeds in shaded stream habitats with rocky, cobble substrate, usually below 6,000 feet in elevation. Absent or infrequent when introduced predators are present
Spea hammondii Western spadefoot toad	--/CSC/--	Occurs seasonally in grasslands, prairies, chaparral, and woodlands, in and around wet sites. Breeds in shallow, temporary pools formed by winter rains. Takes refuge in burrows.
Fish		
Hypomesus transpacificus Delta smelt	FT/ST/--	Open surface waters in the Sacramento/San Joaquin Delta. Seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Found in Delta estuaries with dense aquatic vegetation and low occurrence of predators. May be affected by downstream sedimentation
Oncorhynchus mykiss Central Valley ESU steelhead	FT/--/--	This ESU enters the Sacramento and San Joaquin Rivers and their tributaries from July to May; spawning from December to April. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays
Oncorhynchus tshawytscha Central Valley spring-run chinook	FT/ST/--	This ESU enters the Sacramento and San Joaquin Rivers and tributaries March to July; spawning from late August to early October. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays

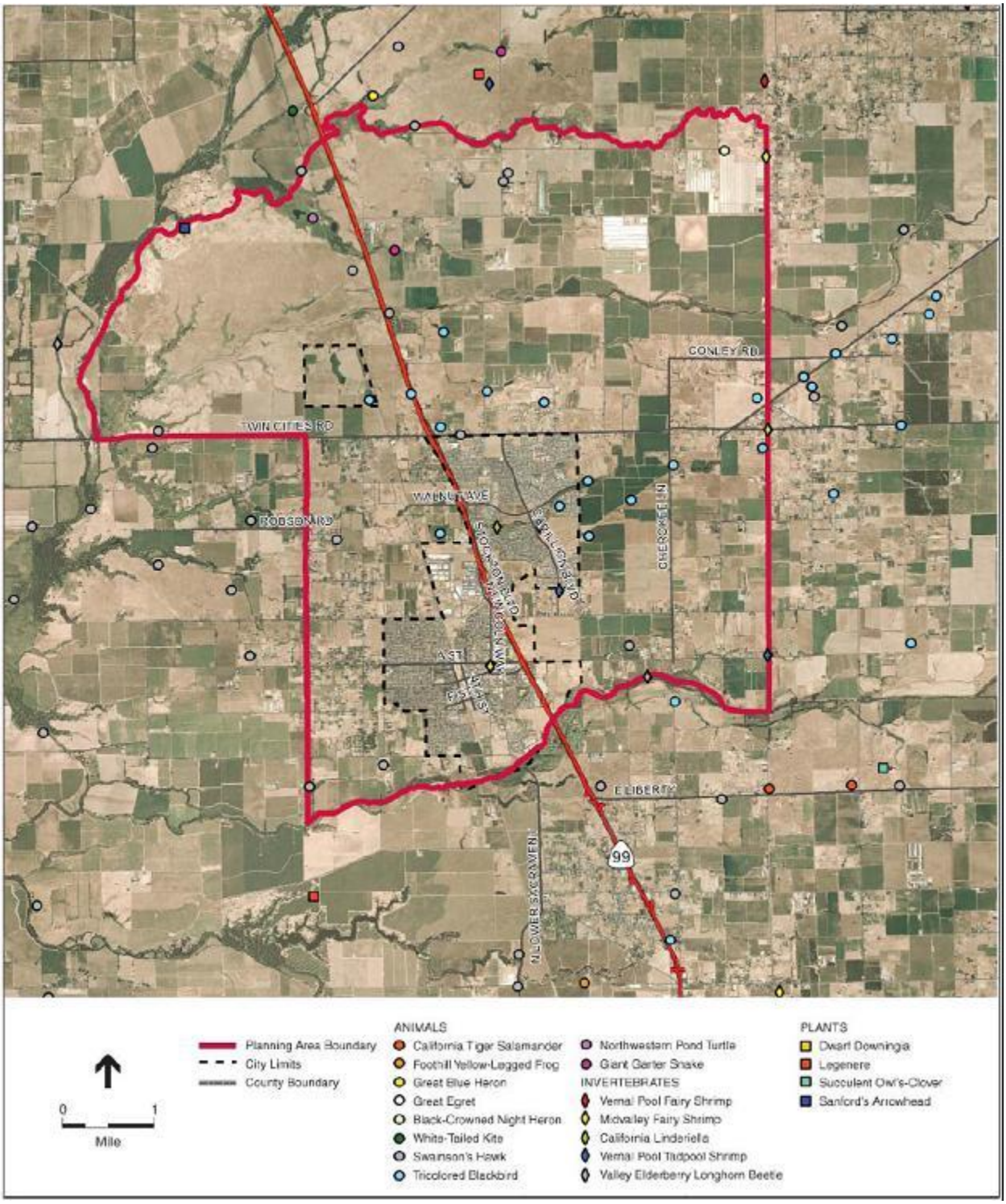
Species/Animals/Mammals	Status: Fed/State/CNPS	General Habitat
Oncorhynchus tshawytscha winter-run chinook, Sacramento River	FE/SE/--	This ESU enters the Sacramento River December to May; spawning peaks May and June. Upstream movement occurs more quickly than in spring run population. Young move to rearing areas in and through the Sacramento River, Delta, and San Pablo and San Francisco Bays
Oncorhynchus tshawytscha Central Valley fall/late-fall-run Chinook	FC/CSC/--	This ESU enters the Sacramento and San Joaquin rivers and their tributaries from July to April; spawning October to February. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays
Pogonichthys macrolepidotus Sacramento splittail	FD/CSC/--	Currently known only from the Delta, Suisun Bay and associated marshes. Prefers slow moving river sections and dead end sloughs. Requires flooded vegetation for spawning and juvenile foraging habitat. Spawning occurs over flooded vegetation in tidal freshwater and euryhaline habitats of estuarine marshes and sloughs, and slow-moving reaches of large rivers
Invertebrates		
Andrena blennospermatis A vernal pool andrenid bee	--/--/--	Collects pollen from vernal pool flowers, especially Blennosperma. Bees nest in the uplands around vernal pools
Branchinecta lynchi Vernal pool fairy shrimp	--/--/--	Lifecycle restricted to vernal pools
Branchinecta mesovallensis Midvalley fairy shrimp	FSC/--/--	Lifecycle restricted to vernal pools in the Central Valley
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	FT/--/--	Breeds and forages exclusively on elderberry shrubs (Sambucus mexicana) typically associated with riparian forests, riparian woodlands, elderberry savannas, and other Central Valley habitats. Occurs only in the Central Valley of California. Prefers to lay eggs in elderberries 2–8 inches in diameter; some preference shown for "stressed" elderberries
Hydrochara rickseckeri Ricksecker's water scavenger beetle	--/--/--	Occurs in slow moving waters, adults and larvae are aquatic
Lepidurus packardi Vernal pool tadpole shrimp	FE/--/--	Lifecycle restricted to vernal pools
Linderiella occidentalis California linderiella	--/--/--	Lifecycle restricted to vernal pools
Vascular Plants		
Aster lentus Suisun Marsh aster	--/--/1B.2	Rhizomatous herb occurring in tidal brackish and freshwater marshes. Found at 0-10 feet in elevation. Blooms May-Nov
Carex comosa Bristly sedge	--/--/2.1	Generally found in lake-margin and edge habitats, Below 1,400 feet in elevation. Blooms May-Sept.

Species/Animals/Mammals	Status: Fed/State/CNPS	General Habitat
Castilleja campestris ssp. Succulent Succulent owl's-clover	FT/SE/1B.2	Occurs under vernally-flooded conditions in vernal-pool habitats such as valley and foothill grassland. Blooms Apr-May
Downingia pusilla Dwarf downingia	--/--/2.2	Prefers lake margins, vernal pools and wet places sometimes playas and grasslands. Blooms Mar-May
Gratiola heterosepala Boggs Lake hedge-hyssop	FSC/SE/1B.2	Marshes and swamps, lake margins, and in clay substrate in vernal pools. Blooms Apr-Aug. 30-7,800 feet in elevation
Hibiscus lasiocarpus Rose-mallow	--/--/2.2	Prefers freshwater marshes and swamps. Blooms Jun-Sep. Found below 100 feet.
Juglans hindsii Northern California black walnut	--/--/1B.1	Occurs in riparian forest and woodland, Found below 1,500 feet elevation. Blooms April-May
Lathyrus jepsonii var. jepsonii Delta tule pea	FSC/--/1B.2	Occurs in both tidal freshwater and brackish marshes in the Central and San Joaquin Valleys and in the Bay Area. Blooms May-Sept
Legenere limosa Legenere	FSC/--/1B.1	Occurs in vernal pool beds. Blooms Apr-Jun.
Lilaeopsis masonii Mason's lilaeopsis	FSC/SR/1B.1	Generally occurs in riparian scrub, freshwater-marsh and brackish-marsh habitats, Found below 33 feet in elevation. Blooms Apr-Nov.
Limosella subulata Delta mudwort	--/--/2.1	Generally occurs under wet conditions in tidal freshwater-marsh habitats, Found below 9 feet in elevation. Blooms May- Aug.
Orcuttia tenuis slender Orcutt grass	FT/SE/1B.1	Annual herb occurring in vernal pools. Found between 100 and 5,800 feet in elevation. Blooms May-October
Orcuttia viscida Sacramento Orcutt grass	FE/SE/1B.1	Occurs in vernal pools. Blooms Apr-Jul
Sagittaria sanfordii Sanford's arrowhead	FSC/--/1B.2	Found in assorted freshwater habitats including marshes, swamps and seasonal drainages. Blooms May-Oct.
Scutellaria lateriflora Blue skullcap	--/--/2.2	Meadows and seeps, marshes and swamps. Blooms Jul-Sep. Found below 1,700 feet in elevation.

STATUS CODES
Federal State CNPS
FE = Endangered
FT = Threatened
FC = Candidate
FD = Federally Delisted SE = Endangered
ST = Threatened
SR = Rare
CSC = California Special Concern species
SFP = Fully Protected Species
List 1B = Plants rare, threatened, or endangered in California and elsewhere
List 2 = Plants rare, threatened, or endangered in California, but more common elsewhere
List 3 = Plants about which we need more information--a review list
List 4 = Plants of limited distribution--a watch list

Source: CNDDB 2007, CDFG 2007, CNPS 2007, USFWS 2007

Figure D-4 California Natural Diversity Database Species in the City of Galt



Source: City of Galt General Plan Environmental Impact Report

Historic and Cultural Resources

The City of Galt has registered historic sites located at various locations in the City. These are shown in Table D-13.

Table D-13 Registered Historic Sites in the City of Galt

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
Brewster Building (N2099)	X				8/16/2000
Brewster House (N638)	X				6/23/1978
Liberty Schoolhouse (P579)				X	12/21/1981
Rae House (P743)				X	5/8/1991
Utah Condensed Milk Company Plant (N650)	X				8/3/1978

Source: California Office of Historical Preservation

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) document America's architectural and engineering heritage. There are no HABS and HAER structures in the City of Galt.

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

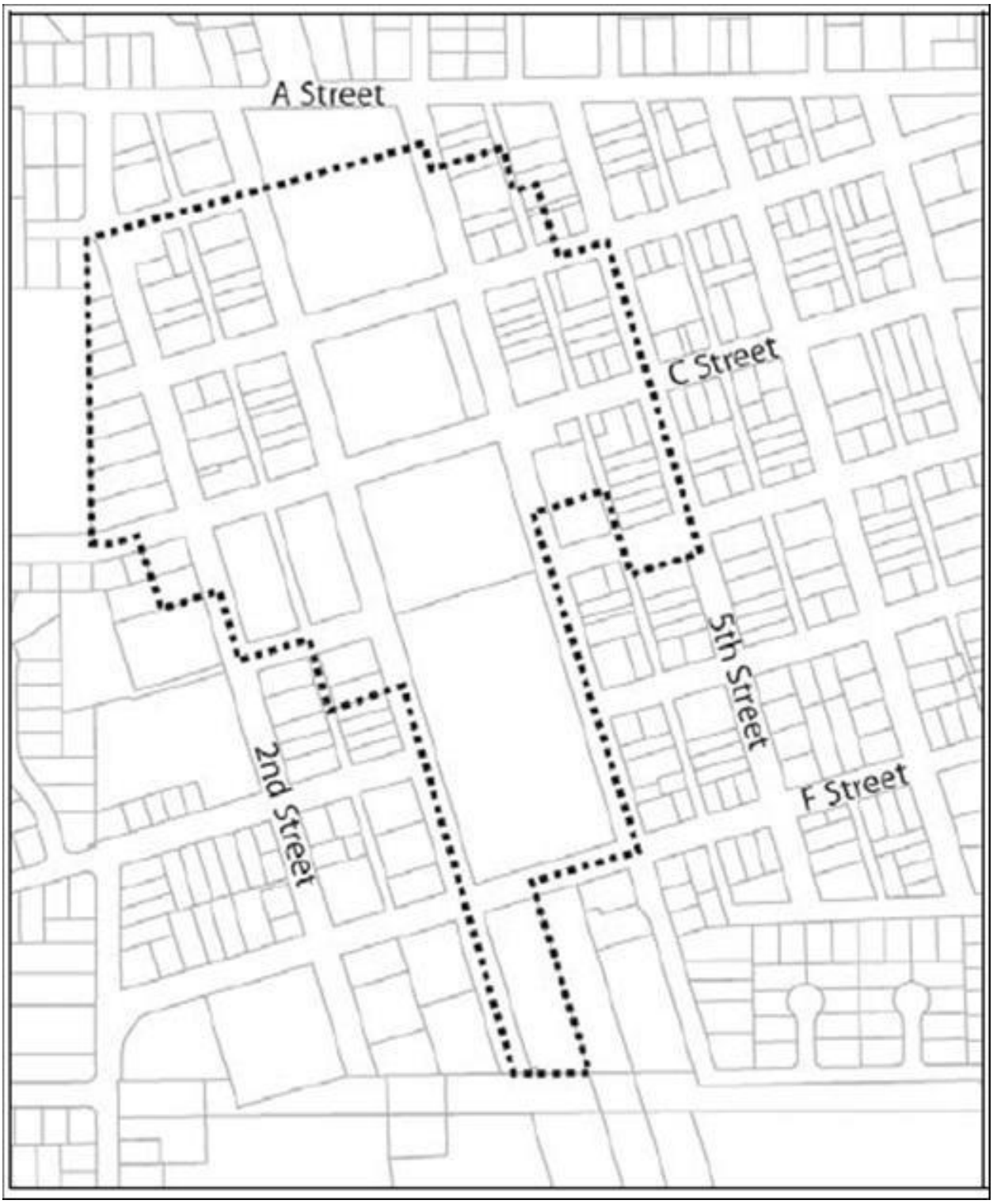
Locally Designated Historic Places

The City of Galt initiated a study in 1999 that looked at the possibility of the creation of a historic district within the downtown. In order for the district to be considered a significant resource, it would have to meet certain criteria set forth by local government and/or the National Register of Historic Places. The study focused primarily on structures that were within the boundary of the Historic Preservation District's

Downtown Revitalization Historic Plan (see Figure D-5). The study was never completed, but does provide a background on potential preservation techniques that could be used in the future.

Old Town Galt has always been the heart of the community, extending from 2nd Street in the west to Lincoln Way in the east, and A Street in the north to F Street in the south. The historic commercial core is centered at the intersection of C Street and 4th Street. In the early 1900s most commercial activities fronted on 4th Street facing the railroad property where a 90-foot flagpole marked the center of town activity. Today, the center of Galt's commercial activity is located at the intersection of C Street and Lincoln Way, with the C Street corridor (between Lincoln Way and Highway 99) providing the majority of commercial space for the Downtown area.

Figure D-5 Boundaries of the Historic Business District



Source: City of Galt General Plan Background Report

In addition to the registered sites, there are several assets within Galt that define the community and represent the City's history. Table D-14 is a listing of historic resources identified within Galt, including a

description of their importance and relative condition. This information was derived from the City's 1990 General Plan and side notes have been added for more recent information, including that provided by the Galt Historical Society.

Table D-14 Historic Structures and Features in Galt

#	Street Address	Description	Importance	Condition
1&2	120 7th St	Christian Church	Early church. Architecture Galt Local. Historical Landmark #4	Good
3	236 6th St	1920's Bungalow		
4	603 C St	Residence	Eiler's Residence (1800s) (Sunny South)	Excellent
5	Corner 6th and C	1920's Bungalow w/ water tower		Removed
6	550 C St	Galt Water Tower	Galt Local Historical Landmark #1	Excellent
7	-	-	-	-
8	312 5th St	Victorian Residence	Early residence, architecture	Good
9	318 5th St	Victorian Residence	Early residence, architecture	Removed
10	324 5th St	Victorian Residence	Early residence, architecture	Good
11	340 5th St	1920's Bungalow	Early residence, architecture	Good
12	346 5th St	Victorian Cottage	Early residence, architecture	Good
13	352 5th St	Victorian Cottage	Early residence, architecture	Removed
14	113 4th St	Victorian Cottage (Sperry Res)	State Point of Historical Interest, Library-School House	Fair
15, 16,17	149 4th St	Has been almost completely obscured by additions	General Store with gun slits (currently a mortuary)	Good - Building with additions would not be eligible for National Register
18	201 4th St	2 story C. 1890's brick structure with cast iron columns and exquisite brick cornice details	National Register, Brewster Building, McFarland Building, Odd Fellows Hall	Poor
19	215 & 217 4th St	C. 1920's one story fire brick structure w/ intricate cast iron vents. Five stores possible	Early Commercial, Dr. Harm's Office, rebuilt after 1924 fire.	Fair – 2/3 of structure painted and windows covered
20,21	227 & 229 4th St	C. 1980's brick structure rebuild in the 1930's Checkerboard brick pattern. Tile detail and vents, transom windows; interesting downspouts	Sawyer Building Telephone Exchange, Dr. Osler's Soda Fountain, Ray Arlin's Drug Store, rebuilt after1924 fire	Good – one upstairs window not original

#	Street Address	Description	Importance	Condition
22	409 C St	C. 1920's light brick building w/ intricate iron vents. Three storefronts. Currently used for Galt Activity Center	Early commercial, site of Galt Hotel and Estrellita Ballroom	Good
23	4th & C St	C. 1890's two-story Halianate Victorian commercial block building. Two storefronts, plus upstairs rooms	Early commercial, Bank of Galt 1890s and Steiner's Market	Good
24		C. 1890's two-story Victorian commercial building. Two storefronts, apartments upstairs.	Early commercial	Fair – Brick facing of lower façade detracts
25	325 4th Street	Two-story Halianate Victorian brick commercial building. Has been converted completely (upstairs and downstairs apartments)	Early commercial façade has been severely altered. Upstairs bay windows also altered	Poor – Downstairs
26	416 B Street	Old Blacksmith Shop		Removed
27	206 5th Street	Brewster Howe OHP, 1979	Winn House, Brewster Residence, Justice Court, National Register	Excellent
28	218 5th Street	First Court House/Jail		Poor
29	417 B Street	Halianate Victorian Cottage	Early residence, architecture	Excellent
30	4th Street across from Park	Old Diamond National Limber yards – typical 1 920's-40's	Example of railroad related industry frame lumber storage structure	Removed
31	3rd and F Street [destroyed by fire in1992]	Old Sego Milk Plant	Example of railroad related industry	Removed
34,35,36	128-1 40	Victorian cottages	Early residence, architecture	
37	200 3rd Street	First Congregational Church, frame church w/ prominent spire	Early church, First church built in Galt by John McFarland, architecture, Galt Local Historical Landmark #2	Excellent
38	214 3rd Street	Victorian cottage	Early residence, architecture	Good
39	530 3rd Street	St. Christopher's Church, gothic brick church w/ spire	Early church, architecture, Second church built in Galt, architecture, Galt Local Historical Landmark #3	Excellent
40	119 2nd Street	1920's bungalow	Early residence, architecture	Fair
41	127 2nd Street	1920's bungalow with water tower	Early residence, architecture	Poor
42	131 2nd Street [Demolished in 2003]	Vacant frame Victorian cottage	Early residence, architecture	Removed

#	Street Address	Description	Importance	Condition
43	205 B Street	Residence	McAllister Property	Poor
44	205 2nd Street	1920's bungalow with water tower	Early residence, architecture, water tower	
45	NE corner 2nd & C	Victorian cottage	Early residence, architecture	
47	218 2nd Street	Residence	Granny McKinstry's home	Poor
48	244 2nd Street	Victorian cottage	Early residence, architecture	Fair
49	326 2nd Street	Residence	Dr. Obed Harvey's Office	Removed
50	204 Oak Avenue	Victorian residence	State Point of Historical Interest Rae Residence	Excellent
51	508 5th Street	Dutch Colonial with gambrel roof	State Historic Landmark, Leland	Good

Source: Historic Element, City of Galt General Plan, 1990. OHP, Historic Properties Data File for List Sacramento County, 2007. Galt Historical Society 2007.

Growth and Development Trends

Past growth within the City of Galt has been strong and steady. Current California Department of Finance estimates for July 1, 2015 were 24,607. Table D-15 shows past growth trends since 1970.

Table D-15 Past Growth in the City of Galt

Year	Population	Change	Percent Change
1970	4,530	–	–
1980	5,575	1,045	23.1%
1990	8,889	3,314	59.4%
2000	19,472	10,583	119.1%
2010	23,647	4,175	21.4%

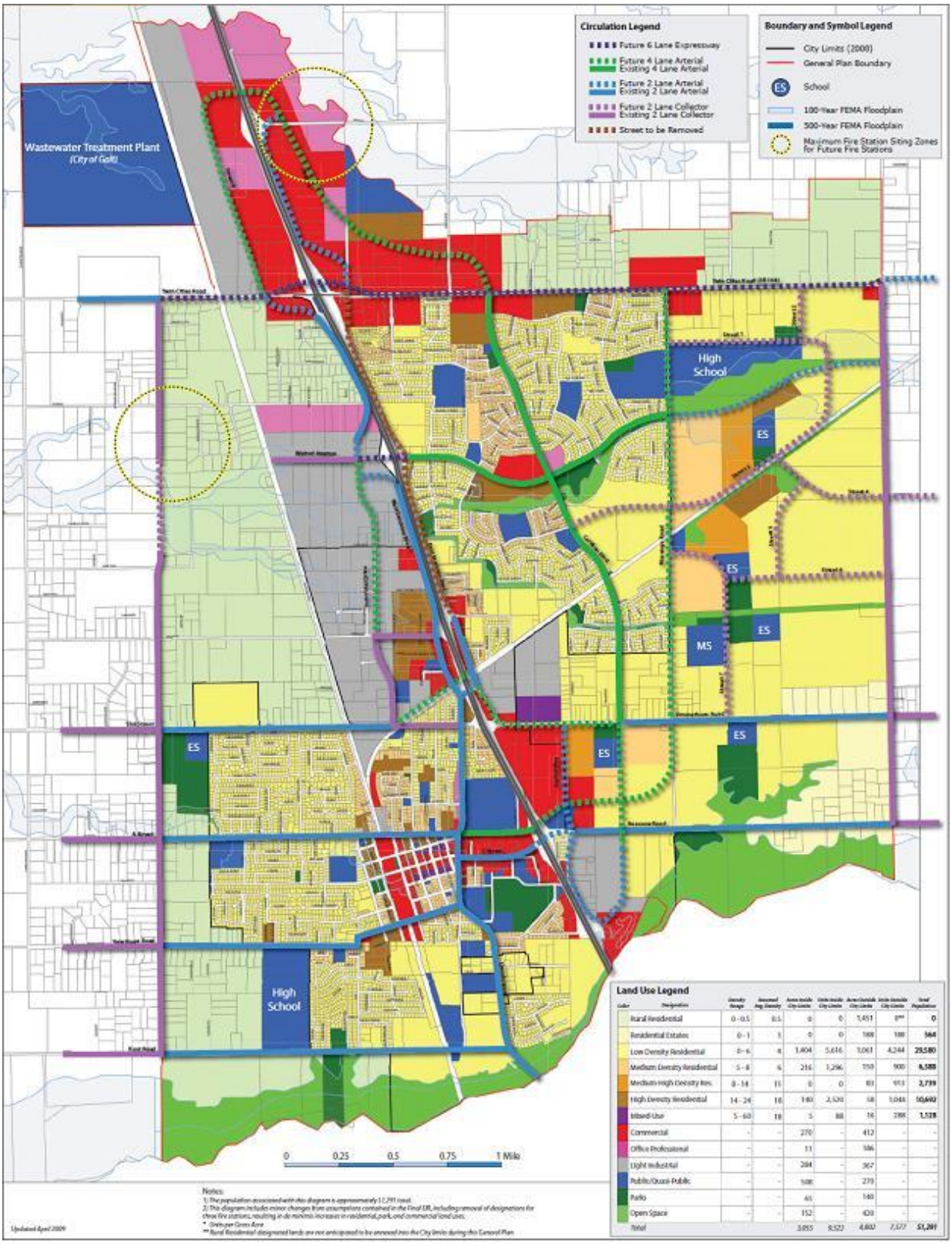
Source: State of California Department of Finance, US Census Bureau 2010

Land Use

Galt has grown largely to the southwest and northeast over the past two decades. While the expansion of the city limits has increased substantially, buildout of the city limits has been slower than expected. In 2007, 815 acres of available vacant land existed within the city limits (468 acres zoned residential and 347 acres zones nonresidential).

The General Plan Area includes all land designated for or to be considered for future development as part of Galt under this General Plan. This boundary includes 13,400 acres, which is enough land for the projected residential and non-residential growth of the City to the year 2030 (see Figure D-6). The General Plan Area follows the Laguna Creek floodplain/1,500 feet north of Twin Cities Road on the north, Dry Creek on the south, Cherokee Lane on the east, and Sargent Road/Union Pacific railroad tracks on the west. This boundary is approximately 4,380 acres larger than the City's current (2007) sphere of influence (9,017 acres).

Figure D-6 City of Galt 2030 Land Use



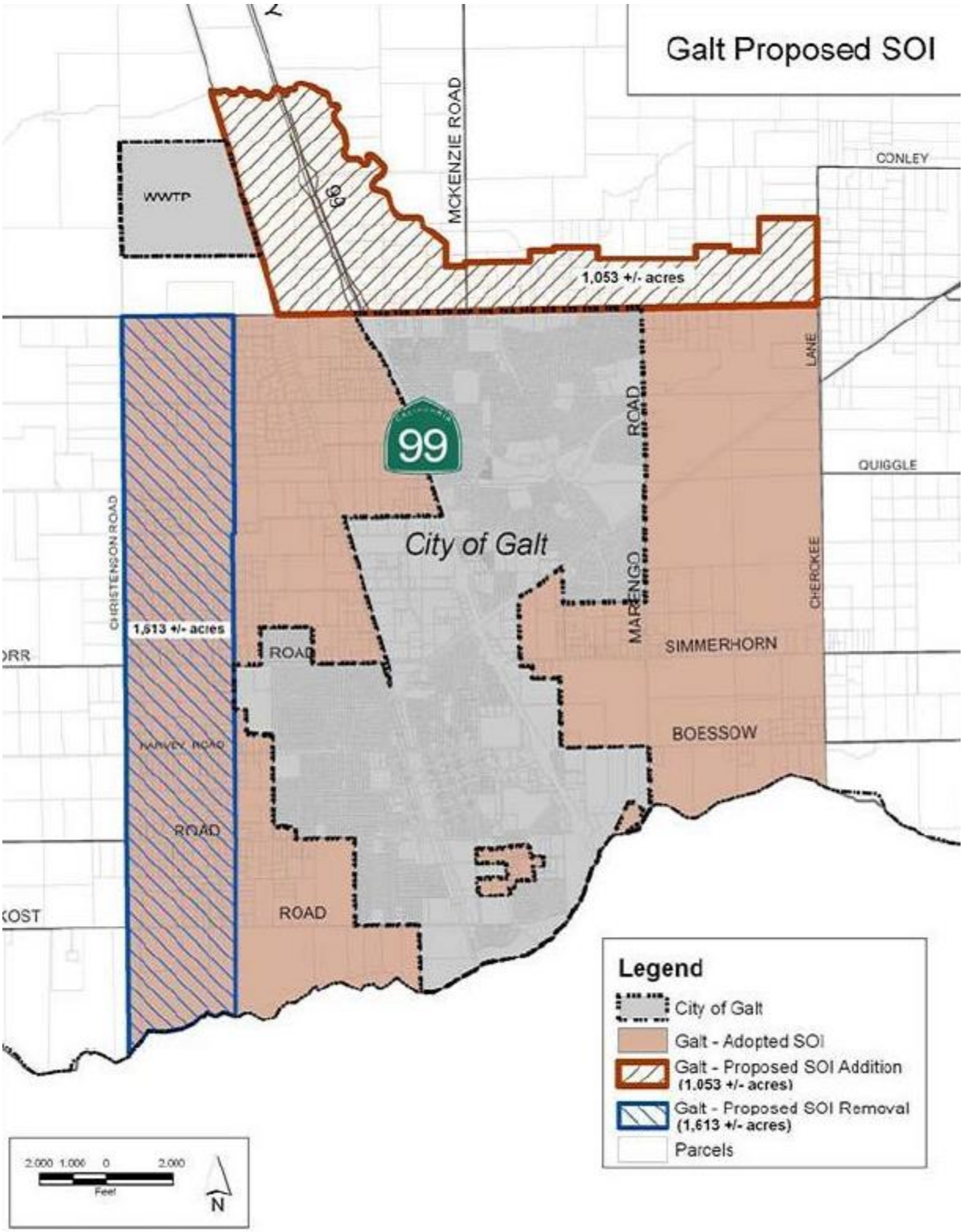
Source: City of Galt Housing Element

In addition to future land use inside current city limits, the City of Galt submitted an application to the Sacramento Local Agency Formation Commission (LAFCo) to amend the Sphere of Influence (SOI) on July 20, 2009. The application is consistent with the newly adopted 2030 Galt General Plan. As part of this application submission, City staff prepared a Municipal Services Review (MSR), which was submitted with the SOI application.

The amended SOI application requested approximately 1,053 acres be added to the SOI on lands north of Twin Cities Road from Cherokee Road on the east to the U.P.R.R. mainline to the west. The northern boundary generally follows Skunk Creek between the eastern and western margins noted above. (see Figure D-7)

A simultaneous detachment of approximately 1,613 acres was also proposed. The detached area is located between Sargent and Christensen Roads and from Twin Cities Road south to the County boundary. The amended SOI would allow for future annexation and urbanization to the City of Galt.

Figure D-7 Proposed Sphere of Influence for the City of Galt



Source: City of Galt General Plan Environmental Impact Report

Development since 2011 Plan

As shown in Table D-16, Galt has seen a growth of 4.1% of population between 2010 and January 1, 2015.

Table D-16 City of Galt Population Changes Since 2011

Year	Population	Change	% Change
2010[1]	23,647	–	–
2015[2]	24,607	960	4.1%

Source: [1]US Census Bureau, [2]California Department of Finance

The Galt Community Development Department tracked total building permits issued since 2011 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table D-17 and Table D-18. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people living in the area potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the City to identified priority hazards.

Table D-17 City of Galt Total Development Since 2011

Property Use	2011	2012	2013	2014	2015
Residential	0	1	21	52	73
Commercial	0	0	2	2	0
Industrial	0	0	0	1	0
Other	0	0	0	0	0
Total	**0**	**1**	**22**	**55**	**73**

Source: City of Galt Track-it Database

Table D-18 City of Galt Development in Hazard Areas since 2011

Property Use	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Residential	0	0	56	0
Commercial	0	0	0	0
Industrial	0	0	0	0
Other	0	0	0	0
Total	**0**	**0**	**56**	**0**

Source: City of Galt Track-it Database

[1]Moderate or higher wildfire risk area

Future Development

The Sacramento Council on Governments (SACOG) modeled population projections for the City of Galt and other areas of the region in 2012 for a Metropolitan Transportation Plan/Sustainable Communities

Strategy report. This forecast uses a 2008 base year estimate with projections to 2020 and 2035 for population, housing units, households and employment. SACOG estimated the City population in 2020 and 2035 to be 26,015 and 30,732 respectively.

D.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table D-8 as high or medium significance hazards and primary hazards to the State of California. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the Base Plan. In general, the most vulnerable structures are those located within the flood risk areas, wildfire risk areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Drought

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Past Occurrences

The entire state of California has experienced a prolonged period of drought since the last HMP. In 2014 and 2015, the State of California established mandatory water conservation goals to be met by jurisdictions all throughout the state.

Vulnerability to Drought

Based on historical information, the occurrence of drought in California, including the City of Galt, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability of the City of Galt to drought is City-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels.

Future Development

As the population in the area continues to grow, so will the demand for water. The City relies on ground water for its water source so it is somewhat insulated from short-term drought but receding groundwater levels during a prolonged drought could be problematic. Increased planning will be needed to account for population growth and increased water demands.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–High

Hazard Profile and Problem Description

Although the City is located outside of the major flood plain area, the City experiences two types of flooding. The first is associated with local water courses. The second is associated with localized flood events resulting from inadequate surface flow. Heavy rainfall causes these types of flooding events.

Runoff from the City's study area is drained by a variety of local streams and creeks including Laguna Creek (south), Skunk Creek, Deadman Gulch, Hen Creek and Dry Creek, which drain to the Cosumnes River. The areas near the confluence of these smaller water courses with the Cosumnes River includes large areas of flood plain, which absorb excess flows from local watersheds during heavy rains and spring floods. Much of the storm water of this floodplain is maintained through a complex system of levees and dikes. The City itself does not have nor need levees to provide protection.

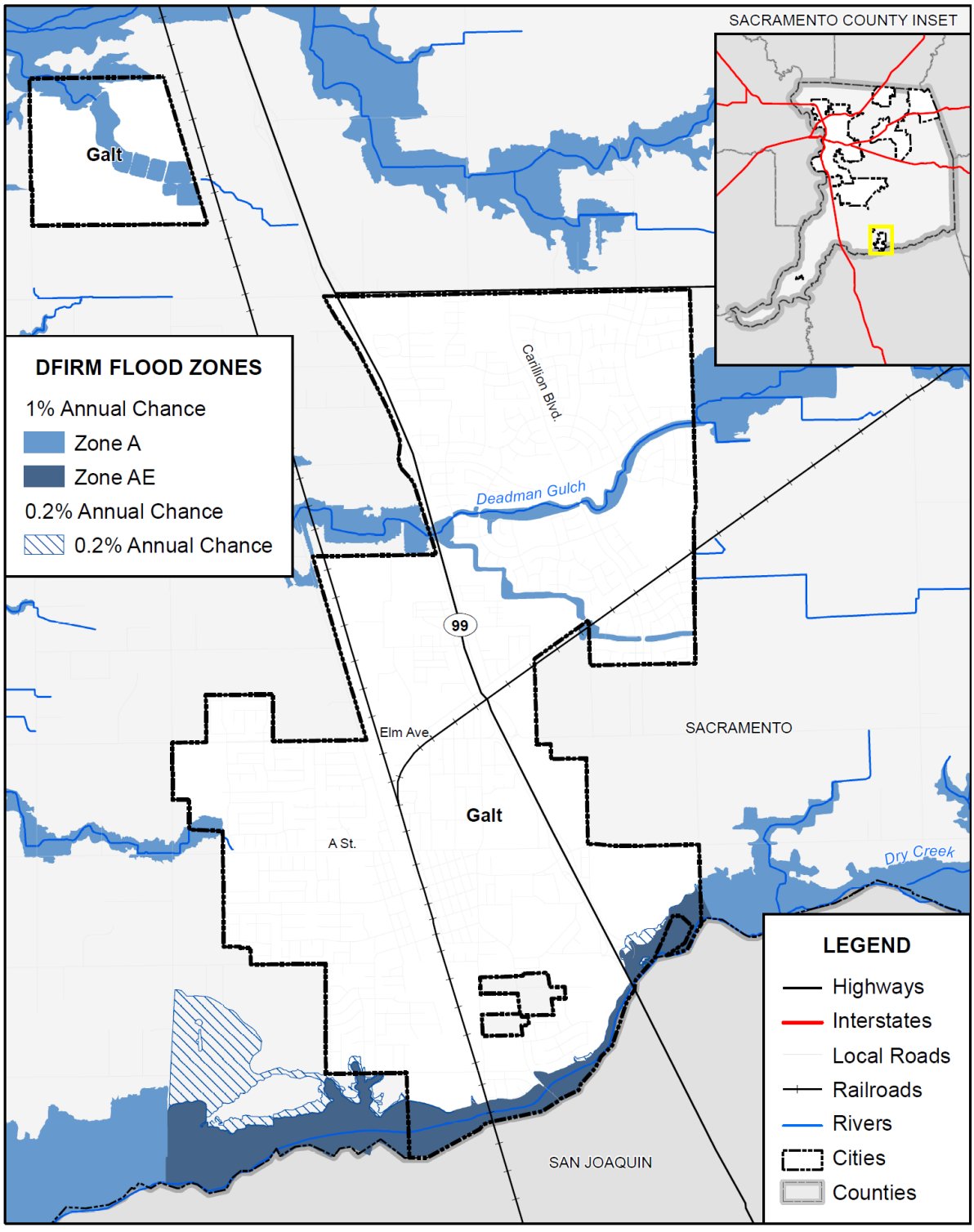
Past Occurrences

No flooding events have occurred during the timeframe of this LHMP. The last known flooding event occurred in the early 2000's due to unauthorized fill and modification to the Dry Creek floodplain.

Flood Zones

A small portion of the City is located inside of the 100-year and 500-year flood zones as defined by the Federal Emergency Management Agency (FEMA). This is seen in Figure D-8.

Figure D-8 City of Galt – FEMA DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Vulnerability to Flood

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Galt. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table D-19 shows the property use, improved parcel count, improved values, estimated contents, and total values that fall in a floodplain in the City.

Table D-19 City of Galt – Count and Improved Value by Property Use and Detailed Flood Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Zone A						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	3	0	$91	$0	$91	$182
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	10	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	3	0	$0	$0	$0	$0
Total	**16**	**0**	**$91**	**$0**	**$91**	**$182**
Zone AE						
Agricultural	2	0	$52,541	$0	$52,541	$105,082
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	2	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Recreational	1	1	$157,500	$315,000	$157,500	$630,000
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	2	0	$391,840	$0	$0	$391,840
Total	**7**	**1**	**$601,881**	**$315,000**	**$210,041**	**$1,126,922**
Zone AH						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone AO						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone A99						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Total 1%	**23**	**1**	**$601,972**	**$315,000**	**$315,000**	**$1,231,972**
0.2% Annual Chance Flood Zone*						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	2	0	$2,459,475	$0	$0	$2,459,475
Total	**3**	**0**	**$2,459,475**	**$0**	**$0**	**$2,459,475**
X Protected by Levee Zone						
Agricultural	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone X						
Agricultural	1	1	$34,651	$129,519	$34,651	$198,821
Care / Health	10	10	$1,227,530	$5,202,485	$1,227,530	$7,657,545
Church / Welfare	18	16	$1,306,933	$12,233,873	$1,306,933	$14,847,739
Industrial	51	42	$17,390,006	$48,781,867	$26,085,009	$92,256,882
Miscellaneous	102	0	$122,765	$0	$122,765	$245,530
NO DATA	0	0	$0	$0	$0	$0
Office	27	25	$3,135,756	$10,876,912	$3,135,756	$17,148,424
Public / Utilities	106	0	$0	$0	$0	$0
Recreational	2	1	$5,584	$15,869	$5,584	$27,037
Residential	6,715	6,588	$377,380,122	$1,053,719,322	$188,690,061	$1,619,789,505
Retail / Commercial	87	79	$28,958,505	$74,593,865	$28,958,505	$132,510,875
Vacant	262	12	$25,690,339	$1,579,095	$0	$27,269,434
Total	**7,381**	**6,774**	**$455,252,191**	**$1,207,132,807**	**$249,566,794**	**$1,911,951,792**

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Table D-20 summarizes Table D-19 above and shows City of Galt loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table D-20 City of Galt – Flood Loss Summary

Flood Zone	Improved Parcel Count	Total Improved Value	Estimated Contents Value	Total Improved/ Contents Value	Loss Estimate	Loss Ratio
1% Annual Chance	1	$315,000	$315,000	$630,000	$126,000	0.005%
0.2% Annual Chance*	0	$0	$0	$0	$0	0.00%

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

According to Table D-19 and Table D-20, the City of Galt has 1 improved parcel and $630,000 of structure and contents value in the 1% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a 1% chance in any given year of a flood event causing roughly $126,000 in damage in the City of Galt. A loss ratio of 0.005% indicates that losses in Galt to flood would be relatively minor, as less than an eighth of a percent of the total values in the City would be damaged.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.10 of the Base Plan, was used for the City of Galt as well as for the County as a whole. Table D-21 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table D-21 City of Galt – Flooded Acres

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
A	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	9.35	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	34.29	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	2.78	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Total	**46.43**	**0**	**0.00%**
AE	Agricultural	34.00	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	1.37	0	0.00%
	Recreational	3.86	3.86	100.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	26.26	0	0.00%
	Total	**65.49**	**3.86**	**100.00%**
AH	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
AO	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	0.00%
A99	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	0.00%
Total 1%		**111.92**	**3.86**	**100.00%**
Shaded X (0.2% Annual Chance)*	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0.28	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	4.83	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Total	**5.11**	**0**	**0.00%**
X Protected by Levee	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
Zone X	Agricultural	26.06	26.06	1.57%
	Care / Health	6.01	6.01	0.36%
	Church / Welfare	30.49	29.84	1.80%
	Industrial	152.21	140.00	8.46%
	Miscellaneous	59.00	0	0.00%
	No Data	0	0	0.00%
	Office	11.11	10.18	0.62%
	Public / Utilities	530.46	0	0.00%
	Recreational	0.42	0.15	0.01%
	Residential	1,399.10	1,355.34	81.88%
	Retail / Commercial	72.53	68.83	4.16%
	Vacant	498.57	18.77	1.13%
	Total	**2,785.96**	**1,655.18**	**100.00%**

Source: FEMA DFIRM 6/16/2015, Sacramento County 2015 Parcel/Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the flood zones were counted and multiplied by the 2010 Census Bureau average household factors for Galt. According to this analysis, there is a total population of 0 residents of the City at risk to flooding in the 1% and 0.2% annual chance floodplain. This is shown in Table D-22.

Table D-22 City of Galt – Count of Improved Residential Parcels and Population by Flood Zone

Flood Zone	Improved Residential Parcels	Population*
1% Annual Chance	0	0
0.2% Annual Chance*	0	0
Total	**0**	**0**

Source: FEMA DFIRM 6/16/2015, Sacramento County 2015 Parcel/Assessor's Data, US Census Bureau

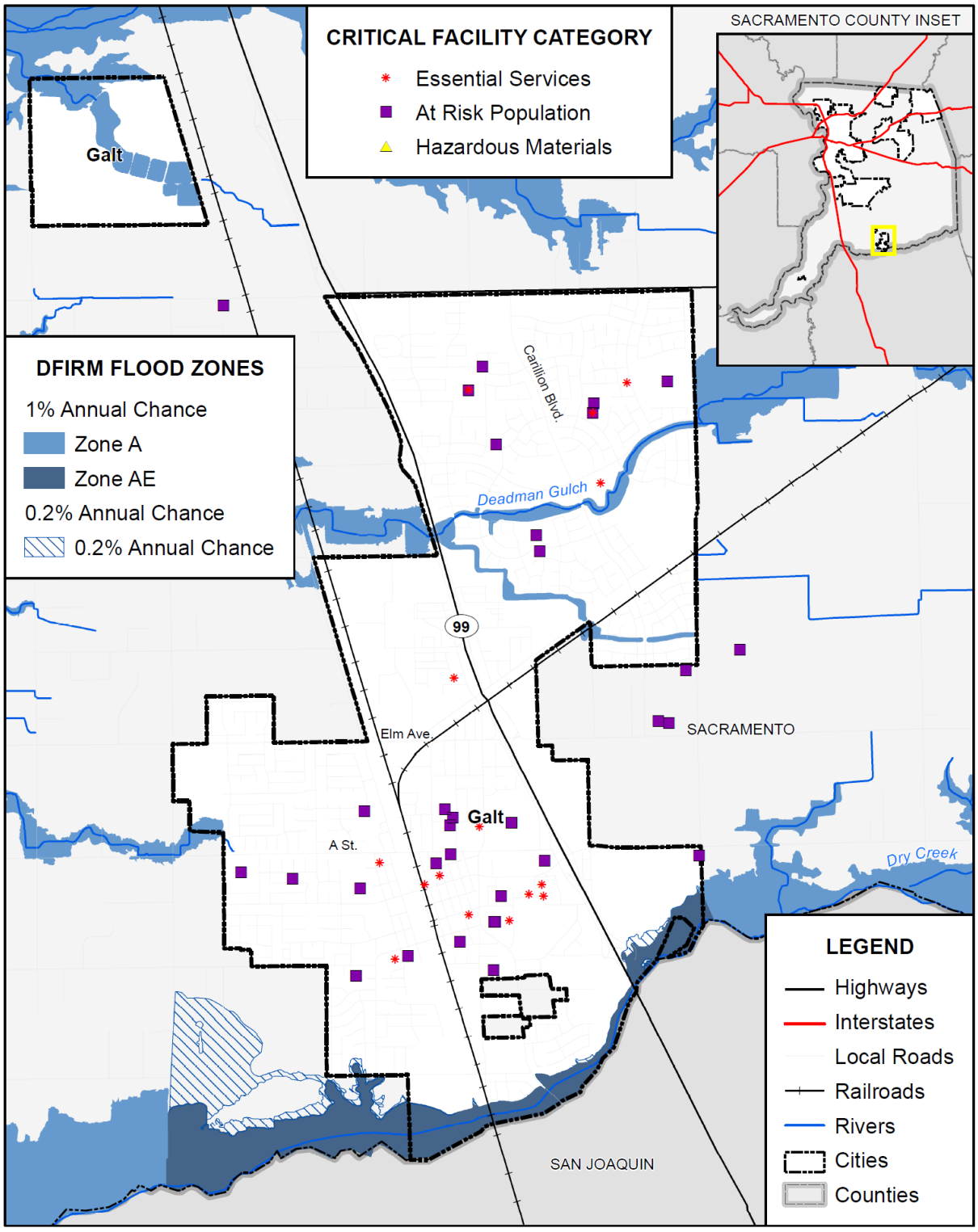
* Average household populations from the 2010 US Census were used: Galt– 3.24.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Galt in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersects a DFIRM flood hazard areas, and if so, which zone it intersects. Details of critical facilities in the floodplain in the City of Galt are shown in Figure D-9. As shown on the table and figure, Galt has no critical facilities located in 1% annual chance or 0.2% annual chance DFIRM flood zones. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure D-9 City of Galt – Critical Facilities and Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Galt joined the National Flood Insurance Program (NFIP) on December 1, 1981. The City does not participate in the CRS program. NFIP data indicates that as of February 16, 2016, there were 108 flood insurance policies in force in the City with $33,326,600 of coverage. Of the 108 policies, 105 were residential (single-family homes) and 3 were nonresidential; 6 of the policies were in A zones (the remaining 102 were in B, C, and X zones). The GIS parcel analysis detailed above identified 1 improved parcel in the 100-year flood zone. 6 policies for 1 parcel in the 100-year floodplain equates to insurance coverage of 100 percent. There have been 2 historical claims for flood losses totaling $69,338. There have been no substantial damage claims. NFIP data further indicates that there are no repetitive loss (RL) buildings in the City.

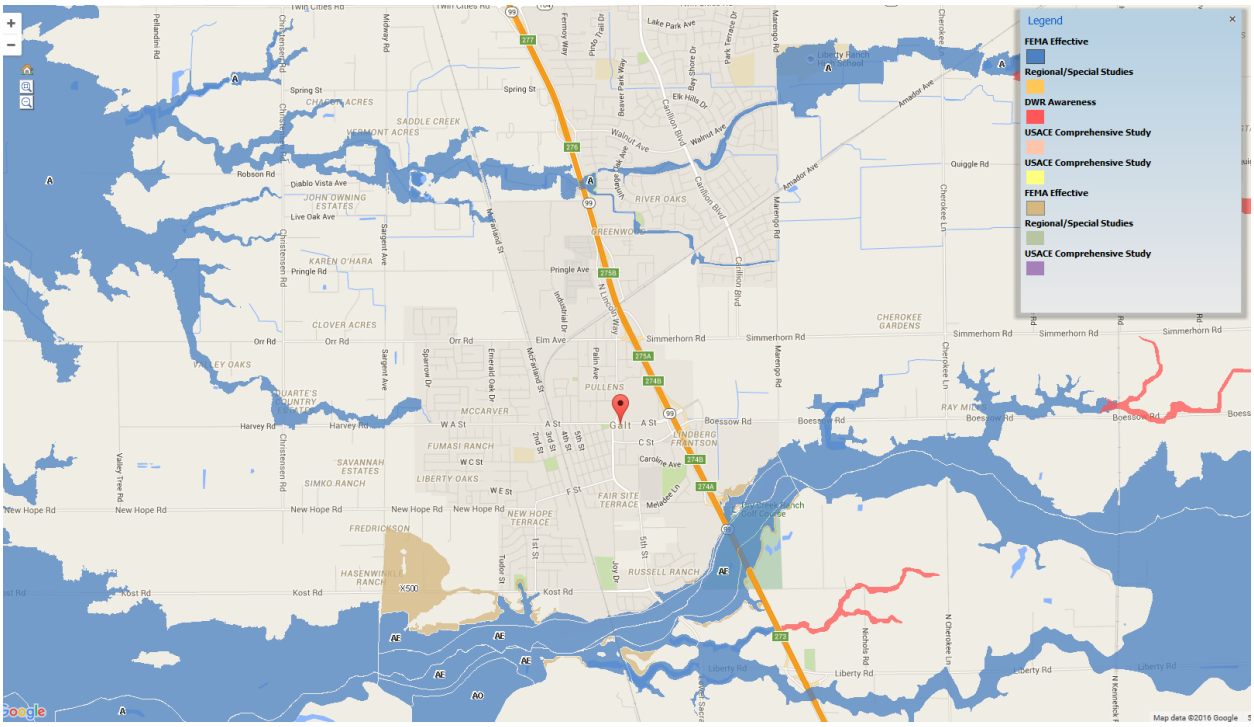
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Sacramento County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency, however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. The BAM map for Galt is shown in Figure D-10.

Figure D-10 City of Galt Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 100-Year, Orange – Local 100-Year (developed from local agencies), Red – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), Pink – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), Purple – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Natural Resources at Risk

Any potential number of plant, animal and invertebrate species may be at risk associated with regulatory wetlands contained within the floodplain.

Historic and Cultural Resources at Risk

The City Planning Team noted no facilities at risk.

Future Development

The City enforces the floodplain ordinance. If any development is to occur in the floodplain, it would have to conform to the elevation standards of the floodplain ordinance. No development is expected in the floodplain in the future.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding events can occur any time during the rainy season (November to April). These events result from prolonged, heavy rainfall and are characterized by high peak flows of moderate duration and large volumes of runoff. Flooding is more severe when prior rainfall has resulted in saturated ground conditions. Other localized flooding hazards are caused by obstacles to natural drainage flows, such as small creek dams and dikes formed by freeway and railroad fills.

Cloudburst storms, sometimes lasting as long as three hours, can occur any time from the late fall to early spring, and may occur as an extremely severe sequence within a general winter rainstorm. Flooding from cloudburst activity is characterized by high peak flow, short duration of flood flow, and a small volume of runoff.

Past Occurrences

The City Planning Team noted no identified occurrences of localized flooding during the timeframe of this LHMP. This is most likely due to the drought which plagued California for most of the past 5 years.

Vulnerability to Localized Flooding

Areas of localized flooding in the City of Galt include:

- Cedar Flat Way/Benteen Way
- Cobble Hill Way
- intersection Walnut Ave/Park Terrace Drive; Beeley Way
- G St and H St, between UPRR tracks and Church St
- Chabolla Drive, near intersection with Lincoln Way
- Park Ave/Camellia Way.

Future Development

Future development in the City will add more impervious surfaces and need to drain those waters. The City will need to be proactive to ensure that increased development has proper siting and drainage for stormwaters. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses.

Severe Weather: Extreme Temperatures: Cold/Freeze

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Temperature extremes tend to occur on an annual basis in Galt. Temperatures below freezing may occur in the city between November and March. Many months see a number of days where daily low temperatures fall below 32°F. Health impacts are the primary concern with this hazard, though economic

impacts are also an issue. The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures.

Past Occurrences

Past occurrences of extreme cold and freeze in the City are shown in both Table D-23 and Table D-24.

Table D-23 Record Low Temperatures in the City of Galt

Month	Temperature	Date	Month	Temperature	Date
January	20°	1/05/1950	July	48°	7/8/1983
February	23°	2/07/1989	August	48°	8/5/1950
March	26°	3/5/1971	September	42°	9/30/2007
April	31°	4/9/1999	October	35°	10/30/1948
May	34°	5/3/1950	November	26°	11/21/1941
June	41°	6/7/1950	December	18°	12/22/1990

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Table D-24 Average Number of Days in a Month Below 32°F in Galt

Month	Days Below 32°F	Month	Days Below 32°F
January	7.2	July	0
February	2.2	August	0
March	0.5	September	0
April	0	October	0
May	0	November	1.5
June	0	December	6.2

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Vulnerability to Cold and Freeze

Severe cold temperatures result in frozen and leaking water pipes, slippery road conditions, damage to crops and landscaping, and life-threatening situations for those who work out of doors and the homeless.

Future Development

Like extreme heat, vulnerability to freeze will increase as the average age of the population in the City shifts. Greater numbers of future senior citizens will result from the large number of baby boomers in the City. The elderly are more at risk to the effects of freeze. However, many of the residents of the City are accustomed to living with freeze and take precautions to guard against the threat of cold and freeze.

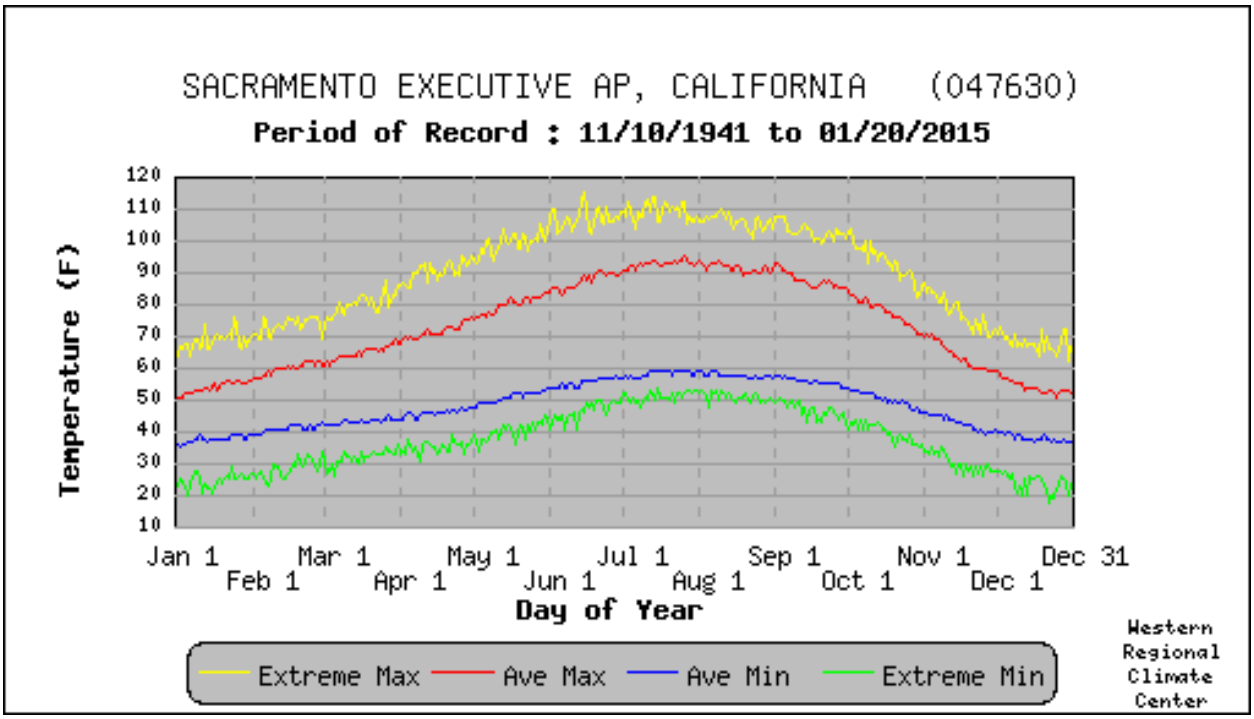
Severe Weather: Extreme Temperatures – Extreme Heat

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The City of Galt experiences temperatures in excess of 100 degrees during the summer and fall months. According to the nearest weather station to the City of Galt, the temperature moves to 105-110° F in rather extreme situations (see Figure D-11). Many months see a high number of days where daily high temperatures exceed 90°F. Generally, people who live and work in this weather are prepared to cope with the extremes in that they dress appropriately and stay in air conditioned buildings during the peak temperature periods of the day.

Figure D-11 Daily Temperatures Averages and Extremes for the City of Galt



Source: Western Regional Climate Center, Sacramento FAA Airport Station

Past Occurrences

Past average occurrences of extreme heat in the City of Galt are shown in both

Table D-25 and Table D-26.

Table D-25 Record High Temperatures in the City of Galt

Month	Temperature	Date	Month	Temperature	Date
January	74°	1/12/2009	July	114°	7//1983
February	76°	2/19/1964	August	110°	8/10/1996
March	88°	3/5/1971	September	108°	9/01/1950
April	95°	4/9/1999	October	104°	10/02/2001
May	105°	5/3/1950	November	87°	11/01/1960
June	115°	6/7/1950	December	73°	12/02/2011

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Table D-26 Average Number of Days in a Month Exceeding 90°F in Galt

Month	Days Exceeding 90°F	Month	Days Exceeding 90°F
January	0	July	21.4
February	0	August	19.0
March	0	September	12.6
April	0.5	October	2.5
May	5.5	November	0
June	11.6	December	0

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Vulnerability to Extreme Heat

Health impacts are the primary concern with this hazard, though economic impacts are also an issue. The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable.

Reliance on air conditioning causes a strain on the electrical energy in the Galt area. Occasionally peak demands outweigh supply and a condition known as brown-out occurs. This is an extremely dangerous situation for electrical equipment as it operates without the needed electricity causing damage to the systems. Days of extreme heat have been known to result in medical emergencies, civil unrest, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts.

Future Development

Vulnerability to extreme heat will increase as the average age of the population in each City shifts. Greater numbers of future senior citizens will result from the large number of baby boomers in the Planning Area. The elderly are more at risk to the effects of extreme heat, especially those without proper air conditioning. However, many of the residents of the City are accustomed to living with extreme heat and take precautions to guard against the threat of extreme heat.

Severe Weather: Fog

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The Sacramento Valley can produce some extremely dangerous fogs in the winter and early spring months. These are a type of radiation fog called "tule fog." Tule fog forms on cold and clear nights, when the ground is moist and there is very little wind. Under such conditions the ground cools quickly and thus cools the air above it as well. The moisture in this cooled air condenses and can create extremely dense fog. Since the air may be stagnant and there is little evaporative effect from the sun in winter months, tule fogs can last for several days and, in some instances, over a week. Under these conditions, visibility is often reduced to 600 feet, but can drop to less than 10 feet.

Past Occurrences

The City Planning Team noted no identified occurrences have been noted since the2011 LHMP.

Vulnerability to Fog

When tule fog forms, a severe risk is posed to traffic with the potential for multi-car pileups, especially on Highway 99. This may have an economic impact on the City due to delays in transportation times or even the shutting down of Highway 99. The same dense and lingering fog can also produce adverse health effects in those with respiratory ailments.

Future Development

Many of the residents of the City are accustomed to living with fog and take precautions to guard against the threat of fog, such as slowing down while traveling.

Severe Weather: Heavy Rains and Storms

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the City of Galt. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

The District Planning Team noted no identified occurrences have been noted during the timeframe of this LHMP.

Vulnerability to Heavy Rain and Storms

Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees. A list presented above in the discussion of the flood hazard details those areas within the City that are most often affected during these heavy storm events.

Future Development

The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from heavy storms and rain. Future development in the City is subject to these building codes. New critical facilities such as communications towers should be built to withstand hail damage, lightning, and heavy rains.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Low

Hazard Profile and Problem Description

The Cosumnes Community Services Fire District serves the Planning Area. Wildland fires are common in open space areas with vegetation that exhibits low fuel moisture (percentage of water in vegetation. High winds can also contribute to the severity of the fire. Generally, the undeveloped portions of the study area do not pose a high risk due to existing agricultural practices on the land. Most lands are actively cultivated with irrigated crops that have little fire fuel. However, grass fires can occur on uncultivated lands, particularly where there is native vegetation, such as the riparian corridors near local water courses. Fire hazards can also occur in urbanized areas of the study area. Residential and commercial structure fires can occur particularly in older neighborhoods. Additionally, some industrial processes can include the use or storage of flammable liquids. The storage of propane gas can also create a fire hazard.

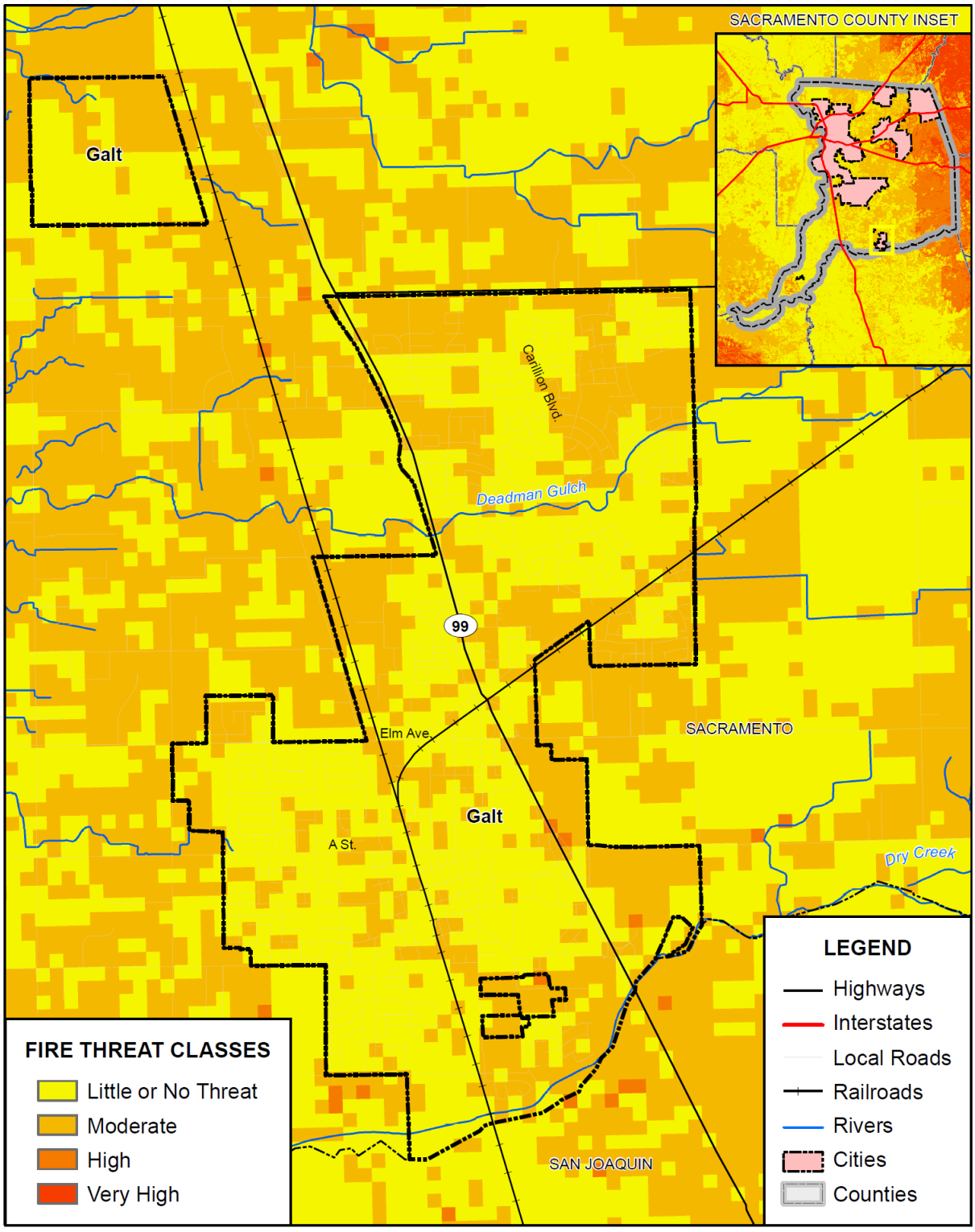
Past Occurrences

The City Planning Team noted no identified occurrences of wildfire since the 2011 LHMP.

Vulnerability to Wildfire

Following the methodology described in Section 4.3.17, a wildfire map for the City of Galt was created (see Figure D-12). Wildfire threat within the City ranges from low to moderate.

Figure D-12 City of Galt's Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Values at Risk

Analysis results for Galt are shown in Table D-27, which summarizes total parcel counts, improved parcel counts and their structure values by occupancy type affected by fire.

Table D-27 City of Galt – Count and Value of Parcels by Property Use and Fire Threat Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Little or No Threat					
Agricultural	3	$87,192	1	$129,519	$216,711
Care / Health	7	$604,727	7	$3,146,702	$3,751,429
Church / Welfare	13	$1,026,485	13	$5,182,557	$6,209,042
Industrial	30	$5,180,025	24	$13,027,907	$18,207,932
Miscellaneous	61	$87,617	0	$0	$87,617
Office	21	$2,224,550	20	$7,929,083	$10,153,633
Public / Utilities	84	$0	0	$0	$0
Recreational	2	$157,500	1	$315,000	$472,500
Residential	4,781	$260,660,991	4,733	$711,354,812	$972,015,803
Retail/Commercial	64	$14,033,547	59	$34,998,849	$49,032,396
Vacant	95	$10,786,699	11	$1,572,833	$12,359,532
Total	**5,161**	**$294,849,333**	**4,869**	**$777,657,262**	**$1,072,506,595**
Moderate					
Care / Health	3	$622,803	3	$2,055,783	$2,678,586
Church / Welfare	5	$280,448	3	$7,051,316	$7,331,764
Industrial	21	$12,209,981	18	$35,753,960	$47,963,941
Miscellaneous	45	$35,239	0	$0	$35,239
Office	6	$911,206	5	$2,947,829	$3,859,035
Public / Utilities	34	$0	0	$0	$0
Recreational	1	$5,584	1	$15,869	$21,453
Residential	1,931	$116,672,127	1,852	$342,186,720	$458,858,847
Retail/Commercial	23	$14,924,958	20	$39,595,016	$54,519,974
Vacant	174	$17,754,955	1	$6,262	$17,761,217
Moderate Total	**2,243**	**$163,417,301**	**1,903**	**$429,612,755**	**$593,030,056**
High					
Residential	3	$47,004	3	$177,790	$224,794
High Total	**3**	**$47,004**	**3**	**$177,790**	**$224,794**
Grand Total	**7,407**	**$458,313,638**	**6,775**	**$1,207,447,807**	**$1,665,761,445**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data, CAL FIRE

Population at Risk

The Fire Threat dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the threat zones were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction and unincorporated area. Results were tabulated by jurisdiction. According to this analysis, there is a total population of 6,010 residents of Galt at risk to moderate or higher wildfire risk. This is shown in Table D-28.

Table D-28 City of Galt – Count of Improved Residential Parcels and Population by Fire Threat Zone

Fire Threat Zone	Improved Residential Parcels	Population*
Little or No Threat	4,733	15,335
Moderate	1,852	6,000
High	3	10
Very High	0	0
Total	**6,588**	**21,345**

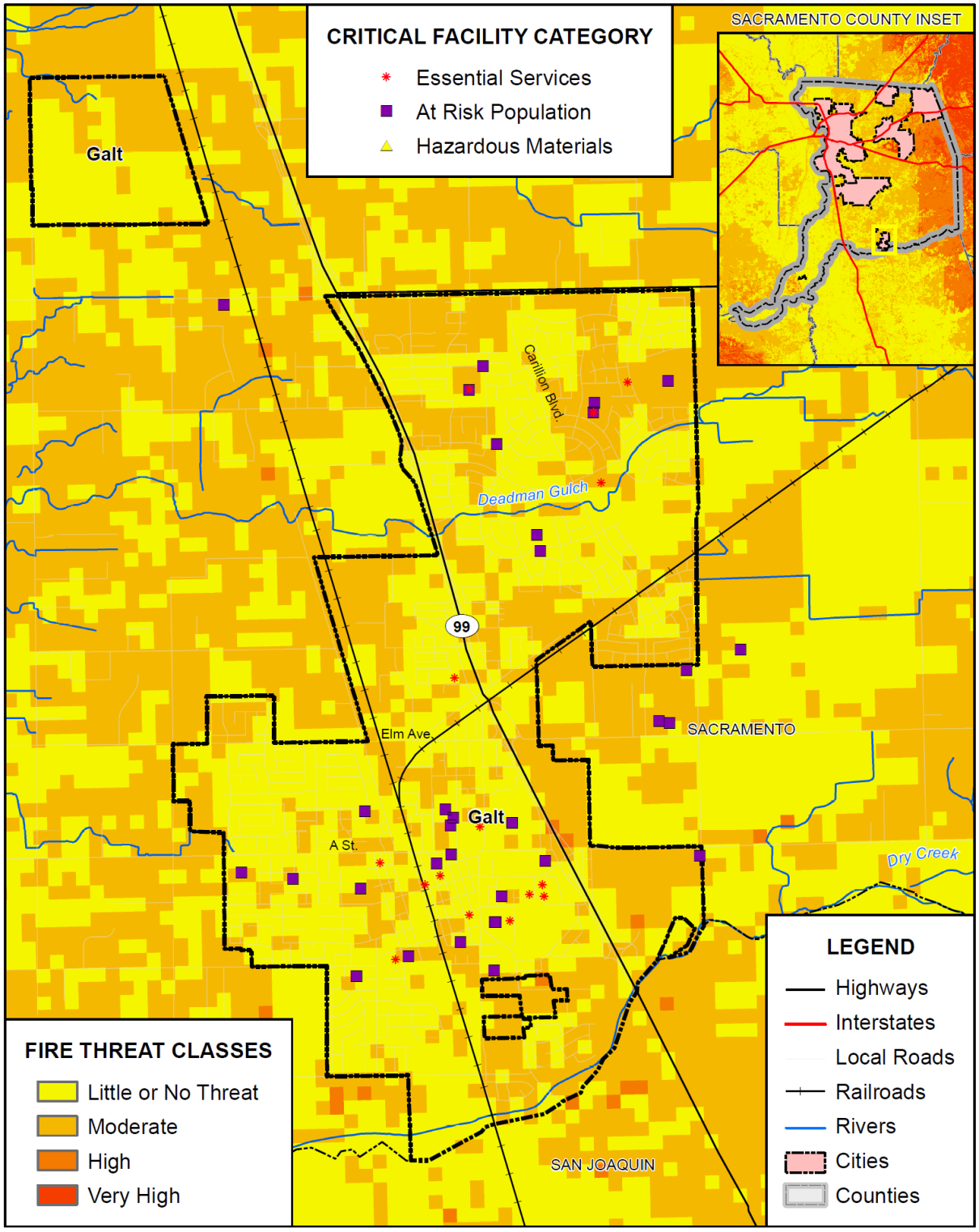
Source: Sacramento County 2016 Parcel/2015Assessor's Data, CAL FIRE

* Average household populations for Galt (3.24) from the 2010 US Census were used

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect a fire threat zone provided by CAL FIRE, and if so, which zone it intersects. There are 10 facilities in the moderate or higher fire threat zone in the City. These are shown in Figure D-13 and detailed in Table D-29. Details of critical facility definition, type, name and address and jurisdiction by fire threat zone are listed in Appendix E.

Figure D-13 City of Galt – Critical Facilities in the Fire Threat Zone



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table D-29 City of Galt – Critical Facilities in the Fire Threat Zone

Critical Facility Category	Facility Type	Facility Count
Little or No Threat		
Essential Services Facilities Total	Emergency Evacuation Shelter	6
	Fire Station	2
	Government Facilities	2
	Medical Health Facility	1
	Police	1
At Risk Population Facilities Total	Adult Day Care	1
	Adult Education School	1
	Adult Residential	3
	Day Care Center	4
	Private Elementary School	2
	Private K-12 School	2
	Public Continuation High School	1
	Public Elementary School	4
	Public High School	1
	Residential Care/Elderly	1
	School-Age Day Care Center	3
	Total	**23**
Hazardous Materials Facilities Total	Sewer Treatment Plant	1
	Total	**1**
Little or No Threat Total		**36**
Moderate		
Essential Services Facilities	Emergency Evacuation Shelter	2
	Fire Station	1
	Total	**3**
At Risk Population Facilities	Adult Residential	2
	Day Care Center	1
	Public Elementary School	1
	Public Middle School	2
	School-Age Day Care Center	1
	Total	**7**
Moderate Total		**10**
Grand Total		**46**

Source: CAL FIRE, Sacramento County GIS

Natural Resources at Risk

Depending on the nature and location, wildfires have the potential to impact natural resources in the City.

Historic and Cultural Resources at Risk

Depending on the nature and location, wildfires have the potential to impact historic and cultural resources in the City.

Future Development

Development may occur in the moderate or higher wildfire threat areas; however, City ordinances for building in these areas are enforced. Most pertinent is the requirement that any new Single Family Dwellings constructed shall have fire sprinkler system installed protecting the interior spaces.

D.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

D.6.1. Regulatory Mitigation Capabilities

Table D-30 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Galt.

Table D-30 City of Galt's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y 2010	
Capital Improvements Plan	Y	CIP is updated with every two-year budget cycle
Economic Development Plan	Y 2015	
Local Emergency Operations Plan	Y	
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	Y	
Engineering Studies for Streams	Y	FEMA adopted modified floodplain maps for portions of the City in October 20, 2016 based upon more detailed study of Dry Creek.

Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: 2017 CBC
Building Code Effectiveness Grading Schedule (BCEGS) Score		Score:
Fire department ISO rating:		Rating:
Site plan review requirements	Y	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Revised/Combined with subdivision ordinance 6/2015
Subdivision ordinance	Y	Revised/Combined with zoning ordinance 6/2015
Floodplain ordinance	Y 2012	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y 2002	Stormwater Protection
Flood insurance rate maps	Y 2012/2016	
Elevation Certificates		
Acquisition of land for open space and public recreation uses		
Erosion or sediment control program	Y 2002	
Other		

Source: City of Galt

General Plan

The City Council adopted the City of Galt's General Plan on April 7, 2009. Adoption of the General Plan in 2009 culminated a five-year period during which the City worked with the General Plan Advisory Committee, Planning Commission, and the City Council to update the General Plan.

The General Plan sets out a long-term vision for Galt's growth and outlines policies, standards, and programs to guide day-to-day decisions concerning Galt's development through the year 2030. Designed to meet the State planning requirements, the General Plan consists of two documents: The Existing Conditions Report and the Policy Document. The Existing Conditions Report inventories and analyzes the existing conditions and trends in Galt and provides the formal supporting documentation for general plan policies. The Policy Document is divided into two main parts. Part I is a summary of the General Plan, describing the nature and purpose of the plan, highlighting the guiding principles of the plan, and outlining the plan's main proposals. Part II contains explicit statements of goals, policies, standards, implementation programs,

and quantified objectives that constitute the formal policy of the City of Galt for land use, development and environmental quality.

In addition to the General Plan Existing Conditions Report and General Plan Policy Document, an Environmental Impact Report (EIR) analyzing the impacts and implications of the General Plan was prepared. The EIR, which is not formerly part of the General Plan, was prepared to meet the requirements of the California Environmental Quality Act.

Ordinances

The City of Galt has many ordinances related to mitigation.

Galt Development Code Ordinance (Title 18)

The purpose of this title is to protect and promote the public health, safety, peace, comfort, convenience, prosperity, and general welfare. More specifically, this title is adopted in order to achieve the objectives set forth in state law and the General Plan, including but not limited to the following:

- To guide the physical development of the City in a manner consistent with the goals, policies, and land use diagram of the Galt General Plan;
- To foster a compatibility among land uses;
- To promote the stability of existing land uses that conform with the General Plan and to protect them from incompatible intrusions;
- To ensure that public and private lands are ultimately used for the purposes which are most appropriate and most beneficial from the standpoint of the City as a whole;
- To promote a safe and effective traffic circulation system for vehicles, bicycles, and pedestrians;
- To provide adequate off-Street parking and loading facilities for vehicles and bicycles;
- To foster efficient removal of refuse and encourage the collection of recyclable materials;
- To facilitate the appropriate location of community facilities and institutions;
- To protect and enhance real property values; and
- To safeguard and enhance the appearance of the City.

Subdivision Ordinance (Combined into the Galt Development Code, adopted June 2015)

The ordinance codified in this title is adopted to supplement and implement the Subdivision Map Act set forth in Division 2, Title 7 of the California Government Code and may be cited as the "subdivision ordinance" of the City. The council of the city has, in the interest of protecting the health, safety and general welfare of the people of the city, adopted the ordinance codified in this title to carry out the following purposes:

- To implement the provisions of the Subdivision Map Act;
- To provide policies, standards, requirements and procedures to regulate and control the design and improvement of all subdivisions within the city;
- To implement the programs, policies and objectives of the General Plan of the city; and
- To promote the orderly growth and development of the city and to promote open space, conservation, protection and proper use of land, and to ensure provision for adequate traffic circulation, utilities and services.

No land shall be subdivided and developed for any purpose which is not in conformity with the general plan and any specific plan of the city or specifically authorized by the zoning ordinance or other applicable provisions of this code.

Floodplain Ordinance (Title 19)

Galt's Floodplain Ordinance was updated to conform to CA State Model Ordinance by 2012. FEMA has adopted DFIRM maps for Galt in 2012 and a portion in 2016. Copies of CA State DWR SB5 best available data floodplain maps were made available to the City on 7/2008.

Stormwater Ordinance (Title 16)

The purpose of this Chapter is to ensure, protect, and promote the health, safety, general welfare, and protection of property for city of Galt citizens by:

- Regulating non-storm water discharges to the city storm drain system;
- Controlling the discharge to city storm drain systems from spills, dumping, or disposal of materials other than storm water;
- Reducing pollutants in storm water discharges from the city storm drain system to the maximum extent practicable;
- Minimizing damage to surrounding properties and public rights-of-way, the degradation of the water quality of watercourses, and the disruption of natural or city authorized drainage flows caused by the activities of clearing and grubbing, grading, filling, and excavating of land, and sediment and pollutant runoff from other construction related activities, and to comply with the provisions of the city's NPDES permit. Significant grading activities are further regulated in Chapter 16.30, grading ordinance.

Erosion Control Ordinance (Chapter 16.30)

The grading ordinance is enacted for the purpose of regulating grading on property within the city limits of the city to safeguard life, limb, health, property and the public welfare; to avoid pollution of watercourses with nutrients, sediments, or other materials generated or caused by surface water runoff; to comply with the City's National Pollution Discharge Elimination System (NPDES) permit no. CA0082597, issued by the California Regional Water Quality Control Board and to ensure that the intended use of a graded site within the city limits is consistent with the City General Plan, any specific plans adopted thereto and all applicable city ordinances and regulations. The grading ordinance is intended to control all aspects of grading operations within the city limits of the City.

Fire Code (Chapter 15.28)

There is hereby adopted by the City Council of the City of Galt for the purpose of prescribing regulations governing conditions hazardous to life and property from fire or explosion, that certain code known as the California Fire Code, Title 24, California Code of Regulations, Part 9, incorporating the International Fire Code published by the International Code Council, being particularly the 2010 Edition, including the appendices thereof, and the International Fire Code Standards published by the International Code Council, being particularly the 2009 Edition, and the wholes thereof, save and except such portions as hereinafter deleted, modified or amended herein. Not less than one (1) copy of such code has been and now is filed with the Clerk of the City of Galt. From the effective date of the ordinance codified in this chapter, the

provisions thereof shall be controlling within the limits of the City of Galt except that any inconsistent regulations and ordinances adopted pursuant to applicable law by a fire protection district or a community service district having a fire department within the City shall be controlling by the City within that district's jurisdictional areas.

Weed, Rubble, and Rubbish Control (Chapter 8.32)

All weeds, rubble, rubbish or other rank growths located upon private property or upon sidewalks and streets abutting private property within the city, which constitute a fire menace or which are otherwise a menace to health or safety, are a public nuisance and may be abated as provided in this chapter. Notwithstanding any other portion of this chapter, no burning of weeds, rubble, rubbish or trash shall occur on any open space within the City.

Building Code (Chapter 15.04)

"California Code of Regulations, Title 24," 2013 Edition Parts 1 – 12, the Uniform Building Security Code, the Uniform Code for the Abatement of Dangerous Buildings, the Uniform Housing Code, the Uniform Sign Code, the Uniform Code for Building Conservation and the California Swimming Pool, Spa and Hot Tub Code are adopted by reference, save and except such portions as are hereinafter deleted or amended.

D.6.2. Administrative/Technical Mitigation Capabilities

Table D-31 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Galt.

Table D-31 City of Galt's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	
Mutual aid agreements	Y	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y FT	
Floodplain Administrator	Y FT	
Emergency Manager	Y	
Community Planner	Y	

Civil Engineer	Y	
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	Y	
Grant writing	N	
Hazus analysis	N	
Other		

Source: City of Galt

D.6.3. Fiscal Mitigation Capabilities

Table D-32 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table D-32 City of Galt's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas, or electric services	Y	Water, sewer, storm drainage
Impact fees for new development	Y	
Storm water utility fee	Y	Only adequate to fund minor maintenance projects
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	Y	
Community Development Block Grant	Y	
Other federal funding programs		
State funding programs		
Other		

Source: City of Galt

D.6.4. Mitigation Education, Outreach, and Partnerships

Table D-33 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information. More information can be found below the table.

Table D-33 City of Galt's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Quarterly newsletter mailed to every City Utility Account
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	Y	Community Emergency Response Team (CERT)
Other		

D.6.5. Other Mitigation Efforts

The City of Galt has no other ongoing mitigation efforts to include.

D.7 Mitigation Strategy

D.7.1. Mitigation Goals and Objectives

The City of Galt adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

D.7.2. NFIP Mitigation Strategy

The City of Galt has participated in the Regular Phase of the NFIP since 1981. Since then, the City has administered floodplain management regulations that meet the minimum requirements of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country.

The Community Rating System (CRS) was created in 1990. It is designed to recognize floodplain management activities that are above and beyond the NFIP's minimum requirements. If a community implements public information, mapping, regulatory, loss reduction and/or flood preparedness activities and submits the appropriate documentation to the FEMA, then its residents can qualify for a flood insurance premium rate reduction. Given the limited number of structures in the City that are affected by the special flood hazard area, the City of Galt is not contemplating joining CRS at this time.

Presently, the City of Galt manages its floodplains in compliance with NFIP requirements and implements a floodplain management program designed to protect the people and property of the City. These floodplain management activities implemented by the City include:

General Plan policies limiting development from occurring in the special flood hazard area. Below is the excerpt from the City's General Plan Safety and Seismic element relating to flood hazards:

Flood Hazards

The goal and policies of this section seek to protect development from flood damage. The Galt Planning Area is bounded on the north by Laguna and Skunk Creeks, on the west by the Cosumnes River, and on the south by Dry Creek. In the event of a severe storm, these water bodies, along with Deadman Gulch, could overtop resulting in flooding. The Federal Emergency Management Agency (FEMA) conducts studies to identify floodplains and to require existing development in those areas to secure flood insurance. The FEMA-mapped 100-year and 500-year floodplains within the Planning Area are shown in Figure SS-1.

General Plan Goal SS-3: To protect the lives and property of residents and visitors to Galt from flooding hazards and manage floodplains for their open space and natural resource values.

Policy SS-3.1: Floodplain Mapping

The City shall use the most current FEMA floodplain map to direct development outside of the 100-year floodplain.

Policy SS-3.2: Development in 100-year Floodplain

The City shall prohibit development in the 100-year floodplain of streams to minimize safety hazards, property loss, environmental disruption, and to promote stream enhancement, improved water quality, recreational opportunities, and groundwater recharge.

Policy SS-3.3: Natural Drainageways Enhancements

The City should promote the aesthetic, environmental, and functional improvement of natural drainageways where water courses have been disrupted in such a manner as to balance the protection of abutting uses with the consideration of environmental, recreational, and open space needs.

More information about the floodplain administration in the City of Galt can be found in Table D-34.

Table D-34 City of Galt Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	108 $54,421 $33,326,600

NFIP Topic	Comments
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	2 $69,338.31 0
How many structures are exposed to flood risk within the community?	0
Describe any areas of flood risk with limited NFIP policy coverage	N/A
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	No
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review, engineering capabilities
What are the barriers to running an effective NFIP program in the community, if any?	None
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	CAC, June 2016
Is a CAV or CAC scheduled or needed?	No
Regulation	
When did the community enter the NFIP?	12/1/1981
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Minimum floor elevation is one foot above BFE
Provide an explanation of the permitting process.	All building permits are reviewed
Community Rating System	
Does the community participate in CRS?	No
What is the community's CRS Class Ranking?	N/A
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

D.7.3. Mitigation Actions

The planning team for the City of Galt identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: All hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: City of Galt Planning Department

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Increase Redundancy/Functionality of Water Wells and Sewer Lift Stations

Hazard Addressed: Multi-hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: Water wells and sewer lift stations are critical facilities for the City. Having redundancy and functionality during a disaster would be key.

Other Alternatives: None.

Existing Planning Mechanisms through which Action will be Implemented: Water and wastewater systems master plans

Responsible Office: Public Works

Priority (High, Medium, Low): High

Cost Estimate: $20,000 per year.

Potential Funding: Utility ratepayers, disaster mitigation grants

Benefits (avoided Losses): Water and wastewater services would still continue to function in the City during a disaster.

Schedule: Within 5 years.

Action 3. Drain Inlet Retrofit Capital Improvement Plan (CIP)

Hazard Addressed: Localized Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: One aspect that is identified that contributes to local flooding hazard is the capacity of old drain inlets.

Other Alternatives: None identified.

Existing Planning Mechanisms through which Action will be Implemented: Pavement Management systems/CIP

Responsible Office: Public Works

Priority (High, Medium, Low): Low

Cost Estimate: $10,000 per year

Potential Funding: City stormwater utility fee

Benefits (avoided Losses):

Schedule: Within 5 years.

Action 4. Creek/Streams Vegetation Management Plan

Hazard Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Channelized creek/streams in Galt's developed areas have been in place for approximately 20 years. Vegetation has grown and USACE permits restrict conventional vegetation control methods. The City has had very good results using goats for vegetation management.

Other Alternatives: More expensive hand treatments.

Existing Planning Mechanisms through which Action will be Implemented:

Responsible Office: Public Works

Priority (High, Medium, Low): Low

Cost Estimate: $10,000

Potential Funding: City stormwater utility funds.

Benefits (avoided Losses): Ensures flood capacity and flow capacity of streams and creeks is not diminished due to excess vegetation growth.

Schedule: Within 5 years

Action 5. Increase Data Capacity of Emergency Frequencies

Hazard Addressed: Multi-hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: Frequency microwave transmissions carry increasing data streams in addition to voice.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented:

Responsible Office: Police Department

Priority (High, Medium, Low): Medium

Cost Estimate: $22,000

Potential Funding: Various emergency response, homeland security, and pre-disaster mitigation grants.

Benefits (avoided Losses): Data streaming won't be a choke point in communications. This can increase response capabilities to natural hazards, which can result in increased life safety and reduced property losses.

Schedule: As grant funding is available.

Annex E City of Rancho Cordova

E.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Rancho Cordova, a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to the City of Rancho Cordova, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this community.

E.2 Planning Process

As described above, the City of Rancho Cordova followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC) and Steering Committee, the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table E-1. Additional details on plan participation and City representatives are included in Appendix A.

Table E-1 City of Rancho Cordova Planning Team

Name	Position/Title	How Participated
Albert Stricker	PW Director	Reviewed draft LHMP
June Cowles	Senior Planner	Reviewed draft LHMP. Attended HMPC meetings.
Todd Humphrey	Facilities Manager	Reviewed draft LHMP and provided input
Joe Cuffe	Interim Chief Building Official	Reviewed draft LHMP and provided input
Allen Quynn	Associate Civil Engineer	Reviewed draft LHMP and provided input as well as coordinated review within the City. Attended HMPC meetings.
Amanda Norton	Economic Development Analyst	Reviewed draft
Mark Dumford	IT Manager	Provided updated GIS information
Steve Harriman	Operations and Maintenance Manager	Reviewed LHMP and provided input
Ashley Downton	Communications Specialist	Reviewed LHMP and provided input
Stacey Rappleye	Building Permit Technician II	Reviewed LHMP and provided input

E.2.1. Coordination with Other Community Planning Efforts

Coordination with other community planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the City integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table E-2.

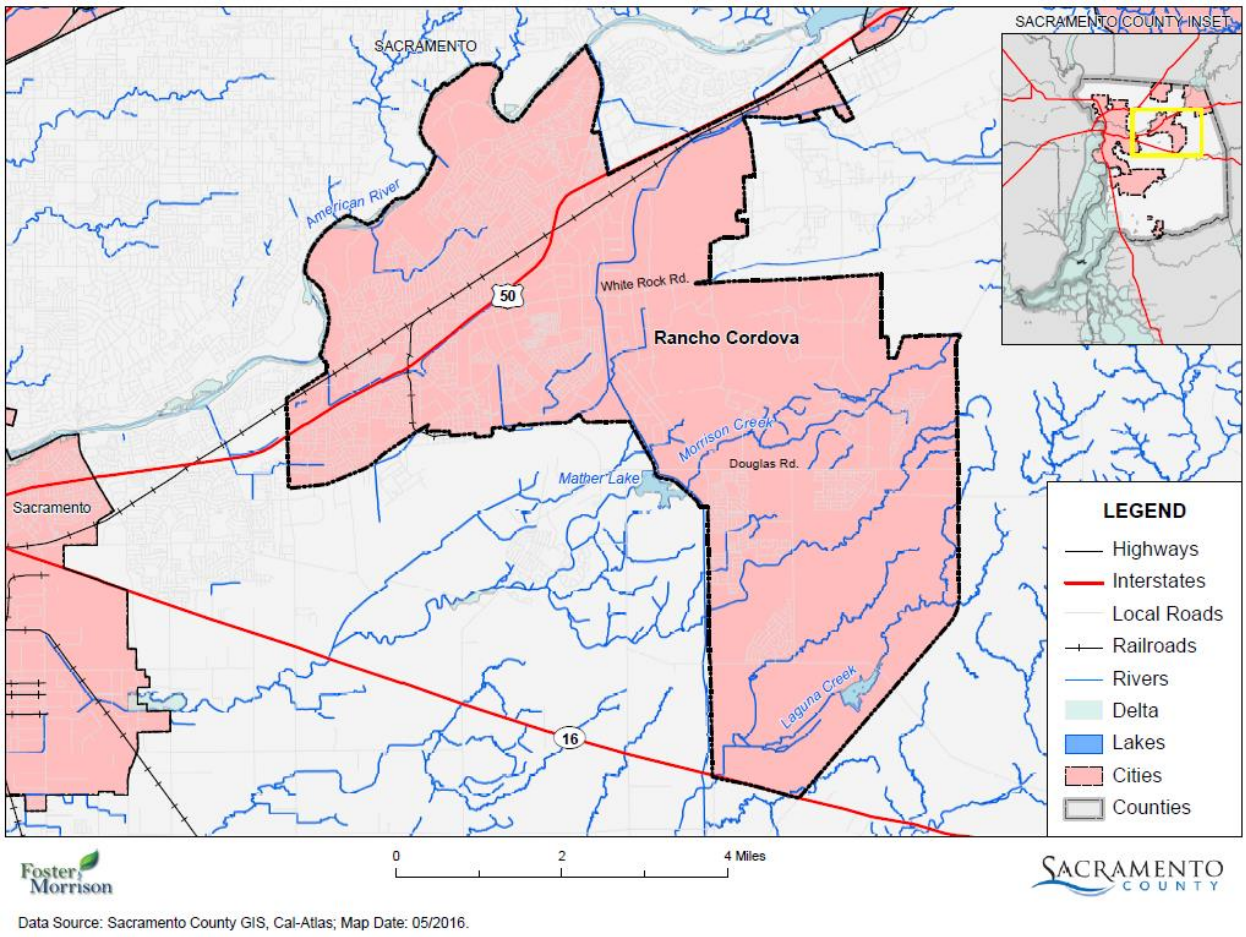
Table E-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
LHMP still has not been incorporated into GP	LHMP will be incorporated in next GP update.
Other	The 2011 LHMP Update was not incorporated into other plans or programs.

E.3 Community Profile

The community profile for the City of Rancho Cordova is detailed in the following sections. Figure E-1 displays a map and the location of the City of Rancho Cordova within Sacramento County.

Figure E-1 City of Rancho Cordova



E.3.1. Geography and Climate

The City of Rancho Cordova is located in northern Sacramento County, California within the Highway 50 corridor between the cities of Sacramento to the west, Folsom to the northeast, Elk Grove to the southwest and the unincorporated community of Fair Oaks to the north. Rancho Cordova covers approximately 34.8 square miles of land, the majority of which historically consisted of flat grassland and oak woodlands. The City is generally bordered by the American River to the north, Hazel Ave and the boundary of the 100-year floodplain for the Consumnes River on the east, Jackson Highway on the south, and Bradshaw Road on the west.

The City of Rancho Cordova contains a wide range of existing land uses, including approximately 3,582 acres of residential developments, 441 acres of commercial/retail uses, 894 acres of office uses, and

approximately 837 acres of industrial uses within the City limits. In addition, there are approximately 9,746 acres of agricultural (vacant) uses, and over 2,198 acres of public/private recreation and natural preserve uses. Mather Airport is located along the southwest boundary of the City, and the Aerojet Rocket Testing Facility is located to the east.

Located within the City are various creeks, tributaries, drainage basins and surface waterways including: the American River, Cordova Creek, Morrison Creek and its tributaries, Laguna Creek, Buffalo Creek and the Folsom South Canal. The American River parkway on the City's northern boundary is a portion of a 29 mile open space greenbelt that provides flood protection and recreational opportunities within the City limits. The floodplain of the Cosumnes River is located to the southeast of the City's boundary.

Rancho Cordova, like much of the California Central Valley has a Mediterranean climate characterized by damp to wet, mild winters and hot, dry summers. The wet season runs from October through April, though there is occasional light rainfall in the summer months. The annual temperature mean is 61.1 °F, with monthly means ranging from 45.8°F in December to 75.4 °F in July. Summer high temperatures are often moderated by an ocean breeze known as the "delta breeze": which comes through the Sacramento-San Joaquin River Delta from the San Francisco Bay.

E.3.2. History

The earliest evidence of human occupation in the Rancho Cordova area is archaeological explorations of the Windmiller Pattern which dates from 4,500-2,500 Before Present (B.P.). Evidence suggests populations during this early horizon probably emphasized hunting and fishing, with seed collecting as a supplement to the diet. Later occupations during the Middle (2,500 B.P.-A.D. 500) and Late Horizons (A.D. 500-to Euroamerican contact) show similarities to the Early horizon culture, though local innovation or cultural blending seems to have resulted in intensive fishing, acorn use, and elaborate social and ceremonial customs.

Rancho Cordova and the surrounding area are in Valley Nisenan territory, one of a large population of Native Americans groups that inhabitated a variety of ecological settings California prior to the arrival of Euroamericans. The Nisenan historically lived in permanent villages that were usually located on raised areas to avoid flooding. Organized around household family or household units that combined to form tribelets, the Valley Nisenan fostered trading relationships with surrounding groups for commodities such as salt, marine shells, and basketry.

Spanish exploration of the Central Valley dates to the late 1700s, but exploration of the Northern section of the Central Valley and contact with its Native American population did not begin until the early 1800s when Spanish missionaries moved in from the coastal areas. In 1833, the missions were secularized and their lands divided among the Californians as land grants called ranchos. These ranchos, such as the 35,000-acre Rancho Rio de los Americanos, part of which is located within the City, facilitated the growth of a semi-aristocratic group that controlled the large ranchos.

During the middle of the 19th century trails were being blazed across the plains and mountains facilitating the westward migration of Euroamericans. Rancho Rio de los Americanos however remained largely undeveloped until the discovery of gold in 1848 which resulted in a flood of Euroamericans in the region

and caused a dramatic alteration of both Native American and Euroamerican cultural patterns. The second half of the nineteenth century witnessed an ongoing and growing immigration of Euroamericans into the area, an influx also accompanied by regional cultural and economic changes. These changes are highlighted by the development of the Rancho Cordova area associated with expanding business opportunities related to gold mining, agriculture, and/or ranching.

On July 1, 2003, after more than 20 years of advocacy, the City of Rancho Cordova officially incorporated, becoming the 478th city in the State of California. Located in the eastern part of Sacramento County, Rancho Cordova is a community with a rich history including the first 12 miles of railroad in California, a thriving military base in its time, and the home of a successful aerospace company.

E.3.3. Economy and Tax Base

US Census estimates show economic characteristics for the City of Rancho Cordova. These are shown in Table E-3 and Table E-9. Mean household income in the City was $70,118. Median household income in the City was $58,979.

Table E-3 City of Rancho Cordova Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	43	0.1%
Construction	2,098	7.1%
Manufacturing	2,085	7.0%
Wholesale trade	655	2.2%
Retail trade	3,026	10.2%
Transportation and warehousing, and utilities	1,401	4.7%
Information	732	2.5%
Finance and insurance, and real estate and rental and leasing	2,619	8.8%
Professional, scientific, and management, and administrative and waste management services	3,482	11.7%
Educational services, and health care and social assistance	6,406	21.6%
Arts, entertainment, and recreation, and accommodation and food services	2,446	8.2%
Other services, except public administration	1,580	5.3%
Public administration	3,151	10.6%

Source: US Census Bureau American Community Survey 2010-2014 Estimates

Table E-4 City of Rancho Cordova Income and Benefits

Income Bracket	Population	Percent
>$10,000	701	4.3%
$10,000 – $14,999	672	4.1%

Income Bracket	Population	Percent
$15,000 - $24,9999	1,701	10.5%
$25,000 – $34,999	1,567	9.6%
$35,000 – $49,999	2,294	14.1%
$50,000 – $74,999	3,294	20.3%
$75,000 – $99,999	2,284	14.1%
$100,000 – $149,999	2,502	15.4%
$150,000 – $199,999	830	5.1%
$200,000 or more	409	2.5%

Source: US Census Bureau, 2010

The largest employers with the City of Rancho Cordova are shown in Table E-5.

Table E-5 Largest Employers in the City of Rancho Cordova

Employer	Employer
75 to 99 Employees	
US Post Office	Heritage Community Cu
California Highway Patrol	Jl Haley Enterprises
St Jude Medical	Brookfields Restaurant
Rayco Electric Inc.	Moss Adams LLP
Cameron & Co The Pharmacist	Outback Steakhouse
Parole & Community Svc Div.	Custom Electrical Contractors
3D DATACOM	Design Rite Xl
Sacramento County Sheriff Dept.	Sacramento City Sheriff Air Op
Toliver Plastering Inc	Sacramento County Investigations
Keenan & Assoc.	Rancho Cordova Elem School
SAFE Credit Union	Carey Limousine
White Rock Elementary	
100–299 Employees	
Walmart Supercenter	Home Depot
Data Process Pro Assn	Koreana Plaza Market
Sunworld LLC	Wells Fargo Education Financial
Home Instead Senior Care	Costco
Omobia	Republic Services
Fireman's Fund Insurance	Bel Air Markets
Guardsmark	Cordova High School
Naturwood Home Furnishings Inc.	Claims Management Inc.
California Compensation Ins. Co.	Sun World Landscape

Employer	Employer
EDS Corp.	Barco Inc.
Wells Fargo Insurance Svc.	Cordova Casino
Wmp Sales Marriott Intl.	Infor Global Solutions
Marriott-Rancho Cordova	Target
Water Quality Control Board	Pacific Coast Building Prods
Azteca Construction Inc.	Kind Care Home LLC
Lowe's Home Improvement	Broadspire Services
Publix Super Market	Old Spaghetti Factory
CA Technologies	Stantec Consulting
Casa Coloma Health Care Ctr.	Sacramento County Revenue Dept.
Tri Tool Inc	International Business
Dye Ann's Tender Loving Cr Hm	Pacific Jet Charter Inc.
Timberlake Cabinet Co.	Wittman Enterprises LLC
Reserve America	C C Myers Inc.
H T Rodil Care Homes Inc.	Tru Green
PMC	Lifemasters Supported Selfcare
Re/Max Gold	Progressive Insurance
ACCO Engineered Systems	Altair Eyewear
Valley	Pick-N-Pull
Reliance Insurance Co.	Nec Solutions America
Mc Kesson Corp.	Safeway
Encompass Insurance Co.	Sacramento County Environmental
CTB Mc Graw-Hill	
300+ Employees	
Aerojet Rocketdyne Hldngs Inc	Dignity Health System Office
AMPAC Fine Chemicals LLC	Health Net
Delta Dental Of Missouri	Hewlett-Packard
Aerojet Rocketdyne Inc.	CVC
Aerojet International Inc.	Cabledata Inc.
Franklin Resources Inc.	USCS International Inc
VSP Global	Motion Control Engineering Inc.
Foundation Health Special Svc.	Renaissance Food Group LLC
Health Net Federal Svc LLC	Department-Technology Svc
J P Aerospace	Cisco Systems
Mather Aerospace Modelers Inc.	Teledyne MEC
Maximus Inc.	Genworth Financial
FFP Global Inc.	Liberty Reverse Mortgage

Employer	Employer
Superior Pacific Ins. Group	Care Mark Inc.

Source: City of Rancho Cordova Economic Development Department, May 2016

The City has a wide and varied tax base. Tax base information is tracked and maintained by the Sacramento County Assessor's Office. The following tables show the tax base for the City. Table E-6 shows the secured real property value for Rancho Cordova. Table E-7 breaks out the City by land use.

Table E-6 City of Rancho Cordova – Tax Roll Totals by Jurisdiction

Jurisdiction	2015-16 Value ($)	2016-17 Value ($)	Current Year Change	Percent of Current Roll*
Rancho Cordova	7,313,825,493	7,793,218,613	6%	5

Source: Sacramento County Assessor's Office
*Percentages rounded to the nearest whole number

Table E-7 City of Rancho Cordova – Summary of Property Types

Jurisdiction	Single Family with HEX*	Single Family Without HEX*	Multi-Family Residential	Vacant Land	Commercial	Agricultural	Mobile Homes	Other	Total
Rancho Cordova	9,113	8,036	921	1,539	1,324	25	1,350	329	22,637

Source: Sacramento County Assessor's Office
*Homeowners' Exemption

E.3.4. Population

The California Department of Finance estimated the January 1, 2015 total population for the City of Rancho Cordova was 72,203.

Select demographic information from the 2014 US Census American Community Survey (the most recent data available) is shown in Table E-8.

Table E-8 City of Rancho Cordova Demographic Information

Demographic Characteristic	Number	Percent
Race		
White	42,366	63.1%
Black or African American	6,675	9.9%
American Indian or Alaska Native	415	0.6%
Asian	7,741	11.5%
Hawaiian or Pacific Islander	767	1.1%
Two or more races	5,025	7.5%
Households*		

Demographic Characteristic	Number	Percent
Total Households	23,448	–
Average Household Size	2.75	–

Source: US Census Bureau American Community Survey 2010-2014 Estimates; *US Census Bureau, 2010

E.4 Hazard Identification

Rancho Cordova's planning team identified the hazards that affect the City and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to Rancho Cordova (see Table E-9).

Table E-9 City of Rancho Cordova—Hazard Identification Assessment

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Unlikely	Negligible	Low
Bird Strike	Limited	Likely	Negligible	Low
Climate Change	Extensive	Likely	Limited	Low
Dam Failure	Limited	Unlikely	Limited	Medium
Drought and Water Shortage	Limited	Likely	Critical	Medium
Earthquake	Critical	Occasional	Significant	Low
Earthquake: Liquefaction	Significant	Unlikely	Critical	Low
Flood: 100/200/500-year	Significant	Occasional/Unlikely	Critical	Medium
Flood: Localized Stormwater Flooding	Significant	Highly Likely	Limited	Medium
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Limited	Unlikely	Negligible	Low
River/Stream/Creek Bank Erosion	Limited	Likely	Negligible	Low
Severe Weather: Extreme Temperatures – Cold/Freeze	Significant	Highly Likely	Negligible	Low
Severe Weather: Extreme Temperatures – Heat	Significant	Occasionally	Negligible	Low
Severe Weather: Fog	Significant	Likely	Negligible	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Significant	Likely	Limited	Medium
Severe Weather: Wind and Tornadoes	Limited	Unlikely	Negligible	Low
Subsidence	Limited	Unlikely	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Occasional	Negligible	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

E.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Rancho Cordova's hazards and assess the City's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City of Rancho Cordova is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City of Rancho Cordova and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

E.5.1. Hazard Profile

Each hazard vulnerability assessment in Section E.5.3, includes a description as to how the hazard affects the City and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

E.5.2. Vulnerability Assessment and Total Assets at Risk

This section presents the vulnerability assessment for the City and identifies Rancho Cordova's total assets at risk, including values at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Values at Risk

The following data from the Sacramento County Assessor's Office is based on the 2015 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table E-10 shows the 2015 Assessor's values (e.g., the values at risk) broken down by property type for the City of Rancho Cordova.

Table E-10 City of Rancho Cordova – Total Values at Risk by Property Use

Property Use	Parcels	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	26	4	$23,835,393	$279,917	$24,115,310
Care / Health	16	16	$3,018,898	$12,920,250	$15,939,148
Church / Welfare	33	32	$17,218,354	$49,673,451	$66,891,805
Industrial	591	558	$228,179,282	$529,055,369	$757,234,651
Miscellaneous	261	1	$803,547	$989	$804,536
Office	252	232	$203,151,527	$906,493,093	$1,109,644,620
Public / Utilities	288	2	$1,441,646	$1,439,116	$2,880,762
Recreational	9	7	$4,340,406	$12,225,826	$16,566,232
Residential	17,480	16,983	$1,102,307,873	$2,867,551,107	$3,969,858,980
Retail / Commercial	249	236	$158,648,849	$294,710,434	$453,359,283
Vacant	1,282	21	$177,638,537	$4,390,979	$182,029,516
No Data	0	0	$0	$0	$0
Total	**20,487**	**18,092**	**$1,920,584,312**	**$4,678,740,531**	**$6,599,324,843**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facilities and Infrastructure

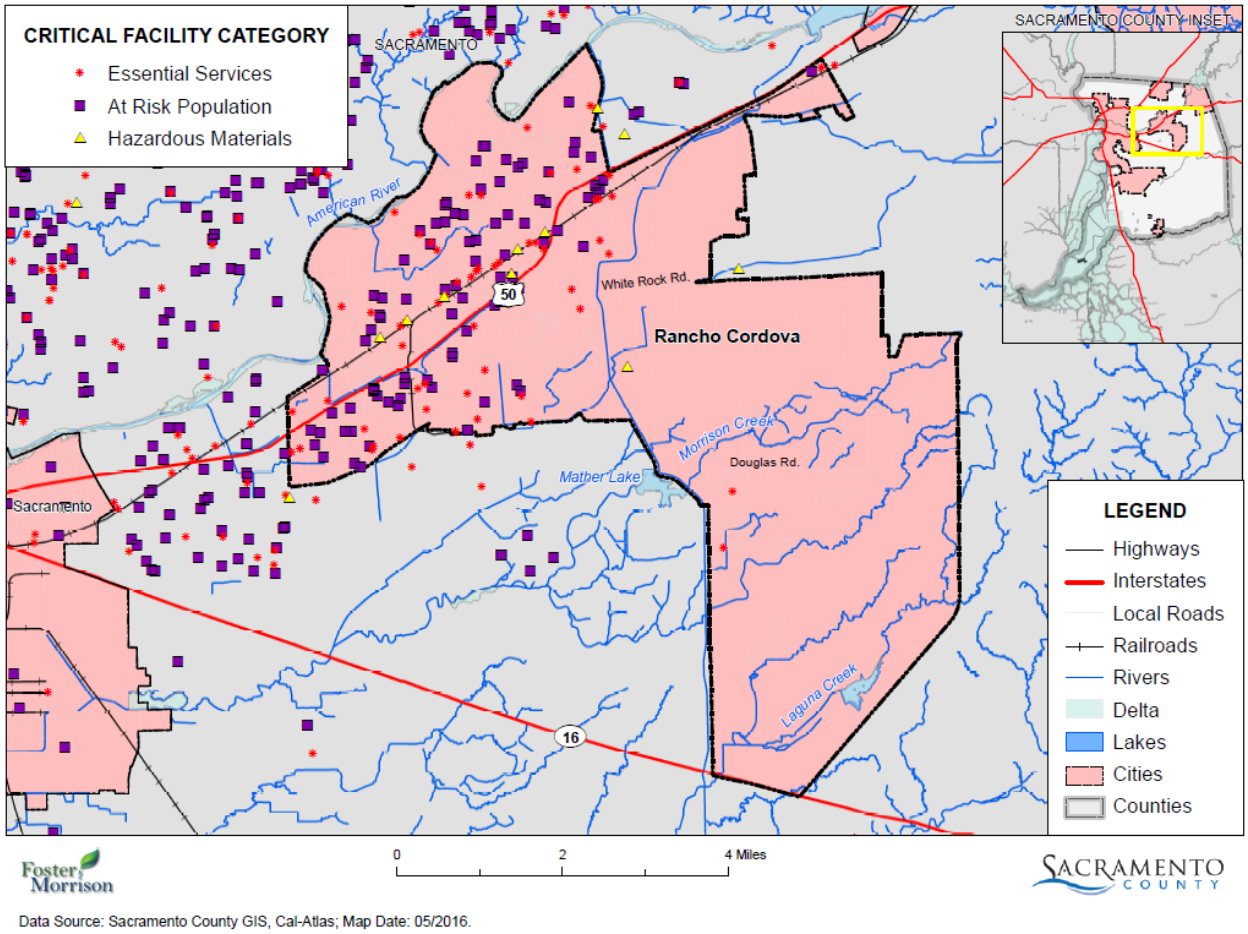
For purposes of this plan, a critical facility is defined as:

> *Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.*

This definition was refined by separating out three classes of critical facilities, that include Essential Services Facilities, At Risk Population Facilities, and Hazardous Materials Facilities, as further described in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Rancho Cordova from Sacramento County GIS is shown on Figure E-2 and detailed in Table E-11. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix E.

Figure E-2 City of Rancho Cordova – Critical Facilities



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

Table E-11 City of Rancho Cordova – Critical Facilities Inventory

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Dispatch Center	1
	Drainage	6
	Emergency Evacuation Shelter	13
	Emergency Rooms	1
	EOC	1
	Fire Station	4
	Gas Storage	1
	Government Facilities	4
	Hospitals	1
	Light Rail Stop	7
	Medical Health Facility	15
	Police	2

Critical Facility Category	Facility Type	Facility Count
	State Facility	1
	Total	**57**
At Risk Population Facilities	Adult Education School	1
	Adult Residential	10
	College/University	1
	Day Care Center	23
	Group Home	6
	Hotel	19
	Independent Study School	1
	Private Elementary School	2
	Private High School	2
	Private K-12 School	1
	Public Continuation High School	1
	Public Elementary School	11
	Public High School	1
	Public Middle School	2
	Residential Care/Elderly	11
	School	1
	School-Age Day Care Center	2
	Special Education School	3
	Total	**98**
Hazardous Materials Facilities	Oil Collection Center	0
	Total	**8**
Grand Total		**163**

Source: Sacramento County GIS

Natural Resources

On the basis of origin, natural resources (economically referred to as raw materials) can be grouped into abiotic (non-living) and biotic (living) resources. Soils, mineral and surface waters comprise the main abiotic natural resources considered here while plant and animal communities comprise the biotic natural resources.

The majority of the soils in the City are the result of alluvial deposits, or river and lake deposits on various geomorphic surfaces. In terms of soil characteristics, surface runoff, soil erosion, and expansive soils can create potential problems for engineering designs and land use activities. The majority of the area soils are characterized by slight to moderate erosion potential, and very low to medium runoff rates.

Historic mineral production in the region has included construction aggregate, kaolin clay, common clay, pumice, and gold. Construction aggregate consists of sand, gravel, and crushed stone. Existing mineral extraction activities that occur in and around the Rancho Cordova Planning Area consist primarily of fine sand and coarse gravel construction aggregates, as well as clay. Construction aggregates come from two different sources: hardbed rock sources and river channel (alluvial) sources. Generally, sand, gravel, and clay are used as fill and for the construction of highways and roads, streets, urban and suburban development, canals, aqueducts, and pond linings, among other uses.

The City of Rancho Cordova has a variety of natural resources of value to the community. A variety of unique and valuable habitats are found within the City, including, but not limited to, oak and cottonwood woodlands, various grasslands, vernal pool areas, and open water and rivers. Major surface waters in the vicinity of the Rancho Cordova include the American River to the north and other surface waters within the City limits include the Folsom South Canal as well as Laguna and Morrison Creeks. There are approximately 609 acres of vernal pools and approximately 73 acres of fresh water marshes, 37 seasonal marshes and 30,873 acres of valley grassland within the larger Rancho Cordova Planning Area that surrounds and includes the City.

Vernal pools are primary biological natural resource within the City. They are described as seasonal pools that exhibit a four-stage life cycle providing critical habitat to several species of plants and animals, including some species of concern. Many animal species found in the grassland cover type are also found in the vernal pool grassland cover type. Some species found in vernal pool and vernal pool grassland cover types have adapted to specific conditions and are, thus, only found in those cover types. Of those types, some of these species may utilize the vernal pool and vernal pool grassland habitats only during specific stages of vernal pools, and others can be found year-round. Animal that utilize the vernal pool grassland habitat include aquatic crustaceans (branchiopods), amphibians, nesting birds, raptors, and small mammals. The habitats of the City contain numerous special status plant and animal species. A comprehensive list of the habitats and species in the Planning Area is provided in Table E-12. Areas these species reside in are shown in both Figure E-3 and Figure E-4 (who provides this map?).

Table E-12 Special Status Species Occurring in the Rancho Cordova Planning Area

Scientific Name	Common Name	State Listing Status	Federal Listing Status	Other Status
Plant Species				
Downingia pusilla	Dwarf downingia	None	None	CNPS:2 R-E-D: 1-2-1
Gratiola heterosepala	Boggs Lake hedge-hyssop	Endangered	None	CNPS: 1B R-E-D: 1-2-2 USFWS: SC
Juncus Leiospermus	Ahart's dwarf rush	None	None	CNPS: 1B R-E-D: 3-2-3 USFWS: SC
Legenere limosa	Legenere	None	None	CNPS: 1B R-E-D: 2-3-3 USFWS: SC
Narvarretia myersii ssp. myersi	Pincushion navarretia	None	None	CNPS: 1B R-E-D: 3-3-3 USFWS: SC
Orcuttia tenuis	Slender orcutt grass	Endangered	Threatened	CNPS: 1B R-E-D: 2-3-3
Orcuttia viscida	Sacramento orcutt grass	Endangered	Endangered	CNPS: 1B R-E-D: 3-3-3

Scientific Name	Common Name	State Listing Status	Federal Listing Status	Other Status
Sagittaria sanfordii	Sanford's arrowhead	None	None	CNPS: 1B R-E-D: 2-2-3 USFWS: SC
Amphibian Species				
Spea (Scaphiopus) hammondii	Western spadefoot	None	None	CDFG: CSC USFWS: SC
Bird Species				
Accipiter cooperii	Cooper's hawk	None	None	CDFG: CSC
Agelaius tricolor	Tricolored blackbird	None	None	CDFG: CSC USFWS: SC
Ardea alba	Great egret	None	None	
Ardea herodias	Great blue heron	None	None	
Asio flammeus (nesting)	Short-eared Owl	None	None	CDFG: CSC
Athene Cunicularia (burrow sites)	Burrowing owl	None	None	CDFG: CSC USFWS: SC
Buteo swainsoni	Swainson's hawk	Threatened	None	
Circus cyaneus (nesting)	Northern harrier	None	None	CDFG: CSC
Elanus leucurus	White-tailed kite	None	None	CDFG: fully protected
Eremophila alpestris actia	California horned lark	None	None	CDFG: CSC
Icteria virens (nesting)	Yellow-breasted chat	None	None	CDFG: CSC
Lanius ludovicianus (nesting)	Loggerhead shrike	None	None	CDFG: CSC USFWS: SC
Plegadis chihi (rookery site)	White-faced ibis	None	None	CDFG: CSC USFWS: SC
Riparia riparia	Bank swallow	Threatened	None	
Invertebrate Species				
Branchinecta lynchi	Vernal pool fairy shrimp	None	Threatened	
Branchinecta mesovallensis	Midvalley fairy shrimp	None	None	USFWS: SC
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	None	Threatened	
Lepidurus packardi	Vernal pool tadpole shrimp	None	Endangered	
Linderiella occidentalis	California linderiella (fairy shrimp)	None	Endangered	USFWS: SC
Mammal Species				
Antrozous pallidus	Pallid bat	None	None	CDFG: CSC
Bassariscus astutus	Ringtail	None	None	CDFG: CFP
Myotis ciliolabrum	Western smallfooted myotis	None	None	USFWS: SC
Myotis evotis	Long-eared myotis	None	None	USFWS: SC
Myotis thysanodes	Fringed myotis	None	None	USFWS: SC

Scientific Name	Common Name	State Listing Status	Federal Listing Status	Other Status
Myotis volans	Long-legged myotis	None	None	USFWS: SC
Myotis yumaensis	Yuma myotis	None	None	USFWS: SC
Taxidea taxus	American badger	None	None	CDFG: CSC
Reptile Species				
Emys (=Clemmys) marmorata marmorata	North-western pond turtle	None	None	CDFG: CSC USFWS: SC

Source: City of Rancho Cordova General Plan Natural Resources Element
Key to Ranks and Lists
CDFG: CSC California Species of Special Concern
CDFG: CFP California Fully Protected
USFWS: SC USFWS Species of Concern
CNPS Lists:
List 1A: Plants Presumed Extinct in California
List 1B: Plants Rare, Threatened or Endangered in California or Elsewhere
List 2: Plants Rare, Threatened or Endangered in California, But More Common Elsewhere
List 3: Plants About Which We Need More Information – A Review List
List 4: Plants of Limited Distribution – A Watch List

Figure E-3 Location of Special Status Animal Species in Rancho Cordova

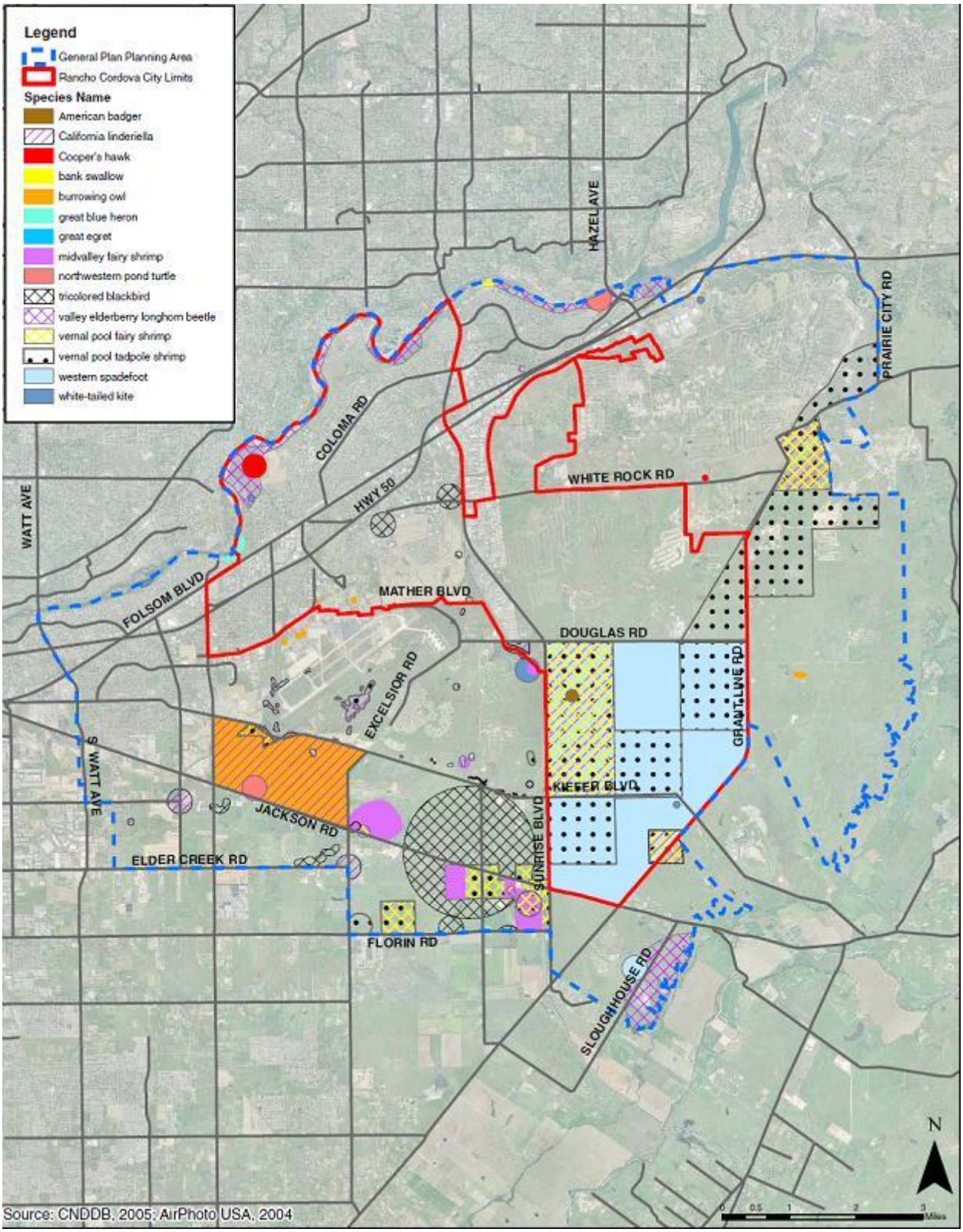
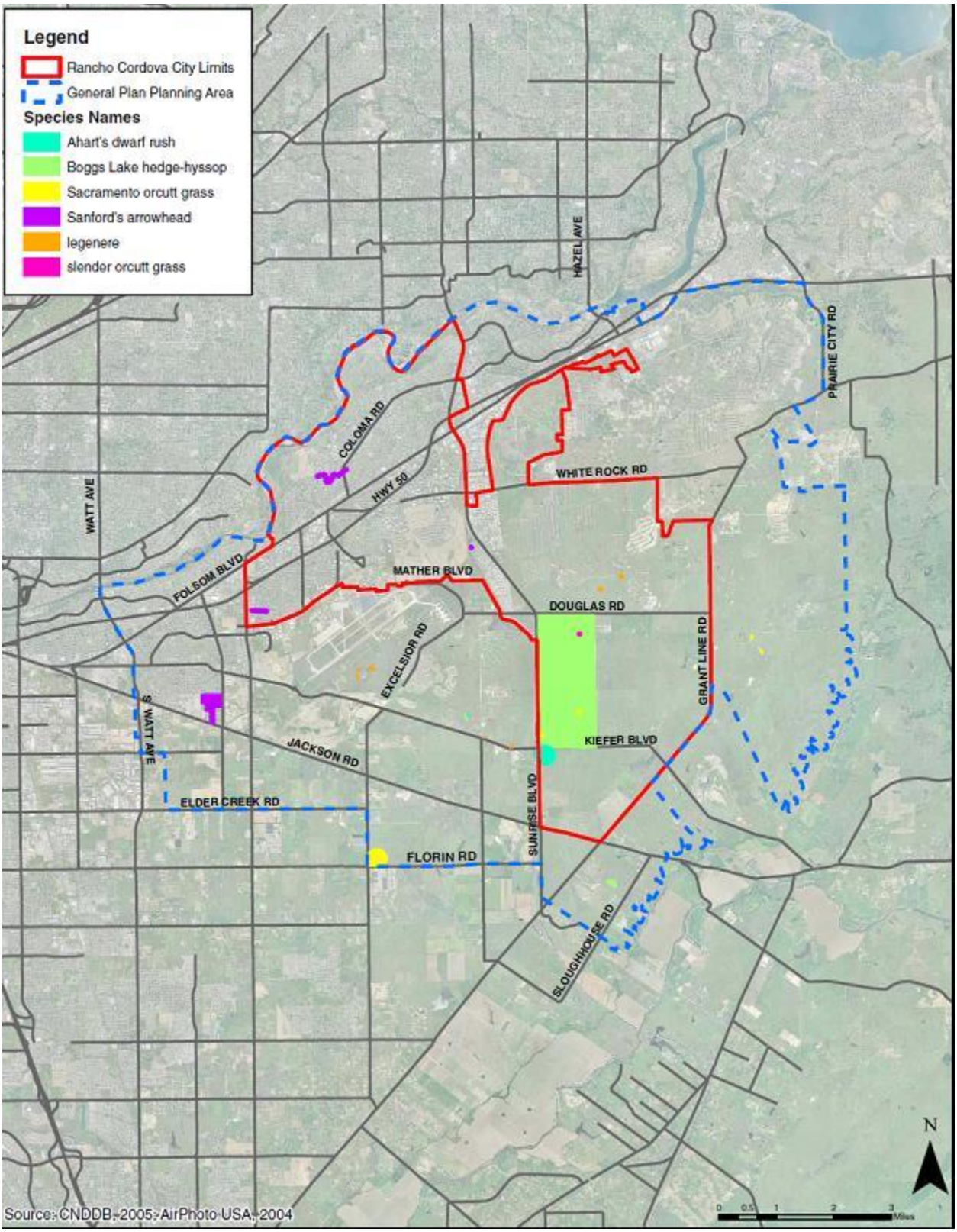


Figure E-4 Location of Special Status Plant Species in Rancho Cordova



Historic and Cultural Resources

Table E-13 shows registered historic sites the in the City of Rancho Cordova.

Table E-13 Registered Historic Sites in the City of Rancho Cordova

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
American River Grange Hall #172 (P823)	X			X	5/15/1996
Fifteen Mile House-Overland Pony Express Route In California (698)		X			9/11/1959

Source: California Office of Historical Preservation

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) document America's architectural and engineering heritage. There are no HABS and HAER structures in the City of Rancho Cordova.

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

In addition to the registered sites, there are several assets within Rancho Cordova that define the community and represent the City's history. A records search at the North Central Information Center at California State University, Sacramento identified eight prehistoric sites and one prehistoric/historic site within the larger Rancho Cordova Planning Area. Most of the prehistoric sites are located along the American River and creeks and some of the sites are known to contain human remains. The prehistoric and historic Native American occupation of the Rancho Cordova area is generally related to the Middle and Late Horizon.

A records search, shown in Table E-14 at the North Central Information Center at California State University, Sacramento identified twenty-three historic resources (e.g., historical archaeological sites, historic buildings, and artifacts) and one prehistoric/historic site within the larger Rancho Cordova

Planning Area. These sites are distributed across the area and are generally related to the development of transportation networks and agriculture. Historic archaeological site CA-SAC-428-H, prehistoric/historic archaeological site CA-SAC-320/H, the Pfingst Realty building, and the American River Grange Hall are eligible for inclusion in the NRHP and the CRHR.

Table E-14 Known Cultural Resources in the City of Rancho Cordova

Trinomial/Address	Description	Eligibility for the National Register of Historic Places
CA-Sac-155/156	Prehistoric site with fire-affected rock and debitage; historic refuse (Shields and Williamson Mounds)	Evaluated 1988; eligible
CA-Sac-157	Prehistoric midden site with fire-affected rock and debitage; historic refuse (Wamser Mound #1)	Not Evaluated
CA-Sac-158	Prehistoric habitation site with artifacts (Wamser Mound #2)	Not Evaluated
CA-Sac-159	Prehistoric habitation site with fire-affected rocks and debitage (Wamser Mound #3)	Not Evaluated
CA-Sac-205	Prehistoric village with groundstone tools and debitage	Not Evaluated
CA-Sac-308-H	Dredge mine tailings (P-34-335)	Not Evaluated
CA-Sac-319	Prehistoric village with groundstone tools and debitage	Evaluated 1995; eligible
CA-Sac-320/H	Prehistoric village with groundstone tools and debitage; historic Chinese occupation site	Evaluated 2001; eligible
CA-Sac-428-H	Sacramento Valley Railroad (P-34-455)	Evaluated 1993; eligible; Reaffirmed 1997
CA-Sac-435-H	Historic refuse scatter	Evaluated 1994; ineligible
CA-Sac-469	Prehistoric midden with fire-affected rock and debitage	Not evaluated
CA-Sac-480-H	Southern Pacific Railroad, Fair Oaks spur	Evaluated 1995; ineligible
PA-99-63	Historic well	Evaluated 1999; ineligible
PA-99-64	Possible historic cellar	Evaluated 1999; ineligible
—	Folsom Boulevard	Recognized as historically significant to local government
9878 Folsom Blvd	Pfingst Realty Company building	Evaluated 1993; eligible
Dawes Street and Folsom Blvd	Mills Station Building	Evaluated 1993; ineligible
9857 Horn Road	Silva Brothers Winery (Currently Rascals Restaurant)	Evaluated 1993; ineligible
2720 Kilgore Road	American River Grange Hall	Evaluated 1996; eligible
—	Aerojet Site 5: Military Personnel Dump	Not evaluated
—	Air Force Plant 70	Ineligible
Rio del Oro Planning Area	Sigma Test Area (Nike Hercules Rocket Test Area)	Evaluated in 2005; potentially eligible
10595 Folsom Blvd	Fire Station 61	Ineligible
12395 Folsom Blvd	Fire Station 63	Ineligible
12401 Folsom Blvd	Retail/Restaurants	Ineligible

Trinomial/Address	Description	Eligibility for the National Register of Historic Places
12415 Folsom Blvd	Demolished	Ineligible
—	Hazel Ave/Nimbus Dam	Not evaluated
2909 Mather Field Rd	Dominos Pizza/Vacant	Ineligible
2919 Mather Field Rd	Residence	Ineligible
10298 McCracken Dr	Residence	Ineligible
State Route 16	Highway	Ineligible
White Rock Road	Road	Not evaluated
Whiterock Road; 0.2 miles east of Whiterock Road/Sunrise Blvd	15 Mile House (Demolished)	State Historic Landmark #698
Kilgore Road between Trade Center and Sun Center Drive	Kilgore Cemetery	Not evaluated

Source: City of Rancho Cordova General Plan Background Report

Growth and Development Trends

Growth within the City of Rancho Cordova has been slow and steady. Rancho Cordova became an incorporated city on July 1, 2003. It is the seventh community in Sacramento County to incorporate and is also California's 478th city. The Rancho Cordova unincorporated area grew at a slower pace than the Sacramento region and the state, with growth of 4.4 percent during the 1990 to 2000 decade, as compared to 17.5 and 13.8 percent for Sacramento County and the state, respectively. Rancho Cordova has experienced increasing population growth rates (Table E-15). Between 2000 and 2010, Sacramento County and the State of California saw growth rates of about 16 percent and 1.0 percent, respectively, while Rancho Cordova's population increased by 20.8 percent.

Table E-15 Population Trends in the City of Rancho Cordova

Year	Rancho Cordova	Sacramento County	California
1990	51,322	1,041,219	29,758,213
2000	53,605	1,223,499	33,871,648
2010	64,776	1,418,788	37,253,956

Source: California Department of Finance

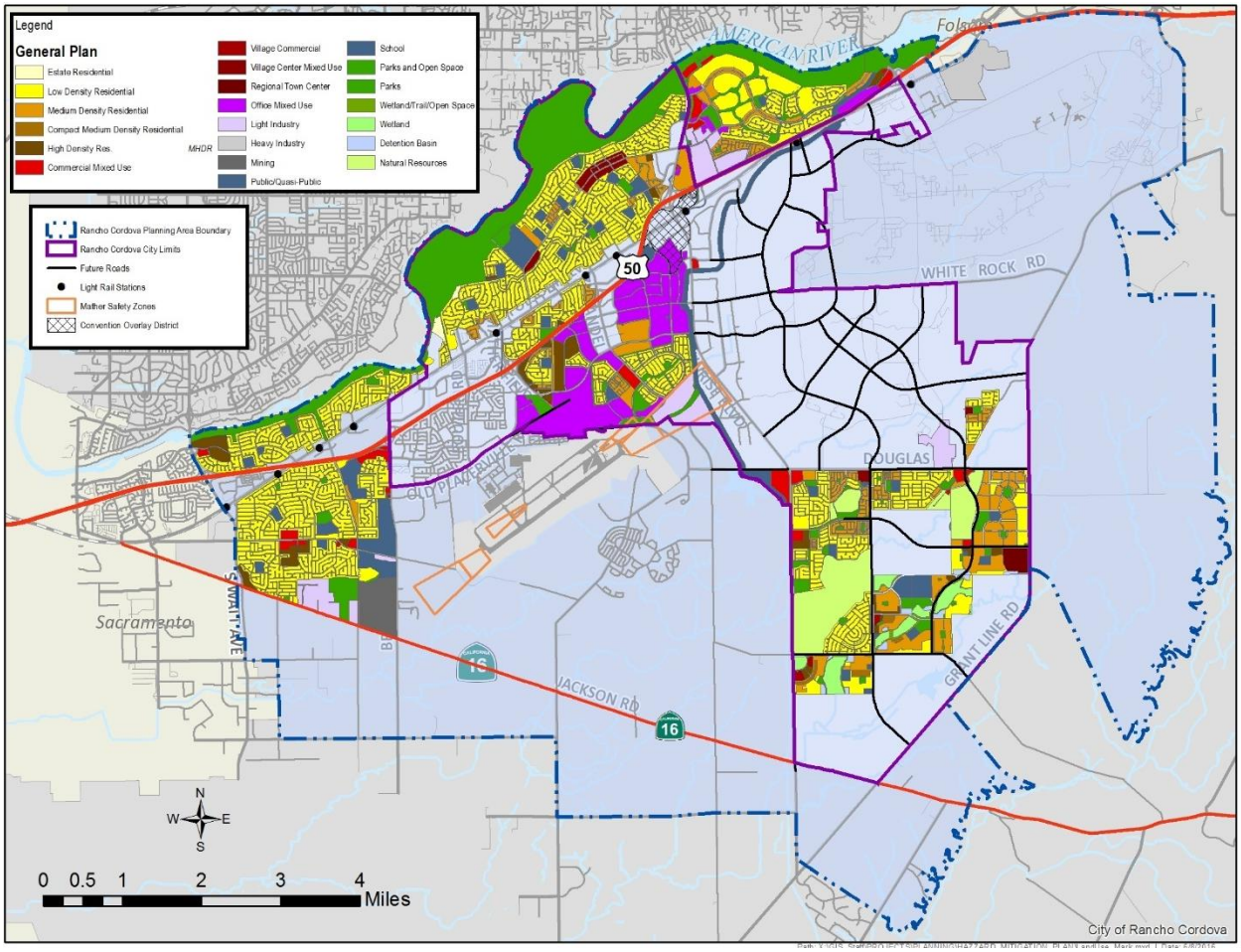
Land Use

Existing land use patterns in Rancho Cordova began during the Gold Rush and expanded with the development of Mather Air Force Base and Aerojet. Regional growth patterns, geography, and circulation have impacted the land uses that comprise the City's current development pattern.

The first figure (Figure E-5) illustrates the General Plan land use designations for most of the General Plan Planning Area developed prior to the City's Incorporation in 2003. This map is parcel based with a specific land use category applied to each parcel. Subsequent zoning and new development/redevelopment must comply with the General Plan land use designation.

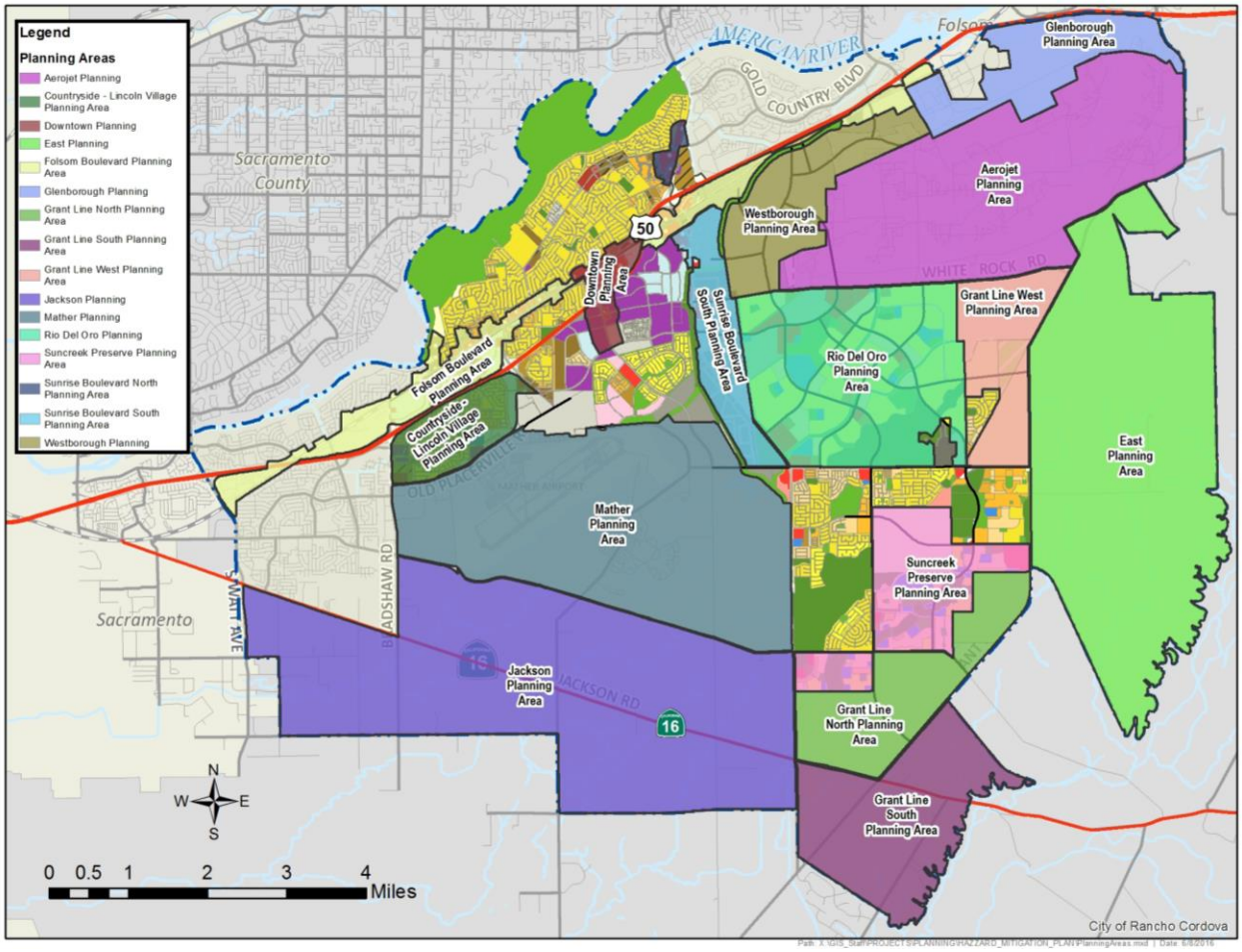
Figure E-6 identifies 16 individual planning areas within the General Plan Planning Area with unique characteristics/features that warrant more detailed planning efforts. Each of the 16 Planning Areas is listed in the Land Use Element with a description of land uses, environmental conditions, and target residential and employment populations. A few of the Planning Areas include parcel specific land use designations (Land Plans), but the majority of Planning Areas include Conceptual Land Plans and require subsequent master planning prior to development (e.g., Specific Plan, Special Planning Area). Conceptual Land Plans are not discrete land uses like the land use categories plotted in Figure E-5; rather, they reflect the City's Building Block concepts and relevant goals, policies, and actions applied to known constraints/opportunities and act as place holders for more detailed land planning.

Figure E-5 City of Rancho Cordova Land Use Map



Source: City of Rancho Cordova General Plan

Figure E-6 City of Rancho Cordova Land Use Map Planning Areas



Source: City of Rancho Cordova General Plan

Development since 2011 Plan

As shown in Table E-16, Rancho Cordova has seen a growth of 6.7% of population between 2010 and January 1, 2015.

Table E-16 City of Rancho Cordova Population Changes Since 2011

Year	Population	Change	% Change
2010[1]	64,776	–	–
2016[2]	72,203	7,427	11.5%

Source: [1]US Census Bureau, [2]California Department of Finance

The Rancho Cordova Building Department and Planning Department tracked building permits issued since 2011 for the City in hazard zones. These are shown in Table E-17 and Table E-18. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more

people living in the area potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the City to identified priority hazards.

Table E-17 City of Rancho Cordova – Development in 100-Year or Levee Flood Zones since 2011

Flood Code	Permit Description	2011 (100 year)	2011 (levee)	2012 (100 year)	2012 (levee)	2013 (100 year)	2013 (levee)	2014 (100 year)	2014 (levee)	2015 (100 year)	2015 (levee)	Totals
C-BLDG	Commercial / Industrial New or T/I's	0	0	0	2	0	2	0	0	0	10	**14**
C-OTHER	Commercial / Industrial Misc.	0	0	0	0	0	0	0	1	0	1	**2**
C-SIGN	Signage	0	0	0	0	0	0	0	0	0	0	**0**
DEMO	Demolition	0	1	0	1	0	3	0	1	0	1	**7**
P-BLDG	New Homes	0	0	0	0	0	0	0	0	0	0	**0**
PME	Heating Air Electrical	2	46	0	52	0	93	2	47	1	127	**370**
POOL	Pool	0	0	1	1	1	0	0	0	1		**4**
R-BLDG	Residential Remodel	0	4	0	4		8	1	6	0	1	**24**
R-OTHER	Residential Misc.	0	7	0	7	1	8	1	10	1	33	**68**
REROOF	Reroofing	1	22	0	16	1	19	0	10	0	25	**94**

Source: City of Rancho Cordova

Table E-18 City of Rancho Cordova – Development in Wildfire Hazard Areas since 2011*

Permit Code	Permit Description	2011	2012	2013	2014	2015	Totals
C-BLDG	Commercial / Industrial New or T/I's	4	2	4	2	6	**18**
C-OTHER	Commercial / Industrial Misc.	2	4	5	6	7	**24**
C-SIGN	Signage	1	2	0	2	1	**6**
DEMO	Demolition	0	1	7	2	1	**11**
P-BLDG	New Homes	148	183	244	120	257	**952**
PME	Heating Air Electrical	65	50	85	58	66	**324**
POOL	Pool	9	13	15	19	17	**73**
R-BLDG	Residential Remodel	3	8	5	5	6	**27**
R-OTHER	Residential Misc.	62	125	212	87	120	**606**
REROOF	Reroofing	7	4	6	4	7	**28**

Source: City of Rancho Cordova

*Moderate or higher wildfire risk area

Future Development

The Sacramento Council on (of) Governments (SACOG) modeled population projections for the City of Rancho Cordova and other areas of the region in 2012 for a Metropolitan Transportation Plan/Sustainable Communities Strategy report. This forecast uses a 2008 base year estimate with projections to 2020 and 2035 for population, housing units, households and employment. SACOG estimated the City population in 2020 and 2035 to be 79,305 and 126,112 respectively.

E.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table E-9 as high or medium significance hazards and primary hazards to the State of California. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the Base Plan. In general, the most vulnerable structures are those located within the flood risk areas, wildfire risk areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

Dam failures can result from a number of natural or man-made causes such as earthquakes, erosion of the face or foundation, improper siding, rapidly rising flood waters, structural/design flaws, and deliberate human actions. Folsom Dam is the major dam which affects the City of Rancho Cordova and the

populations in the inundation areas. Of prime concern are the failures of the Folsom Dam, which is owned by the US Bureau of Reclamation. The flood waters from the dam would affect the City of Rancho Cordova and the surrounding unincorporated areas.

Past Occurrences

The HMPC noted that the dam failure instances to have affected the County in Section 4.2.10 would have affect the City as well.

Vulnerability to Dam Failure

Warning ability is generally determined by the frequency of inspections for structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate. The existence and frequency of updating and exercising an evacuation plan that is site-specific assists in warning and evacuation functions. A failure of the Folsom Dam would leave little time for evacuation of the City of Rancho Cordova.

A dam failure will cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to electric generating facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas. A catastrophic dam failure, depending on size of dam and population downstream, could exceed the response capability of local communities. Damage control and disaster relief support would be required from other local governmental and private organizations, and from the state and federal governments. Figure 4.75 in Section 4.3.6 in the Base Plan shows the areas of Sacramento County at risk to a dam failure of the Folsom Dam.

Values at Risk

Sacramento County provided inundation as a GIS layer for the Folsom Dam system, as part of the following breaks:

- Folsom Right Wing
- Folsom Mormon
- Folsom Dike 4
- Folsom Dike 5
- Folsom Dike 6
- Folsom Dike 7
- Folsom Dike 8
- Folsom Dam

GIS was used to determine the possible impacts of dam failure flooding within the City of Rancho Cordova. The methodology described in Section 4.3.6 of the Base Plan was followed in determining structures and values at risk in potential dam inundation areas. Table E-19 shows the property use, improved parcel count, improved values, estimated contents, total values that fall in a floodplain in the City.

Table E-19 City of Rancho Cordova – Count of Parcels and Values in Dam Inundation Zones

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	0	0	$0	$0	$0
Care / Health	15	15	$2,928,523	$12,707,293	$15,635,816
Church / Welfare	33	32	$17,218,354	$49,673,451	$66,891,805
Industrial	433	410	$169,945,203	$449,965,892	$619,911,095
Miscellaneous	181	1	$320,947	$989	$321,936
Office	248	228	$200,996,416	$895,811,355	$1,096,807,771
Public / Utilities	261	2	$1,190,667	$1,439,116	$2,629,783
Recreational	7	6	$4,186,300	$11,695,592	$15,881,892
Residential	13,752	13,548	$786,007,301	$2,078,662,198	$2,864,669,499
Retail / Commercial	247	234	$156,646,711	$288,453,854	$445,100,565
Vacant	424	4	$77,851,437	$330,210	$78,181,647
No Data	0	0	$0	$0	$0
Total	**15,601**	**14,480**	**$1,417,291,859**	**$3,788,739,950**	**$5,206,031,809**

Sacramento County 2016 Parcel/2015 Assessor's Data

Table E-20 shows potential losses from a Folsom Dam failure with loss estimate and loss ratios for the City. The loss ratio is the loss estimate (i.e., total of improved and contents value for all parcels located in the dam inundation zone in the City) divided by the total potential exposure and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3-foot flood depth (30% damage), 6-foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table E-20 City of Rancho Cordova – Dam Inundation Loss Estimates

Flood Zone	Improved Parcel Count	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
Folsom Dam Inundation	14,480	$3,788,739,950	$2,974,061,587	$6,762,801,537	$2,028,840,461.10 $4,057,680,922.20 $6,762,801,537.00	30.7% 61.4% 100%

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table E-19 and Table E-20, the City of Rancho Cordova has 15,626 improved parcels and roughly $6.7 billion of structure and contents value in the Folsom Dam inundation area. The 3-foot loss ratio of 13.1%, the 6-foot loss ratio of 26.1%, and the total loss ratio of 43.6% indicates that the City has large amounts of assets at risk to a possible Folsom Dam failure.

Population at Risk

The dam inundation zones were overlayed on the parcel layer using GIS. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for the City. According to this analysis, there is a total population of 593 residents of the City at risk to dam inundation. This is shown in Table E-26.

Table E-21 City of Rancho Cordova – Count of Improved Residential Parcels and Population in Dam Inundation Zones

Improved Residential Parcels	Population*
13,548	37,257

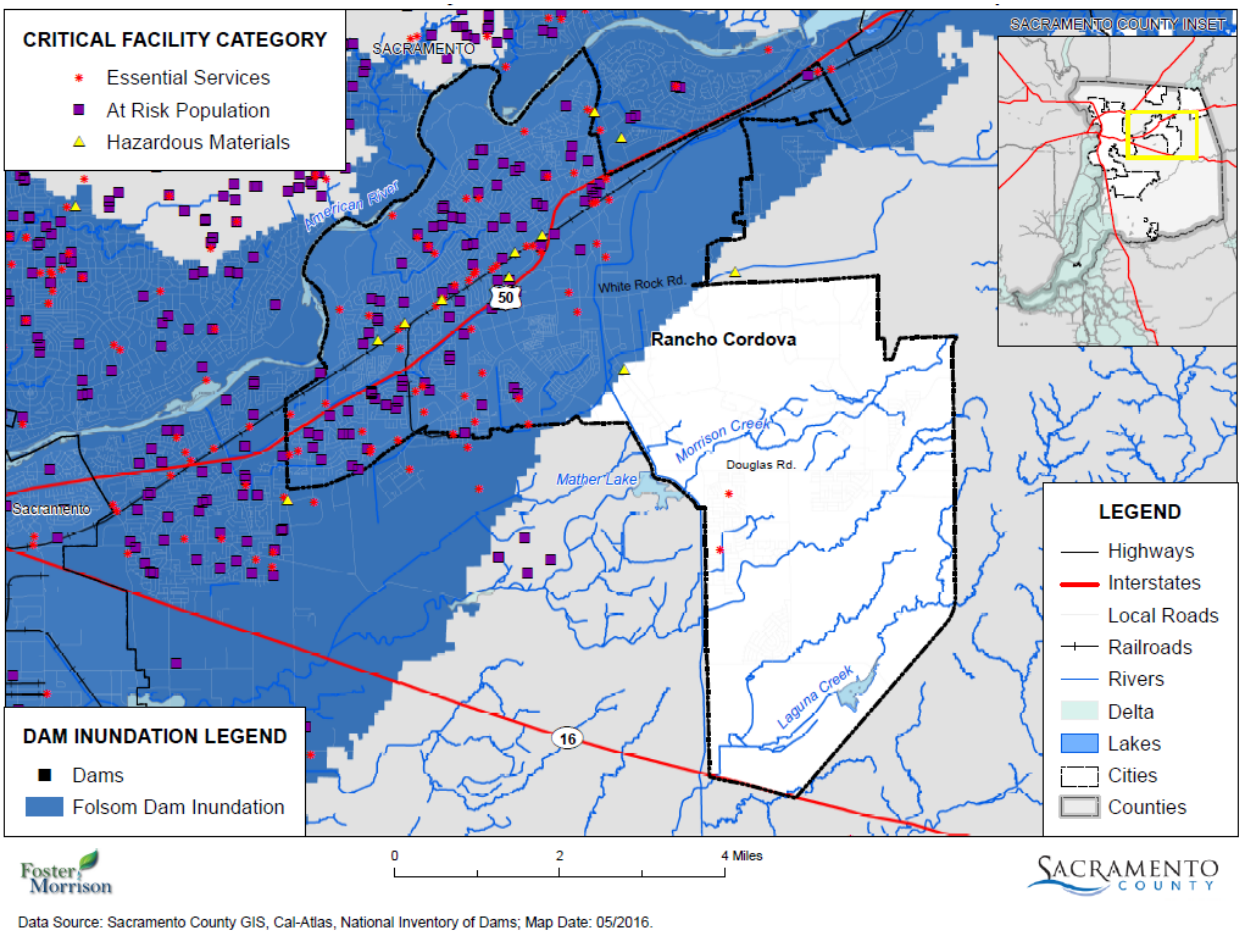
Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data, 2010 US Census Bureau

* Average household populations from the 2010 US Census were used: Rancho Cordova– 2.75.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in the City of Rancho Cordova in identified Folsom Dam inundation zones. GIS was used to determine whether the facility locations intersects the inundation area. Details of critical facilities in the inundation area in Rancho Cordova are shown in Figure E-7 and Table E-22. As shown on the table and figure, Rancho Cordova has 161 critical facilities located in the Folsom Dam inundation areas. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure E-7 City of Rancho Cordova – Critical Facilities in Dam Inundation Zones



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table E-22 City of Rancho Cordova – Critical Facilities in Dam Inundation Zones

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Dispatch Center	1
	Drainage	6
	Emergency Evacuation Shelter	12
	Emergency Rooms	1
	EOC	1
	Fire Station	3
	Gas Storage	1
	Government Facilities	4
	Hospitals	1
	Light Rail Stop	7
	Medical Health Facility	15
	Police	2

Critical Facility Category	Facility Type	Facility Count
	State Facility	1
	Total	**55**
At Risk Population Facilities	Adult Education School	1
	Adult Residential	10
	College/University	1
	Day Care Center	23
	Group Home	6
	Hotel	19
	Independent Study School	1
	Private Elementary School	2
	Private High School	2
	Private K-12 School	1
	Public Continuation High School	1
	Public Elementary School	11
	Public High School	1
	Public Middle School	2
	Residential Care/Elderly	11
	School	1
	School-Age Day Care Center	2
	Special Education School	3
	Total	**98**
Hazardous Materials Facilities	Oil Collection Center	8
	Total	**8**
Total		**161**

Source: Sacramento County GIS

Future Development

The City does not currently restrict development based on dam inundation maps.

Drought

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects

different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for manufacturing, tourism, recreation, and commercial and domestic use.

Past Occurrences

Based on historical information, the occurrence of drought in California, including the City of Rancho Cordova, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users.

Since drought is a regional phenomenon, past occurrences for the City are the same as those for the unincorporated County. Past occurrences of drought can be found in Section 4.2.11 of the Base Plan.

Vulnerability to Drought

The vulnerability of the City of Rancho Cordova to drought is City-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels.

Future Development

As the population in the area continues to grow, so will the demand for water. Water shortages in the future may be worsened by drought, as the City relies on surface water and groundwater for its water source. Increased planning including conjunctive use will be needed to account for population growth and increased water demands.

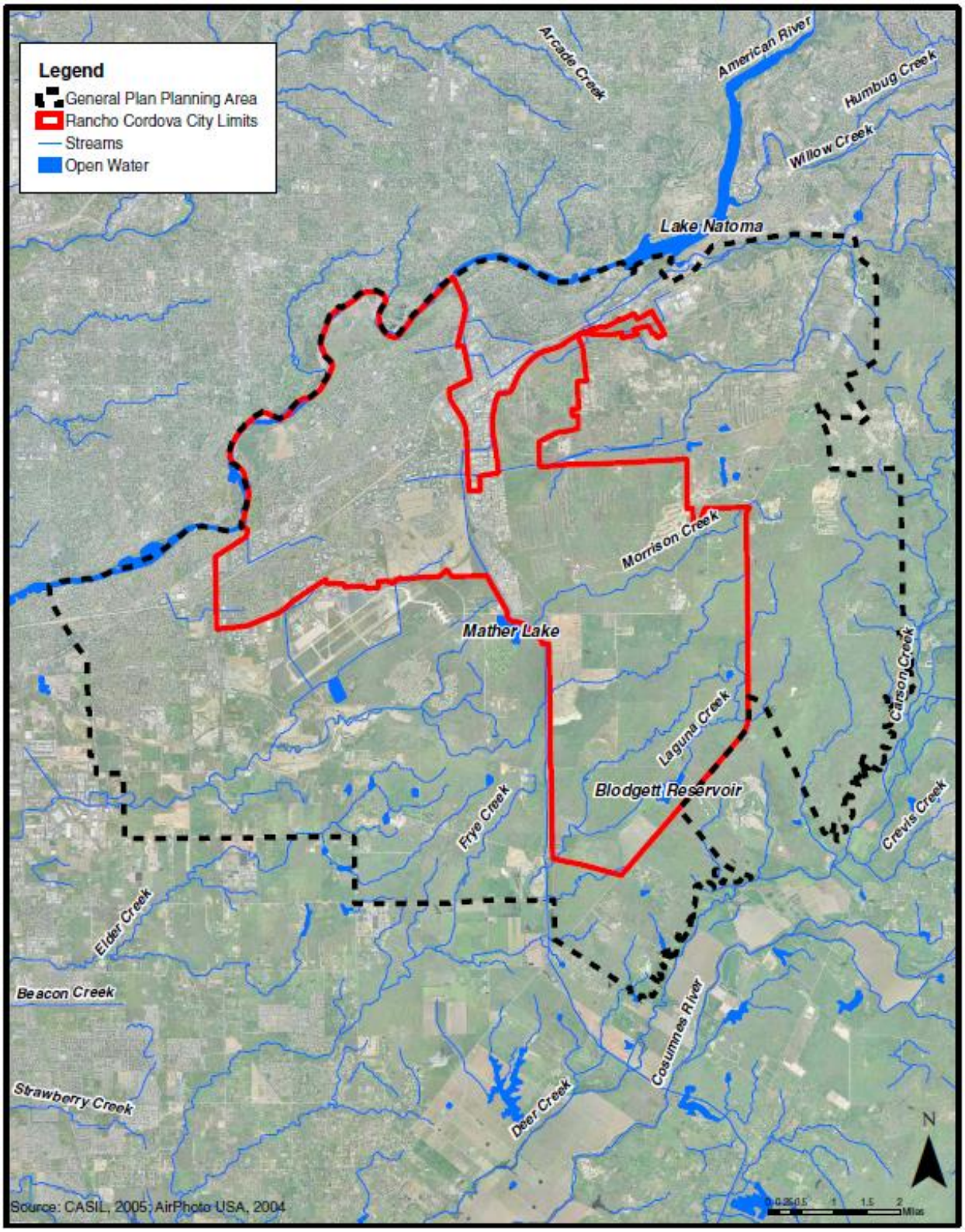
Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional/Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

Major surface waters in the vicinity of the Rancho Cordova Planning Area include the American River, Folsom Reservoir, and Lake Natoma to the north; the Sacramento River to the west; and the Consumnes River to the southeast. Other surface waters within the Rancho Cordova Planning Area include the Folsom South Canal, Cordova Creek, Deer Creek, and the Morrison Creek Stream Group (Morrison, Laguna, Elder, Gerber, Unionhouse, Florin, Buffalo, and Frye Creek, as well as Rebel Hill Ditch) which generally flow in a southwesterly direction southeast of the City, as illustrated in Figure E-8. The topography within the Planning Area includes gently rolling terrain, such as that found in the eastern Great Central Valley interrupted by numerous seasonal creeks and streams. These creeks and streams are largely ephemeral and intermittent, which is typical of areas that experience dry summers and cool, wet winters, as in this part of the Central Valley.

Figure E-8 City of Rancho Cordova Waterways and Drainage



Source: City of Rancho Cordova General Plan Environmental Impact Report

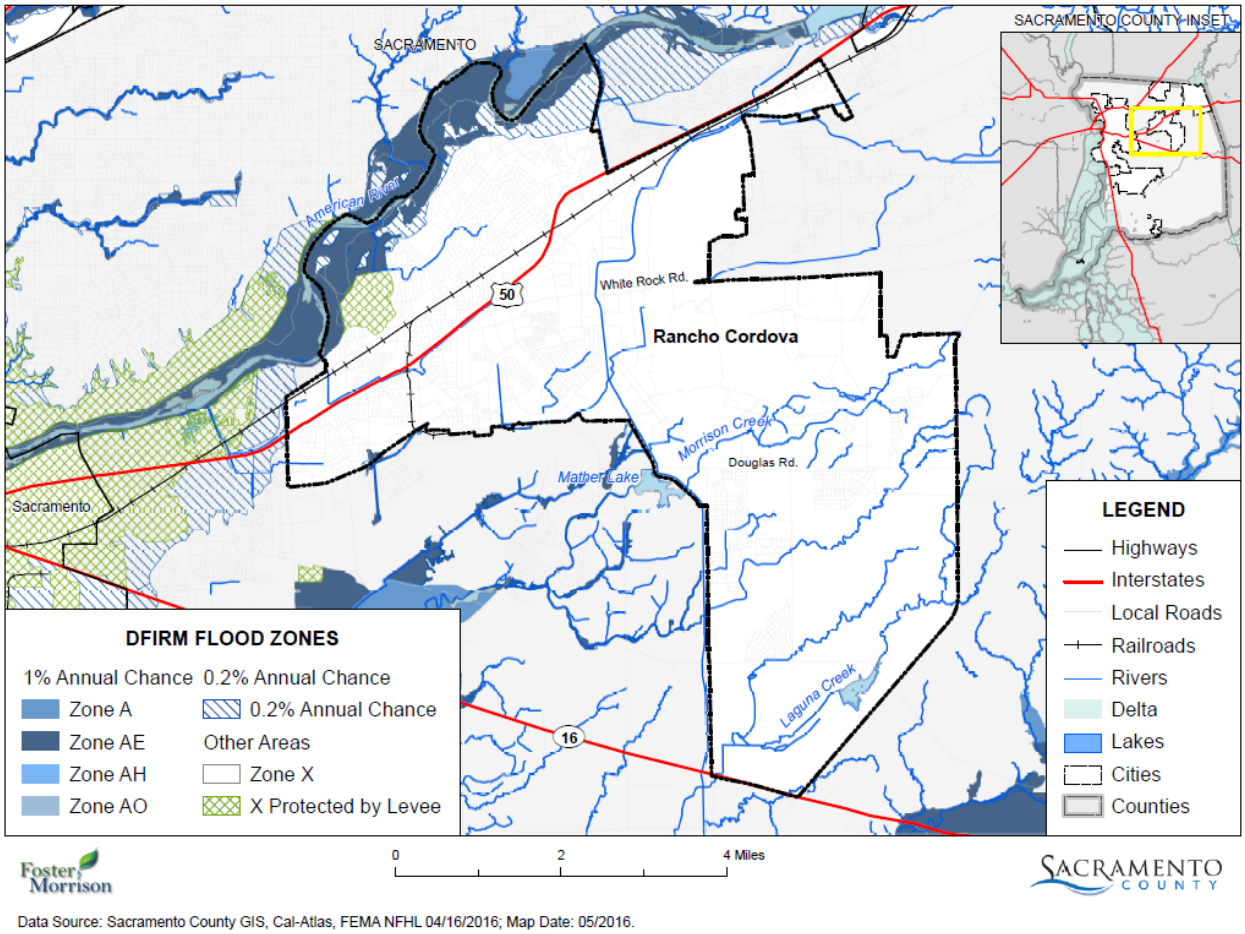
Past Occurrences

Other than localized flooding of streets, there have been no significant flooding events within the City.

Flood Zones

A small portion of the City is located inside of the 100- and 500-year flood zone as defined by the Federal Emergency Management Agency (FEMA). The City also has levee protected areas. This is seen in Figure E-9.

Figure E-9 City of Rancho Cordova – FEMA DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

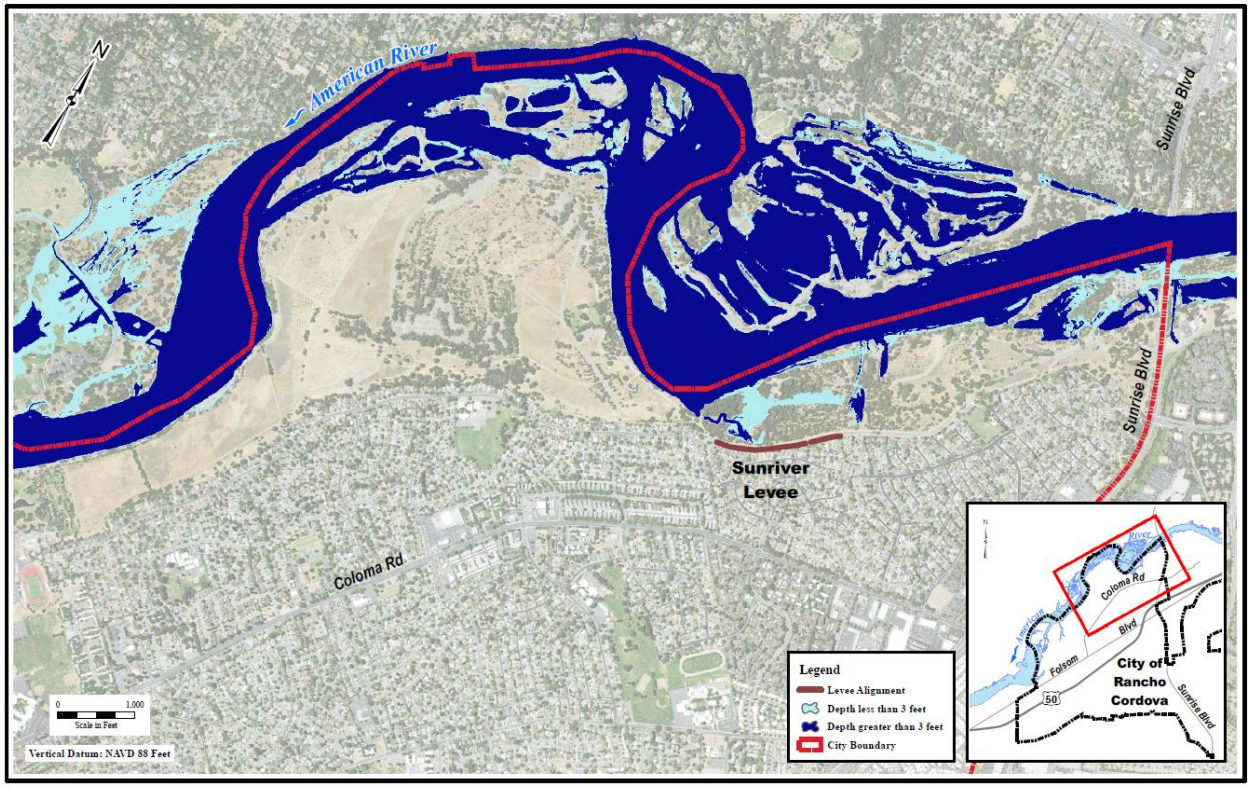
Vulnerability to Flood

The US Army Corps of Engineers is currently making improvements to the Folsom Dam spillway which will be completed in 2017. This improvement will allow the dam to lower the release rate which should result in a reduction in the floodplain.

To satisfy the requirements of ULOP, the City has developed a 200-yr floodplain map based on the proposed Folsom Dam improvements by the US Army Corps of Engineers. These are shown in Figure

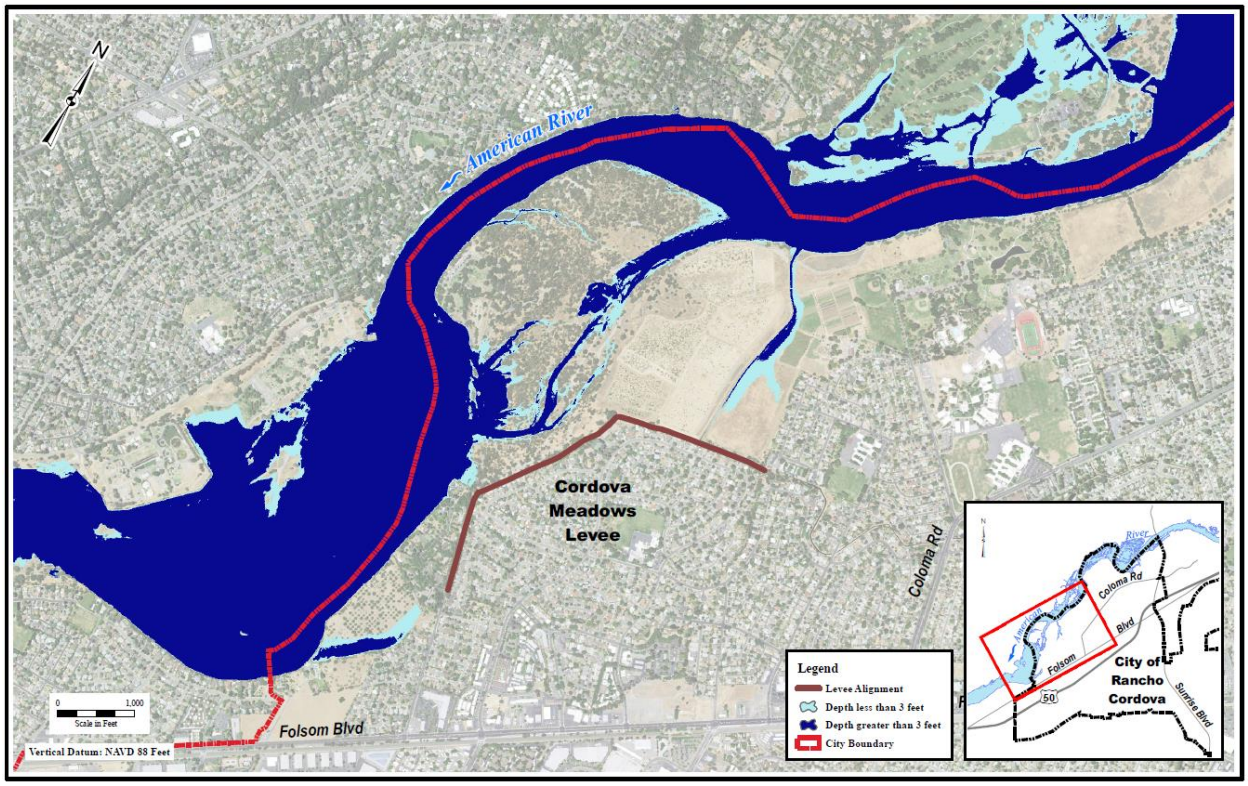
E-10 and Figure E-11. These improvements include the Joint Federal Project to improve the dam spillway and the future dam raise to increase flood storage. In conjunction with the new 200-yr map, the City has made changes to its General Plan and zoning code that will guide development within the 200-yr Urban Level of Flood Protection. The map and associated code changes were adopted by the City Council in the Summer of 2016.

Figure E-10 City of Rancho Cordova – 200-year Flood Depth with Folsom Dam Raise (Upstream)



Source: City of Rancho Cordova

Figure E-11 City of Rancho Cordova – 200-year Flood Depth with Folsom Dam Raise (Downstream)



Source: City of Rancho Cordova

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Rancho Cordova. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. However, this analysis was performed based on the most current 2015 DFIRMs which still reflect some levees as providing 100-year level of protection. According to the County, all levees have since been decertified as not providing a 100-year level of protection, so this analysis is based solely on the information presented in the DFIRMs. Further it is important to note that many levee improvement projects are ongoing throughout the Planning Area, some of which will be providing certification of area levees to both a 100-year and 200-year levels depending on applicable requirements. Thus, this analysis reflects a moment in time and while it does provide information on areas developed behind levees, the X Protected by Levee flood zone will continue to change as these projects are completed and new certifications obtained.Table E-23 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a floodplain in the City.

Table E-23 City of Rancho Cordova – Count and Improved Value by Property Use and Detailed Flood Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Zone A						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone AE						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	0	$20	$0	$20	$40
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	35	0	$0	$0	$0	$0
Recreational	1	0	$0	$0	$0	$0
Residential	21	21	$3,727,473	$10,205,817	$1,863,737	$15,797,027
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	2	0	$1,449,987	$0	$0	$1,449,987
Total	**60**	**21**	**$5,177,480**	**$10,205,817**	**$1,863,757**	**$17,247,054**
Zone AH						

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone AO						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone A99						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Total 1%	**60**	**21**	**$5,177,480**	**$10,205,817**	**$5,102,909**	**$20,486,206**
0.2% Annual Chance Flood Zone*						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	2	2	$235,541	$5,583,564	$235,541	$6,054,646
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	1	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	2	2	$1,206,659	$2,095,866	$1,206,659	$4,509,184
Public / Utilities	12	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	963	963	$49,753,655	$146,650,749	$24,876,828	$221,281,232
Retail / Commercial	3	3	$3,869,123	$3,922,398	$3,869,123	$11,660,644
Vacant	6	1	$508,993	$142,436	$0	$651,429
Total	**989**	**971**	**$55,573,971**	**$158,395,013**	**$30,188,151**	**$244,157,135**
X Protected by Levee Zone						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	2	2	$114,654	$591,104	$114,654	$820,412
Church / Welfare	1	1	$66,298	$127,497	$66,298	$260,093
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	5	0	$1,409	$0	$1,409	$2,818

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	11	0	$13,139	$0	$13,139	$26,278
Recreational	0	0	$0	$0	$0	$0
Residential	806	792	$41,293,762	$112,914,161	$20,646,881	$174,854,804
Retail / Commercial	1	1	$238,539	$302,366	$238,539	$779,444
Vacant	0	0	$0	$0	$0	$0
Total	**826**	**796**	**$41,727,801**	**$113,935,128**	**$21,080,920**	**$176,743,849**
Zone X						
Agricultural	26	4	$23,835,393	$279,917	$23,835,393	$47,950,703
Care / Health	14	14	$2,904,244	$12,329,146	$2,904,244	$18,137,634
Church / Welfare	30	29	$16,916,515	$43,962,390	$16,916,515	$77,795,420
Industrial	591	558	$228,179,282	$529,055,369	$342,268,923	$1,099,503,574
Miscellaneous	254	1	$802,118	$989	$802,118	$1,605,225
NO DATA	0	0	$0	$0	$0	$0
Office	250	230	$201,944,868	$904,397,227	$201,944,868	$1,308,286,963
Public / Utilities	230	2	$1,428,507	$1,439,116	$1,428,507	$4,296,130
Recreational	8	7	$4,340,406	$12,225,826	$4,340,406	$20,906,638
Residential	15,690	15,207	$1,007,532,983	$2,597,780,380	$503,766,492	$4,109,079,855
Retail / Commercial	245	232	$154,541,187	$290,485,670	$154,541,187	$599,568,044
Vacant	1,274	20	$175,679,557	$4,248,543	$0	$179,928,100
Total	**18,612**	**16,304**	**$1,818,105,060**	**$4,396,204,573**	**$1,252,748,653**	**$7,467,058,286**

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Table E-24 summarizes Table E-23 above and shows City of Rancho Cordova loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table E-24 City of Rancho Cordova – Flood Loss Summary

Flood Zone	Improved Parcel Count	Total Improved Value	Estimated Contents Value	Total Improved/ Contents Value	Loss Estimate	Loss Ratio

Flood Zone	Improved Parcel Count	Total Improved Value	Estimated Contents Value	Total Improved/ Contents Value	Loss Estimate	Loss Ratio
1% Annual Chance	21	$10,205,817	$5,102,909	$15,308,726	$3,061,745.20	0.03%
0.2% Annual Chance*	971	$158,395,013	$84,927,203	$243,322,216	$48,664,443.20	0.48%

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

According to Table E-23 and Table E-24, the City of Rancho Cordova has 21 improved parcels and $15,308,726 of structure and contents value in the 1% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a 1% chance in any given year of a flood event causing roughly $3.1 million in damage in the City of Rancho Cordova. The City of Rancho Cordova has 971 improved parcels and $243,322,216 of structure and contents value in the 0.2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor, there is a 0.2% chance in any given year of a flood event causing roughly $48.6 million in damage in the City of Rancho Cordova. A loss ratio of 0.03% and 0.48% indicates that losses in Rancho Cordova to flood would be relatively minor in both 1% and 0.2% annual chance floodplains, as less than a percent of the total values in the City would be damaged.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.10 of the Base Plan, was used for the City of Rancho Cordova as well as for the County as a whole. Table E-25 represents a summary analysis of total acres in the 1% and 0.2% annual chance flood zones in the City.

Table E-25 City of Rancho Cordova – Flooded Acres

Flood Zone	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
1% Annual Chance	794.88	44.68	0.05%
0.2% Annual Chance*	307.17	190.19	1.57%

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household

factors for Rancho Cordova. According to this analysis, there is a total population of 2,706 residents of the City at risk to flooding, with 58 in the 1% annual chance floodplain and 2,648 in the 0.2% annual chance floodplain. This is shown in Table E-26.

Table E-26 City of Rancho Cordova – Count of Improved Residential Parcels and Population by Flood Zone

Flood Zone	Improved Residential Parcels	Population*
1% Annual Chance	21	58
Shaded X (0.2% Annual Chance)**	963	2,648
Total	**984**	**2,706**

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data, US Census Bureau

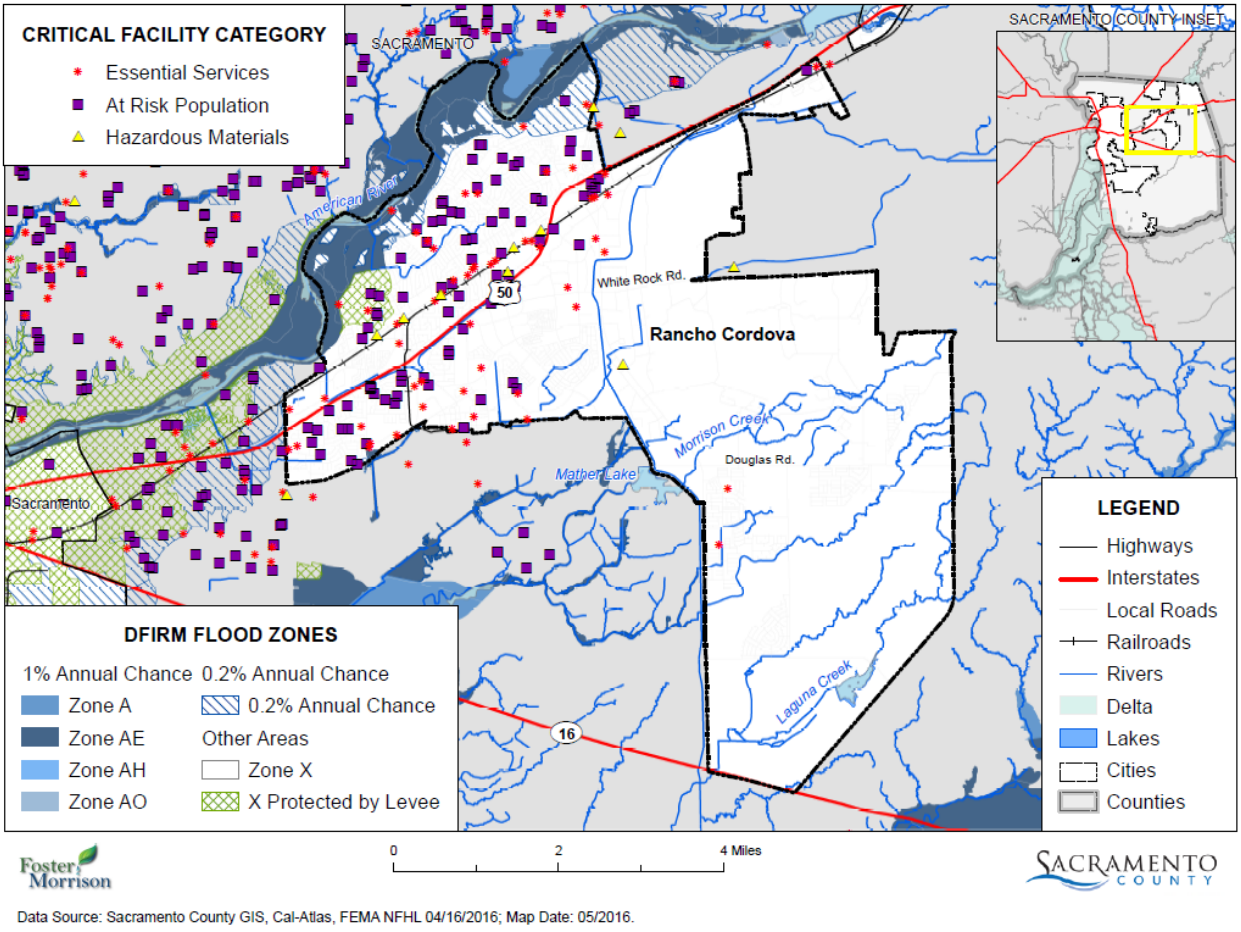
* Average household populations from the 2010 US Census were used: Rancho Cordova– 2.75.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Rancho Cordova in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersects a DFIRM flood hazard areas, and if so, which zone it intersects. Details of critical facilities in the floodplain in the City of Rancho Cordova are shown in Figure E-12 and Table E-27. As shown on the table and figure, Rancho Cordova has 1 critical facility located in 1% annual chance (Zone AE) and 128 critical facilities in the 0.2% annual chance DFIRM flood zones. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure E-12 City of Rancho Cordova – Critical Facilities and Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table E-27 City of Rancho Cordova – Critical Facilities and Flood Zones

Critical Facility Category	Facility Type	Facility Count
Zone AE		
Essential Services Facilities	Emergency Evacuation Shelter	1
	Total	**1**
Zone AE Total		**1**
0.2% Annual Chance		
Essential Services Facilities	Drainage	1
	Emergency Evacuation Shelter	1
	Medical Health Facility	1
	Total	**3**
At Risk Population Facilities	Private K-12 School	1
	Public High School	1
	Total	**2**

Critical Facility Category	Facility Type	Facility Count
0.2% Annual Chance Total*		**5**
Zone X		
Essential Services Facilities Total	Dispatch Center	1
	Drainage	4
	Emergency Evacuation Shelter	11
	Emergency Rooms	1
	EOC	1
	Fire Station	4
	Gas Storage	1
	Government Facilities	4
	Hospitals	1
	Light Rail Stop	7
	Medical Health Facility	13
	Police	2
	State Facility	1
	Total	**51**
At Risk Population Facilities Total	Adult Education School	1
	Adult Residential	10
	College/University	1
	Day Care Center	20
	Group Home	5
	Hotel	19
	Independent Study School	1
	Private Elementary School	2
	Private High School	2
	Public Continuation High School	1
	Public Elementary School	10
	Public Middle School	2
	Residential Care/Elderly	11
	School	1
	School-Age Day Care Center	2
	Special Education School	3
	Total	**91**
Hazardous Materials Facilities	Oil Collection Center	8
	Total	**8**
Zone X Total		**150**
X Protected by Levee		

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Drainage	1
	Medical Health Facility	1
	Total	**2**
At Risk Population Facilities Total	Day Care Center	3
	Group Home	1
	Public Elementary School	1
	Total	**5**
X Protected by Levee Total		**7**
Grand Total		**163**

Source: FEMA 6/16/2015 DFIRM, Sacramento County GIS

*This count only includes those critical facilities in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all critical facilities in the 1% annual chance floodplain.

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Rancho Cordova joined the National Flood Insurance Program (NFIP) on September 15, 2004, as a part of the County prior to the City's incorporation. The City does not participate in the CRS program.

NFIP data indicates that as of February 19, 2016, there were 319 flood insurance policies in force in the City with $96,082,000 of coverage. Of the 319 policies, 311 were residential and 8 were non-residential; 6 policies were in A zones and 313 policies were in B, C, and X zones. The GIS parcel analysis detailed above identified 21 parcels in the 100-year flood zone. 6 policies for 21 parcels in the 100-year floodplain equates to insurance coverage of 28.6 percent. There have been no historical claims for flood losses.

California Department of Water Resources Best Available Maps (BAM)

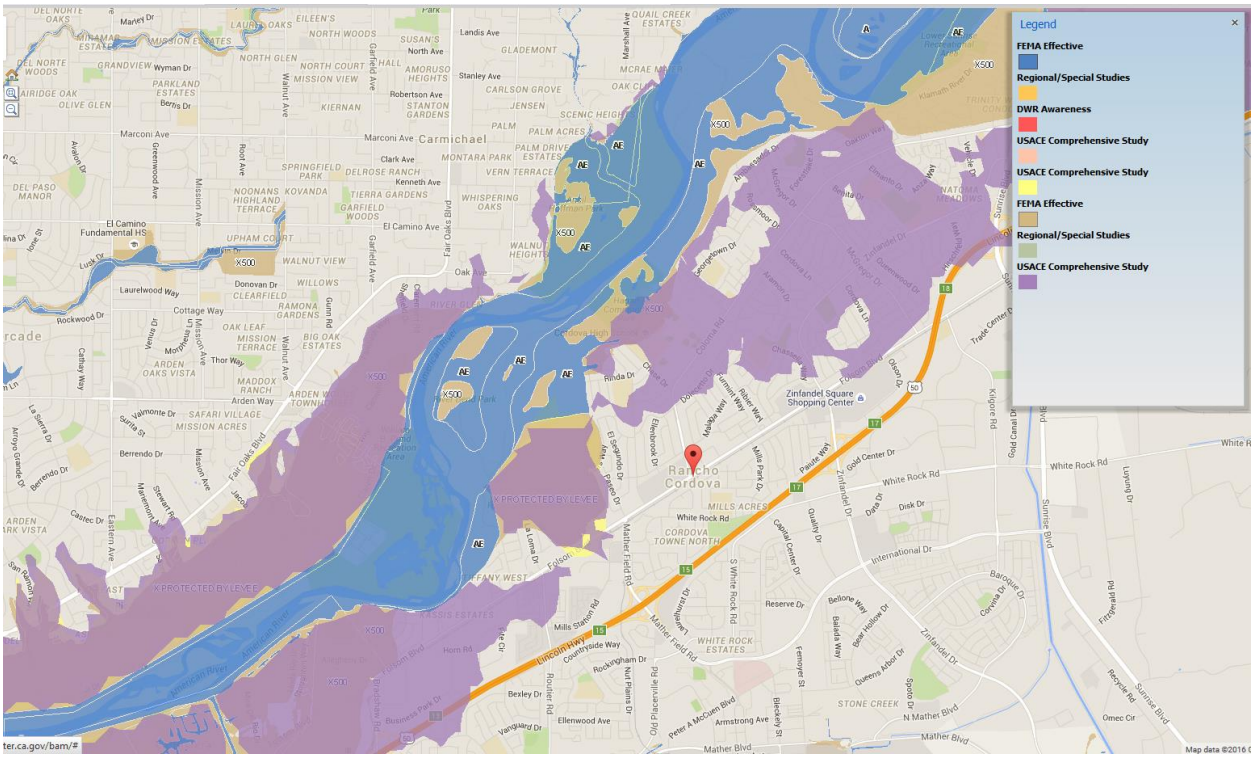
The FEMA regulatory maps provide just one perspective on flood risks in Sacramento County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for

assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency, however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. The BAM map for Rancho Cordova is shown in Figure E-13.

Figure E-13 City of Rancho Cordova Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 100-Year, Orange – Local 100-Year (developed from local agencies), Red – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), Pink – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), Purple – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Future Development

The City enforces the floodplain ordinance. If any development is to occur in the floodplain, it would have to conform to the elevation standards of the floodplain ordinance. No development is expected in the floodplain in the future.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding and other issues caused by severe weather events, primarily heavy rains and thunderstorms, can often pose a risk to the community. Primary concerns include impacts to infrastructure that provides a means of ingress and egress throughout the community. The City has identified areas of chronic localized flooding and is developing a drainage master plan to identify and prioritize Capital Improvement projects to address flooding within the City.

Past Occurrences

The HMPC could not provide specific past instances of localized flooding that have affected the City.

Vulnerability to Localized Flooding

Currently the City experiences localized flooding issues associated with undersized drainage facilities in existing developed and developing areas. This includes existing drainage issues along Sunrise Boulevard south of White Rock Road where surface water flows exceed the capacity of drainage facilities (siphons and overchutes) of the Folsom South Canal. Existing 100-year peak flows are exceeded in several of these facilities and result in localized flooding along Sunrise Boulevard as well as discharge of drainage into the Folsom South Canal. See Table E-28 for a more comprehensive list of local flood areas.

Table E-28 City of Rancho Cordova's Road List of Localized Flooding Problem Areas

Road Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
11051 Fiore Dr.	x						
Berrywood at Gingerwood	x						
2897 Kilgore	x						
Zinfandel @ Sonata (2409 Sonata)	x						
Fiore Dr.	x						
Kilgore Road	x						
Benita at Woodlawn	x						
Trade Center w/o Sunrise	x						
South west end of Pawcatuck Way	x						
Coloma at McGregor	x						
Woodlawn Dr. @ Pine Tree Court (2133 Woodlawn Dr.)	x						

Road Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
2701 Lee Ann & Don Juan	x						
Kilgore Rd. & Sun Center Dr.	x						

Source: City of Rancho Cordova

Future Development

Future development in the City will add more impervious surfaces and need to drain those waters. The City will need to be proactive to ensure that increased development provides adequate stormwater detention to mitigate for increased flows that either cause or exacerbate existing flooding problems. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses.

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the City of Rancho Cordova. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past.

Past Occurrences

The HMPC could not provide specific past instances of heavy rains and storms that have affected the City.

Vulnerability to Heavy Rains and Storms

Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees. Table E-28, discussed above in the discussion of the flood hazard and found at the end of this document, details those areas within the City that are most often affected during these heavy storm events. Most of the localized flooding identified in Table E-28s generally limited to flooding within the street ROW and only has limited impact to private property.

Future Development

The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from heavy storms and rain. Future development in the City is subject to these building codes. New critical facilities such as communications towers should be built to withstand hail damage, lightning, and heavy rains.

Wildfire

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

The Rancho Cordova Planning Area contains portions of the American River Parkway, wetland, and natural areas that support a variety of trees, shrubs, and native grasses. These vegetation types provide a substantial source of fuel and a potential to ignite and pose safety risks to adjacent and surrounding developments. Construction of residential units in these areas has the potential to expose people or structures to significant risk of loss, injury, or death involving wildland fires.

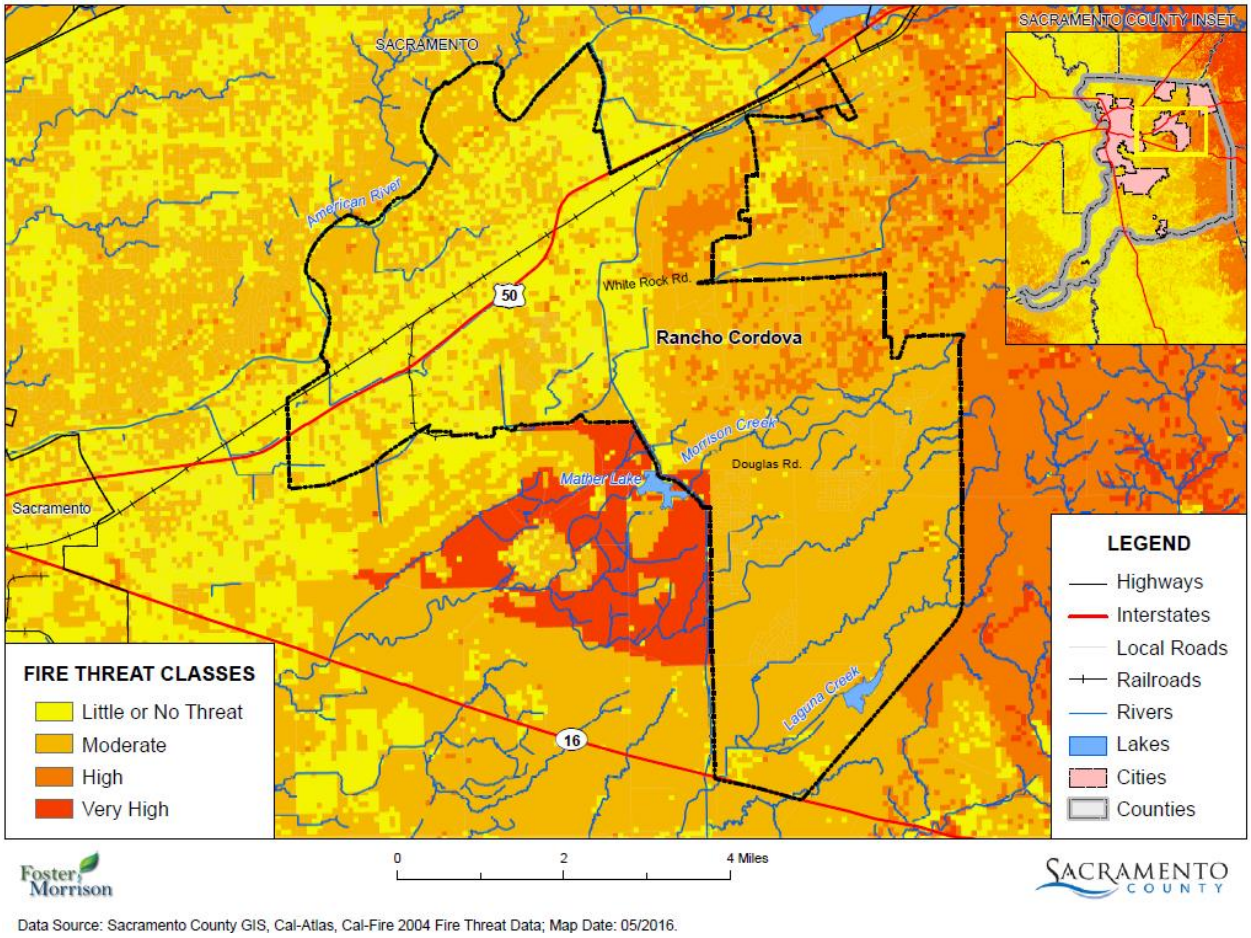
Past Occurrences

The HMPC could not provide specific past instances of wildfire that have affected the City.

Vulnerability to Wildfire

Following the methodology described in Section 4.3.17, a wildfire map for the City of Rancho Cordova was created (see Figure E-14). Wildfire threat within the City ranges from little or no threat to very high.

Figure E-14 City of Rancho Cordova's Fire Threat Zones



Values at Risk

Analysis results for Rancho Cordova are shown in Table E-29, which summarizes total parcel counts, improved parcel counts and their structure values by occupancy type affected by fire.

Table E-29 City of Rancho Cordova – Count and Value of Parcels by Property Use and Fire Threat Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Little or No Threat					
Agricultural	2	$107,251	0	$0	$107,251
Care / Health	8	$1,696,886	8	$6,408,909	$8,105,795
Church / Welfare	25	$10,602,061	24	$30,180,750	$40,782,811
Industrial	451	$167,077,152	432	$410,473,711	$577,550,863
Miscellaneous	108	$239,295	0	$0	$239,295

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Office	204	$150,349,959	187	$627,871,496	$778,221,455
Public / Utilities	147	$1,142,912	2	$1,439,116	$2,582,028
Recreational	6	$3,014,432	6	$4,398,103	$7,412,535
Residential	8,810	$506,723,224	8,718	$1,384,739,724	$1,891,462,948
Retail/Commercial	225	$142,000,687	213	$249,319,719	$391,320,406
Vacant	171	$39,735,106	3	$222,809	$39,957,915
Total	**10,157**	**$1,022,688,965**	**9,593**	**$2,715,054,337**	**$3,737,743,302**
Moderate					
Agricultural	23	$23,726,588	4	$279,917	$24,006,505
Care / Health	8	$1,322,012	8	$6,511,341	$7,833,353
Church / Welfare	8	$6,616,293	8	$19,492,701	$26,108,994
Industrial	137	$59,276,048	124	$117,178,349	$176,454,397
Miscellaneous	153	$564,252	1	$989	$565,241
Office	45	$50,884,425	42	$269,656,057	$320,540,482
Public / Utilities	139	$298,734	0	$0	$298,734
Recreational	3	$1,325,974	1	$7,827,723	$9,153,697
Residential	8,658	$594,965,332	8,257	$1,480,623,031	$2,075,588,363
Retail/Commercial	23	$15,321,736	22	$40,093,592	$55,415,328
Vacant	1,098	$106,005,908	18	$4,168,170	$110,174,078
Total	**10,295**	**$860,307,302**	**8,485**	**$1,945,831,870**	**$2,806,139,172**
High					
Industrial	3	$1,826,082	2	$1,403,309	$3,229,391
Office	3	$1,917,143	3	$8,965,540	$10,882,683
Public / Utilities	1	$0	0	$0	$0
Residential	12	$619,317	8	$2,188,352	$2,807,669
Vacant	10	$26,821,186	0	$0	$26,821,186
Total	**29**	**$31,183,728**	**13**	**$12,557,201**	**$43,740,929**
Very High					
Agricultural	1	$1,554	0	$0	$1,554
Public / Utilities	1	$0	0	$0	$0
Retail/Commercial	1	$1,326,426	1	$5,297,123	$6,623,549
Vacant	3	$5,076,337	0	$0	$5,076,337
Total	**6**	**$6,404,317**	**1**	**$5,297,123**	**$11,701,440**
Grand Total	**20,487**	**$1,920,584,312**	**18,092**	**$4,678,740,531**	**$6,599,324,843**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data, CAL FIRE

Population at Risk

The Fire Threat dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the threat zones were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction and unincorporated area. Results were tabulated by jurisdiction. According to this analysis, there is a total population of 22,729 residents of Rancho Cordova at risk to moderate or higher wildfire risk. This is shown in Table E-30.

Table E-30 City of Rancho Cordova – Count of Improved Residential Parcels and Population by Fire Threat Zone

Fire Threat Zone	Improved Residential Parcels	Population*
Little or No Threat	8,718	23,975
Moderate	8,257	22,707
High	8	22
Very High	0	0
Total	**16,983**	**46,704**

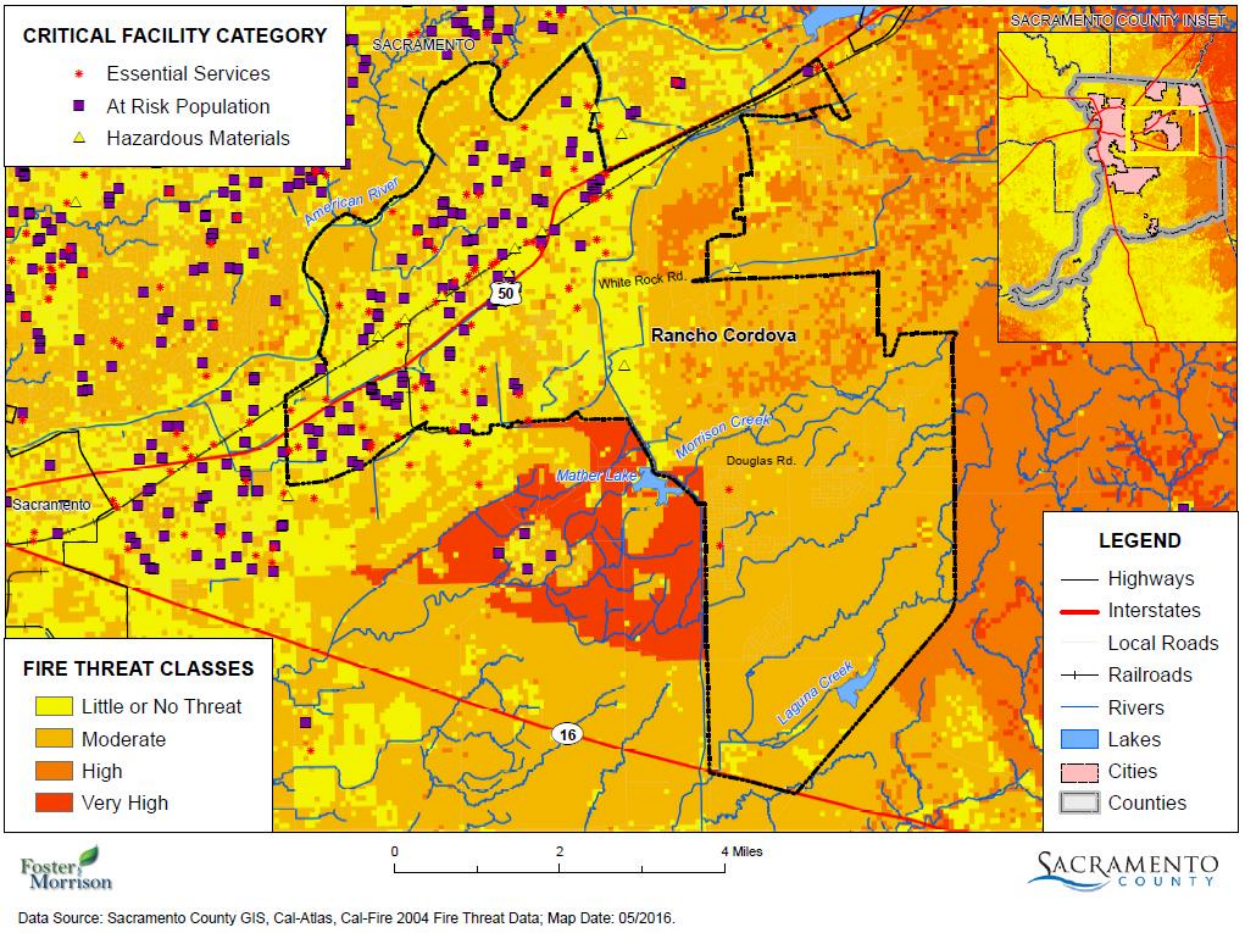
Source: Sacramento County 2016 Parcel/2015 Assessor's Data, CAL FIRE

* Average household populations for Rancho Cordova (2.75) from the 2010 US Census were used

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect a fire threat zone provided by CAL FIRE, and if so, which zone it intersects. There are 54 facilities in the moderate or higher fire severity zone in the City. These are shown in Figure E-15 and detailed in Table E-31. Details of critical facility definition, type, name and address and jurisdiction by fire severity zone are listed in Appendix E.

Figure E-15 City of Rancho Cordova – Critical Facilities in Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table E-31 City of Rancho Cordova – Critical Facilities by Fire Threat Zone

Critical Facility Category	Facility Type	Facility Count
Little or No Threat		
Essential Services Facilities	Dispatch Center	1
	Drainage	3
	Emergency Evacuation Shelter	7
	Emergency Rooms	1
	EOC	1
	Fire Station	2
	Gas Storage	1
	Government Facilities	3
	Hospitals	1
	Light Rail Stop	6
	Medical Health Facility	13

Critical Facility Category	Facility Type	Facility Count
	Police	2
	Total	**41**
At Risk Population Facilities	Adult Residential	9
	Day Care Center	12
	Group Home	4
	Hotel	16
	Private Elementary School	1
	Private High School	1
	Public Elementary School	4
	Public High School	1
	Public Middle School	1
	Residential Care/Elderly	8
	School	1
	Special Education School	2
	Total	**60**
Hazardous Materials Facilities	Oil Collection Center	8
	Total	**8**
Little or No Threat Total		**109**
Moderate		
Essential Services Facilities	Drainage	3
	Emergency Evacuation Shelter	6
	Fire Station	2
	Government Facilities	1
	Light Rail Stop	1
	Medical Health Facility	2
	State Facility	1
	Total	**16**
At Risk Population Facilities	Adult Education School	1
	Adult Residential	1
	College/University	1
	Day Care Center	11
	Group Home	2
	Hotel	3
	Independent Study School	1
	Private Elementary School	1
	Private High School	1
	Private K-12 School	1

Critical Facility Category	Facility Type	Facility Count
	Public Continuation High School	1
	Public Elementary School	7
	Public Middle School	1
	Residential Care/Elderly	3
	School-Age Day Care Center	2
	Special Education School	1
	Total	**38**
Moderate Total		**54**
Grand Total		**163**

Source: CAL FIRE, Sacramento County GIS

Future Development

Development may occur in the moderate or higher wildfire severity areas; however, City ordinances for building in these areas are enforced.

Municipal Code, Chapter 17.12 requires that all dry grass, brush, vines or other dry vegetation shall be cleared for an area of not less than 30 feet from all structures, combustible fences, vehicles and combustible storage.

E.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

E.6.1. Regulatory Mitigation Capabilities

Table E-32 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Rancho Cordova.

Table E-32 City of Rancho Cordova's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan/Master Plan	Y 2006	The General Plan does identify and address hazards in the Safety element with Goals and Policies. The General Plan does not identify projects to include in the mitigation strategy. The General Plan sets Goals and Policies in a broad sense. A more appropriate place for implementation of mitigation strategy/action items is the Zoning Ordinance
Capital Improvements Plan	Y 2016	The CIP does identify hazards and projects to include in the mitigation actions (stormwater, dam, back-up generators) to include in the mitigation strategy. The Plan can be used to implement mitigation actions
Economic Development Plan	N	Currently the City does not have a Plan adopted. The City is currently working on a Plan.
Local Emergency Operations Plan	Y 2013	
Continuity of Operations Plan		
Transportation Plan	Y	
Stormwater Management Plan/Program	Y	
Engineering Studies for Streams	Y	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	2013 California Building Code as amended by municipal code
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	Y	Rating: 3/8 (urban/rural)
Site plan review requirements	Y	Codes are enforced.
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y 2013	Ordinance is an effective measure and is enforced.
Subdivision ordinance	Y 2013	Ordinance is an effective measure and is enforced.
Floodplain ordinance	Y 2013	Ordinance is an effective measure and is enforced.

Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Ordinance is an effective measure and is enforced.
Flood insurance rate maps	Y 2012	Ordinance is an effective measure and is enforced.
Elevation Certificates	Y	Ordinance is an effective measure and is enforced.
Acquisition of land for open space and public recreation uses	Y	Ordinance is an effective measure and is enforced.
Erosion or sediment control program	Y	Ordinance is an effective measure and is enforced.
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: City of Rancho Cordova

City of Rancho Cordova General Plan (2006)

The City of Rancho Cordova General Plan serves as a blueprint for future growth and development and provides comprehensive planning for the future. It encompasses what the City currently is and what it intends to be. It provides the general framework to achieve the desired future condition.

The General Plan includes a Safety Element that focuses on safety issues to be considered in planning for the present and future development for the City. Mitigation related goals of the City of Rancho Cordova General Plan Safety Element are:

- Goal S.1: Establish Rancho Cordova as a safe community and environment for all persons.
- Goal S.2: Reduce the possibility of a flooding or drainage issue causing damage to urban land uses within the City.
- Goal S.3: Reduce the risk of adverse effects to residents or businesses as a result of geologic or seismic instability.
- Goal S.4: Safe railroad crossings for pedestrians, bicyclists, or motorists.
- Goal S.5: Reduce the possibility of serious harm to residents, employees, or the environment as the result of an accidental release of toxic or hazardous substances.
- Goal S.6: Protect the community from potential harm associated with Mather Airport operations.
- Goal S.7: Design neighborhoods and buildings in a manner that prevents crime and provides security and safety for people and property.
- Goal S.8: Maintain effective and community-oriented law enforcement.
- Goal S.9: Reduce the probability of fire damage to all of the City's structures.

The City of Rancho Cordova Disaster Debris Management Plan (July 2016)

The Disaster Debris Management Plan is designed to guide the City of Rancho Cordova's General Services Department during the debris removal planning and post-event operations. The Plan identifies tools to assist the City in addressing debris removal following a debris generating event. The City intends to utilize this Plan to reduce the cost associated with a debris generating event. The Plan incorporates a methodology that has been tested in many regions throughout the U.S. and meets the needs of the City and its residents.

This Plan is intended to guide the City in response to a natural or manmade debris generating event. This Plan is designed to identify agencies and activities that are involved in debris operations to ensure a coordinated response that achieves removal, storage, reduction and final disposition of debris deposited along or immediately adjacent to public rights-of-way.

The City is a contract city, and some of the Public Works staff works under contract. The City participates as an active member of the Solid Waste Working Group and the Operational Area Council, and will work closely in these settings to execute the procurement of a private hauling company for debris collection and removal services and debris monitoring services, and provide disaster services in event of a disaster.

The Plan's purpose is the following:

- Establish and provide a centralized repository of information critical to developing and operating a disaster debris management program (including location of community drop-off stations, Temporary Debris Storage and Reduction Site (TDSRS), site criteria for locating new TDSRS, boundary map, flood plain maps, etc.);
- Identify the rules, regulations and guidelines enacted by Cal OES, CDAA, FEMA and other agencies governing the disaster debris removal process;
- Establish and provide reference and contact information for key personnel;
- Identify the roles and responsibilities of all involved parties; and
- Establish language and a protocol for pertinent public information such as press releases and other debris management information.

City of Rancho Cordova Ordinances

Zoning Code (Title 23)

The purpose of the zoning code is to set forth and coordinate city regulations governing the development and use of land in accordance with the City of Rancho Cordova general plan. The zoning code is specifically intended to do the following:

- Serve as the principal tool for implementing the city's general plan in a manner that protects the health, safety, and welfare of the citizens of Rancho Cordova.
- Facilitate prompt review of development proposals and provide for public information, review, and comment on development proposals that may have a significant impact on the community.
- Create a comprehensive and stable pattern of land uses to help ensure the provision of adequate water, sewerage, transportation, drainage, parks, open space, and other public facilities.
- Conserve and protect the city's natural resources and features such as creeks, significant trees such as heritage oaks, historic and environmental resources.
- Create a complete multi-modal transportation network that promotes pedestrian-oriented development, safe and effective traffic circulation, and adequate facilities for all transportation modes (e.g., walking, bicycling, driving, and using transit).
- Require that permitted uses and development designs provide reasonable protection from fire, flood, landslide, erosion, or other manmade or natural hazards.
- Ensure compatibility between residential and nonresidential development and facilitate the development of compatible mixed-use developments.

This code applies to all land uses, structures, subdivisions, and development within the City of Rancho Cordova, as follows:

- New Land Uses or Structures and Changes to Land Uses or Structures. Compliance with the requirements of this zoning code is required for any person or public agency to lawfully establish, construct, reconstruct, alter, or replace any use of land or structure.
- Issuance of Building Permits. The city may issue building or other construction permits only when:
  - ✓ The proposed land use and/or structures satisfy the requirements of subsection (A) of this section and all other applicable regulations; and
  - ✓ The director determines that the site was subdivided in compliance with the Rancho Cordova land division requirements.
- Subdivisions. Any subdivision of land after the effective date of the ordinance codified in this code shall be consistent with minimum lot size requirements and all other requirements of this code.
- Existing Uses and Structures. An existing land use or structure is lawful only when it was legally established and is operated and maintained in compliance with all applicable provisions of this code.
- Minimum Requirements. The provisions of this code shall be the minimum to ensure the public health, safety, and welfare. For discretionary actions, city officials or bodies have the discretion to impose more stringent requirements than set forth in this code as may be necessary to promote orderly land use development and the purposes of this code.
- Other Requirements. Nothing in this code eliminates the need for obtaining permits, approvals, or entitlements required by the county or any regional, state, or federal agency.
- Severability. Invalidity or enforceability of one or more provisions of this code shall not affect any other provision of this code.

Land Development (Title 22)

This title shall be inapplicable to:

- The financing or leasing of apartments, offices, stores, or similar space within apartment buildings, industrial buildings, commercial buildings, mobile home parks or trailer parks.
- Mineral, oil or gas leases.
- Land dedicated for cemetery purposes under the Health and Safety Code of the state of California.
- A lot line adjustment between two or more existing adjacent parcels, where the land taken from one parcel is added to an adjacent parcel, and where a greater number of parcels than originally existed is not thereby created, providing the lot line adjustment is approved by the planning director acting as an approval body or by the subdivision review committee acting either as an approval body or as an appeals board pursuant to RCMC 22.20.037.
- Boundary line or exchange agreements to which the State Lands Commission or a local agency holding a trust grant of tide and submerged lands is a party.
- Any separate assessment under Section 2188.7 of the Revenue and Taxation Code.
- The financing or leasing of any parcel of land, or any portion thereof, in conjunction with the construction of commercial or industrial buildings on a single parcel unless the project is not subject to review under other local agency ordinances regulating design and improvement.
- The financing or leasing of existing separate commercial or industrial buildings on a single parcel.
- Subdivisions of four parcels or less for construction of removable commercial buildings having a floor area of less than 100 square feet.

Fire Prevention Ordinance (Title 17)

The International Fire Code, 2010 Edition, as published by the International Code Council, and as referenced in and adopted pursuant to Sections 17922 and 18935 of the California State Health and Safety Code (hereinafter referred to as the "IFC"), and Appendices B and C (hereinafter referred to as the "appendix") are hereby adopted and incorporated.

The city council also finds and declares that the uncontrolled growth and/or accumulation of grass, weeds or other materials or obstructions on sidewalks, streets, and on lands or lots is dangerous or injurious to neighboring property and the health or welfare of residents of the vicinity and is a public nuisance in that it creates a condition that reduces the value of private property, promotes blight and deterioration, invites plundering, creates fire hazards, constitutes an attractive nuisance creating a hazard to the health and safety of minors, creates a harbor for rodents and insects and is injurious to the health, safety and general welfare.

Building Code Ordinance (Chapter 16.04)

The purpose of the Rancho Cordova building code is to provide minimum standards to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, installation, quality of materials, use and occupancy, location and maintenance of all buildings and structures within this jurisdiction, and certain equipment specifically regulated herein.

The 2016 California Building Code, Part 2, Title 24 of the California Code of Regulations, a portion of the California Building Standards Code, as defined in Section 18901 et seq. of the California State Health and Safety Code, and any rules and regulations promulgated pursuant thereto, including the International Building Code, 2015 Edition, as published by the International Code Council, and as referenced in and adopted pursuant to Sections 17922 and 18935 of the California State Health and Safety Code, Appendix C (Agricultural Buildings) and Appendix I (Patio Covers) of the CBC (hereinafter referred to as the "appendix"), are hereby adopted and incorporated by reference herein, excluding Sections 102 through 116 of Chapter 1 of the CBC, which are adopted pursuant to Chapter 16.02 RCMC.

Residential Code (Chapter 16.06)

The purpose of the Rancho Cordova Residential Code is to provide minimum standards to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, installation, quality of materials, use and occupancy, location and maintenance of all buildings and structures within this jurisdiction, and certain equipment specifically regulated herein.

The 2013 California Residential Code, Part 2.5, (hereinafter referred to as the "CRC") Title 24 of the California Code of Regulations, a portion of the California Building Standards Code, as defined in Section 18901 et seq. of the California State Health and Safety Code (hereinafter referred to as the "State Code"), and any rules and regulations promulgated pursuant thereto, including the International Residential Code, 2012 Edition, as published by the International Code Council, and as referenced in and adopted pursuant to Sections 17922 and 18935 of the California State Health and Safety Code (hereinafter referred to as the "IRC"}, Appendix H (Patio Covers) of the CRC (hereinafter referred to as the

"appendix"), are hereby adopted and incorporated by reference herein, excluding Sections R102 through R114 of the CRC, which are adopted pursuant to Chapter 16.02 RCMC. Except as otherwise provided by this chapter and Chapter 16.02 RCMC, all construction, alteration, moving, demolition, repair, and use of any building or structure within the city shall be made in conformance with the State Code and any rules and regulations promulgated pursuant thereto, including the IRC and the appendix.

Land Grading and Erosion Control Ordinance (Chapter 16.44)

It is the intent of the city council in enacting this chapter to minimize damage to surrounding properties and public rights-of-way, the degradation of the water quality of watercourses, and the disruption of natural or city-authorized drainage flows caused by the activities of clearing and grubbing, grading, filling and excavating of land, and sediment and pollutant runoff from other construction-related activities, and to comply with the provisions of the City's National Pollutant Discharge Elimination System (NPDES) permit No. CA0082597, issued by the California Regional Water Quality Control Board.

Stormwater Management Ordinance (Chapter 15.12)

This chapter is adopted pursuant to Article XI, Section 7 of the California Constitution, which authorizes the City to exercise its police power to protect and promote the public health, safety and general welfare. While storm water runoff is one step in the natural cycle of water, human activities, including, but not limited to, agriculture, construction, manufacturing and the operation of an urban infrastructure, may result in undesirable discharges of pollutants and certain sediments. Such discharges may accumulate in local drainage channels and waterways and eventually may be deposited in the waters of the United States. The purpose of this chapter is to protect and enhance the water quality of watercourses, water bodies and wetlands within the unincorporated area of the county in a manner consistent with the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act and Municipal Discharge Permit No. CA0082597 by controlling the contribution of urban pollutants to storm water runoff which enters the county storm water conveyance system.

- It is the intent of the city council in adopting this chapter to provide the city with the legal authority to accomplish the following goals:
- To reduce the discharge of pollutants in storm water to the maximum extent practicable;
- To effectively prohibit non-storm water discharges into the county storm water conveyance system;
- To comply with the requirements of the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act and NPDES Municipal Storm Water Discharge Permit No. CA0082597 as they apply to the discharge of pollutants into and from the county storm water conveyance system;
- To fully implement the county's comprehensive storm water management program as approved by the Regional Board;
- To protect the physical integrity and function of the county storm water conveyance system from the effects of pollutants and materials other than storm water;
- To prevent the contamination of groundwater as a result of pollution migration from the county storm water conveyance system;
- To promote cost-effective management and beneficial use of sediments in the county storm water conveyance system;
- To protect the health and safety of maintenance personnel and the public who may be exposed to pollutants in the county storm water conveyance system;

- To provide for the recovery of regulatory costs incurred by the city or, where applicable, the county, in the implementation of its comprehensive storm water management program, including, but not limited to, enforcement activities, inspections, investigations, sampling and monitoring; and
- To establish appropriate enforcement procedures and penalties for violations of the provisions of this chapter.

E.6.2. Administrative/Technical Mitigation Capabilities

Table E-33 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Rancho Cordova.

Table E-33 City of Rancho Cordova's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	Y	Was formed for this LHMP Update. Coordination is expected to be effective in the future when yearly plan review is performed.
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	The City has an ongoing maintenance program to storm drain pipes, structures, channels and basins.
Mutual aid agreements	Y	The City contracts to remove debris around the City in the event of flooding.
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y	Staffing is adequate and staff are trained. Coordination occurs between agencies.
Floodplain Administrator	Y	Staffing is adequate and staff are trained. Coordination occurs between agencies.
Emergency Manager	Y	Staffing is adequate and staff are trained. Coordination occurs between agencies.
Community Planner	Y	Staffing is adequate and staff are trained. Coordination occurs between agencies.
Civil Engineer	Y	Staffing is adequate and staff are trained. Coordination occurs between agencies.
GIS Coordinator	Y	Staffing is adequate and staff are trained. Coordination occurs between agencies.
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	
Hazard data and information	Y	
Grant writing	Y	

Hazus analysis
Other
How can these capabilities be expanded and improved to reduce risk?
Floodplain Manager to obtain Floodplain Management certification

Source: City of Rancho Cordova

E.6.3. Fiscal Mitigation Capabilities

Table E-34 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table E-34 City of Rancho Cordova's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Yes. It funds drainage improvements to reduce flooding
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	Yes, to fund storm water infrastructure projects
Storm water utility fee	Y	Yes, to fund drainage improvements to reduce flooding
Incur debt through general obligation bonds and/or special tax bonds	Y	Requires special election.
Incur debt through private activities	Y	
Community Development Block Grant	Y	
Other federal funding programs	Y	
State funding programs	Y	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: City of Rancho Cordova

E.6.4. Mitigation Education, Outreach, and Partnerships

Table E-35 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information. More information can be found below the table.

Table E-35 City of Rancho Cordova's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	The City works with Sacramento SPLASH to help children understand and value their natural world
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	The City participates in Creek Week which is a week-long celebration focusing on the ecology of local rivers and lakes
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

E.6.5. Other Mitigation Efforts

The City of Rancho Cordova has many other ongoing mitigation efforts that include the following:

- The City has entered into an agreement with the County of Sacramento regarding regional disaster debris and hazardous waste removal after a disaster is declared.

E.7 Mitigation Strategy

E.7.1. Mitigation Goals and Objectives

The City of Rancho Cordova adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

E.7.2. NFIP Mitigation Strategy

As a participant of the National Flood Insurance Program (NFIP), the City of Rancho Cordova has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Rancho Cordova will continue to comply with the requirements of the NFIP in the future.

The City's regulatory activities apply to existing and new development areas of the City; implementing flood protection measures for existing structures and maintaining drainage systems. The goal of our program is to enhance public safety, and reduce impacts and loses while protecting the environment.

The City of Rancho Cordova Public Works Department provides public outreach activities which include map information services, public awareness, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current and accurate flood mapping. In addition, the General Services Department provides information about our stormwater management program and up-to-date information related to the maintenance of our drainage system.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Rancho Cordova is currently evaluating joining the CRS.

More information about the floodplain administration in the City of Rancho Cordova can be found in Table E-36.

Table E-36 City of Rancho Cordova Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	319 $126,710 $96,082,000
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	0 0 0
How many structures are exposed to flood risk within the community?	FM to complete
Describe any areas of flood risk with limited NFIP policy coverage	21 in the 1% annual chance, 971 in the 0.2% annual chance
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	No
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Regulate development in the floodplain to reduce impacts to life and property
What are the barriers to running an effective NFIP program in the community, if any?	None
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	N
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	9/29/2010

NFIP Topic	Comments
Is a CAV or CAC scheduled or needed?	
Regulation	
When did the community enter the NFIP?	9/15/2004
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet
Provide an explanation of the permitting process.	The Planning Department issues permits to build based on zoning codes and floodplain ordinances.
Community Rating System	
Does the community participate in CRS?	No
What is the community's CRS Class Ranking?	N/A
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

E.7.3. Mitigation Actions

The planning team for the City of Rancho Cordova identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. Goals addressed (from Chapter 5 of the Base Plan) are also included in each action.

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: All hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: City of Rancho Cordova Planning Department

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time; $1,600

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Sunrise Boulevard Widening Kiefer to Jackson

Hazards Addressed: Localized flooding

Goals Addressed: 1, 2, 3

Issue/Background: A section of Sunrise Boulevard south of Kiefer and north of Jackson is subject to localized flooding. This project will raise the road in this area to be above the local flood plain.

Other Alternatives: The project is located in a rural area. Vehicles must travel several miles to avoid this location of localized flooding.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The project is currently listed in the City Capital Improvement Plan. City staffs are currently preparing a funding plan and exploring funding options to construct this project.

Responsible Office: City of Rancho Cordova Department of Public Works

Project Priority: Medium

Cost Estimate: $14 Million

Benefits (Losses Avoided): Raising the road above the local flood plain will allow emergency access through the area.

Potential Funding: Federal and/or state grants. Local transportation funds.

Timeline: Within 5 years.

Action 3. City of Rancho Cordova Disaster Debris Management Plan

Hazards Addressed: Multi-hazard – Debris management for floods, fire, earthquake, etc.

Goals Addressed: 1, 2, 3, 4

Issue/Background: The plan addresses responsibilities and roles for removal, disposal and recycling of debris generated from a disaster event.

Project Description: The plan was submitted to the Office of Emergency Services for review and approval.

Other Alternatives: None.

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Department of Public Works

Project Priority: Medium

Cost Estimate: Varies depending on magnitude of disaster.

Benefits (Losses Avoided): N/A

Potential Funding: FEMA, General Fund

Timeline: Plan completed.

Action 4. Transportation Interconnectivity

Hazards Addressed: Muti-hazard; evacuation routes

Goals Addressed: 1, 2, 3, 4

Issue/Background: Long range transportation

Project Description: Ensure interconnectivity and road standards are maintained for disaster preparedness/evacuation routes

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Development Process

Responsible Office/Partners: Planning and Public Works

Project Priority: High

Cost Estimate: Staff time; Undetermined as a case by case basis

Benefits (Losses Avoided):

Potential Funding: Local Funds

Timeline: On-going

Action 5. Intergovernmental Agreement between the County of Sacramento and the City of Rancho Cordova

Hazards Addressed: Multi-hazard – debris management for floods, fire, earthquake, etc.

Goals Addressed: 1, 2, 3

Issue/Background: Debris management is a significant issue in the aftermath of a disaster. The MOU with Sacramento County allows the City to expedite the execution of contracts with waste haulers for debris removal services by allowing the City to use the County's procurement program.

Project Description: The MOU allows the City to use the County's procurement program to hire contractors for debris removal, disposal and recycling.

Other Alternatives: The City could procure the services independently if necessary.

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Department of Public Works

Project Priority: Medium

Cost Estimate: Varies depending on magnitude of disaster.

Benefits (Losses Avoided): N/A

Potential Funding: FEMA, General Fund

Timeline: MOU completed

Action 6. Land Use (Long range)

Hazards Addressed: Multi-hazard (environmental sensitive areas)

Goals Addressed: 1, 2, 3, 4

Issue/Background: Long range sustainability

Project Description: Land Use (Long range): As the City grows towards the south and east cluster development and open space will be encouraged (environmentally sensitive areas to include vernal pools, creeks, and streams). Review projects for environmental sensitive areas when submitted to the City

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Development Process

Responsible Office/Partners: Planning

Project Priority: High

Cost Estimate: Staff time Undetermined as a case by case basis

Benefits (Losses Avoided):

Potential Funding: Local Funds

Timeline: On-going

Action 7. Post disaster training for staff

Hazards Addressed: Multi–hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: Training

Project Description: OES training and post disaster planning classes/webinars for planning staff

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Classes and webinars

Responsible Office/Partners: Planning

Project Priority: High

Cost Estimate: Staff time; Cost of classes

Benefits (Losses Avoided):

Potential Funding: Local Funds

Timeline: On-going

Action 8. Update/Maintain Emergency Operation Plans (EOPs)

Hazards Addressed: Multi Hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Current Emergency Operations Plan was last updated in 2013 and is required to be updated every 5 years.

Project Description: Assemble key City staff to form a team to update and maintain EOPs

Other Alternatives: Maintain existing and out dated EOPs

Existing Planning Mechanism(s) through which Action Will Be Implemented: City staff will review existing EOPs and develop recommended changes/updates to the EOPs.

Responsible Office/Partners: PW Department/Facilities Division/Finance Department/Human Resources/Economic Development/Planning

Project Priority: Medium

Cost Estimate: $25,000 - $50,000

Benefits (Losses Avoided): Lower irrigation water costs

Potential Funding: City funds

Timeline: Next 5 years

Action 9. Increase Everbridge Enrollment

Hazards Addressed: Multi-hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: With more people using cell phones as their primary method of communication, there is an increase need to enroll citizens/groups in Everbridge. Everybridge is essentially a reverse 911 system where agencies and local jurisdiction can provide message alerts to individual citizens or groups. These messages can help the City provide citizens important information regarding natural disasters.

Project Description: Outreach to citizens/groups via news outlets/City website/kiosk to encourage enrollment. City staff will conduct periodic tests of the Everbridge system to measure its effectiveness in reaching out to enrollees.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: Work with Public Information Officer to Outreach to groups to encourage enrollment.

Responsible Office/Partners: PIO/EOC Coordinator

Project Priority: Medium

Cost Estimate: $5,000

Benefits (Losses Avoided):

Potential Funding: City funds

Timeline: FY 16/17

Action 10. Developing and maintaining a database to track community vulnerability.

Hazards Addressed: Gas infrastructure and facility disaster preparedness.

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Rancho Cordova has at least one major gas transmission line (PG&E) and a large gasoline transfer/storage facility. Public safety and property would certainly be negatively impacted if an explosion were to occur on the large transmission line or gasoline storage facility. This mitigation effort would seek to collect and maintain GIS information that could be utilized to better prepare for and respond to such a disaster.

Project Description: The City of Rancho Cordova has built an enterprise GIS that houses approximately 75 GIS layers, including parcels, streets, addresses, public works infrastructure, zoning, etc…. As part of this project, work would be performed to research, gather, and store GIS data relative to major gas transmission lines and facilities. This information would then be used to perform research and prepare pre-operation maps and GIS viewers that would be used for drills and an actual disaster scenario.

Other Alternatives: Rely on general hardcopy maps and GoogleMaps to assist during emergency operation exercises and actual events.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The City of Rancho Cordova GIS staff would take on the bulk of the project work and implementation. Some support would be required from the Police and Fire Departments. Existing GIS software would be used for the collection, storage, and map creation steps. No new software is required for this project.

Responsible Office/Partners: IT Department with GIS staff, Public Works Department, Police Department, Sacramento Metro Fire Department

Project Priority: Medium

Cost Estimate: $5,000 (staff time)

Benefits (Losses Avoided): Reduces the potential impacts from a gas explosion, which would help to reduce negative impacts to property and people living and working near the gas transmission line and facility.

Potential Funding:

Timeline: Project would take approximately 1 month to complete.

Action 11. City Website HMP and City Website, Press Notification, and Social Media Emergency Information

Hazards Addressed: Multi-hazard – Information to the Public

Goals Addressed: 1, 2, 3

Issue/Background: Communications Department

Project Description: Ensure information regarding emergencies is available through the City website with a link to the Multi-Jurisdiction Hazard Mitigation Plan, press notifications, and City social media channels.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: City Website/Press Notifications/Social Media Channels

Responsible Office/Partners: Communications Department

Project Priority: High

Cost Estimate: Staff time

Benefits (Losses Avoided):

Potential Funding: Local Funds

Timeline: Information and link to HMP within 6 months of adoption of HMP. Links on the website pertaining to HMP information will be evaluated once a year. Emergency information will provided on an as-needed basis through the City website, City social media channels, and press notifications.

Action 12. Building & Safety Division Disaster Inspector Training

Hazards Addressed: Post Catastrophic Events, including but not limited to: earthquakes, floods, fires, explosions

Issue/Background: When a catastrophic event occurs, assistance may be needed at the local level to help identify hazards, access the potential risk to the community, and enforce building codes.

In these situations, City personnel adequately trained in disaster response is necessary.

Project Description: To obtain and maintain disaster training and certifications for key personnel within the City of Rancho Cordova Building & Safety Division. Disaster Response Inspectors are typically responsible for responding to post catastrophic events. They will identify utility problems, which could cause an immediate life safety hazard, perform safety evaluations and assessments of structures, and identify instances in which further engineering evaluations are necessary. In addition, the disaster inspector may be responsible for tasks, including but not limited to, posting placards at the site, completing appropriate documentation, and disseminating information to the public.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: CalOES initiates local level response to disaster.

Responsible Office/Partners: Building & Safety Division

Cost Estimate: $0.00 (Training funded by outside agencies)

Benefits (Losses Avoided):

Potential Funding: $0.00

Timeline: As needed

Project Priority: Public Safety

Action 13. Landscape and Irrigation Requirements/Retro

Hazards Addressed: Drought

Goals Addressed: 1, 2, 3, 4

Issue/Background: Landscaped areas around City owned facilities do not meet new drought standards. Developing a new drought policy will help the City conserve water and demonstrate to the community the City's commitment to promote water conservation.

Project Description: Develop a 5 year plan to upgrade City owned and operated facilities to include drought tolerant plants in landscaped areas and more efficient irrigation systems.

Other Alternatives: Do nothing/remove City landscaping

Existing Planning Mechanism(s) through which Action Will Be Implemented: Include budget for projects that reduce the use of water for landscaped areas around City owned buildings.

Responsible Office/Partners: PW Department/Facilities Division/Finance Department

Project Priority: Medium

Cost Estimate: $25,000 - $50,000

Benefits (Losses Avoided): Lower irrigation water costs

Potential Funding: City funds

Timeline: Next 5 years

Action 14. Landscape Ordinance

Hazards Addressed: Drought

Goals Addressed: 1, 2, 3

Issue/Background: Proper landscape selection

Project Description: Update and maintain to incorporate proper selection, planting, and maintenance practices into landscape ordinance.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Development Process

Responsible Office/Partners: Planning

Project Priority: High

Cost Estimate: Staff time; Undetermined as a case by case basis

Benefits (Losses Avoided):

Potential Funding: Local Funds

Timeline: On-going

Action 15. Impervious surface

Hazards Addressed: Drought and flooding

Goals Addressed: 1, 3, 4

Issue/Background: Restrict impervious surface

Project Description: Continue to limit impervious surfaces within front yard of residential lots.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Building permit review and Code enforcement issues

Responsible Office/Partners: Planning

Project Priority: Medium

Cost Estimate: Staff time;

Benefits (Losses Avoided):

Potential Funding: Local Funds

Timeline: On-going

Action 16. Porous pavement and vegetative buffers

Hazards Addressed: Drought and flooding

Goals Addressed: 1, 3, 4

Issue/Background: Ground water retainment

Project Description: Encourage the use of porous pavement, vegetative buffers and islands in large parking areas.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Development Process

Responsible Office/Partners: Planning

Project Priority: Medium

Cost Estimate: Staff time; Undetermined as a case by case basis

Benefits (Losses Avoided):

Potential Funding: Local Funds

Timeline: On-going

Action 17. Storm Water Pump Station Infrastructure Upgrades

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City owns and operates six pump stations which serve to convey storm water during rain events. The City owns and maintains one stationary generator and one portable generator that are each dedicated to powering the pump stations during power outages. The stationary generator is located at the Bear Hollow Pump Station, and the portable generator is housed at the Mills Tower Pump Station. When compared with the other pump stations that lack a generator, the Mills Tower Pump Station has the highest risk of causing significant localized flooding in the event of a power outage. This pump station sits next to residential homes in an older neighborhood that contains undersized drainage pipes. Thus, the City has chosen to house the portable generator at this station. In the event that a power outage were to occur at one of the other pump stations that lack a generator, the portable generator at Mills Tower Pump Station would need to be transported to the station in need. Transporting the portable generator is time consuming, and the City currently relies on contractor vehicles for the transport.

Project Description: City staff will purchase four portable generators, each to be housed at a pump station that does not currently have one onsite.

Cost Estimate includes the purchase and installation of transfer switches and plugs for each of the four pump stations, which would allow for a portable generator hook-up to power the pumps.

Other Alternatives: Continue to rely on the portable generator stationed at Mills Tower Pump Station to power the other pump stations in the event of a power failure.

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Public Works

Project Priority: High

Cost Estimate: $500,000

Benefits (Losses Avoided): Flood hazard mitigation

Potential Funding: Local Funds (Storm Water Utility Fee)

Timeline: To be implemented over 5 years

Action 18. SB-5 Urban Level of Flood Protection

Hazards Addressed: 200-year Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: As part of Senate Bill 5, the City is required to provide a 200-yr urban level of flood protection criteria when regulating development within the 200-yr floodplain and includes amending the General Plan and Zoning Codes.

Project Description: The US Army Corps of Engineers is in the process of making improvements to the Folsom Dam spillway that would reduce the allowable release rate from the dam from into the American River to 117,000 cfs for the 200-yr storm event. In order to accurately reflect the reduced floodplain that would result from the reduction in flow, the City has remapped the 200-yr floodplain. To satisfy the requirements of SB5, the City has updated its General Plan and incorporating the revised floodplain map into its zoning ordinance.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: Part of Capital Improvement Program

Responsible Office/Partners: Public Works

Project Priority: High

Cost Estimate: $70,000

Benefits (Losses Avoided): Not providing a higher level of flood protection would result in an increase in property damage due to flooding.

Potential Funding: Local Funds (Stormwater Utility Fee)

Timeline: To be completed in 2017

Action 19. Channel Vegetation Management and Erosion Control

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City has a Streambed Alteration Agreement with the California Department Fish and Wildlife for routine maintenance of vegetation in and near waterways, including creeks, channels, and basins. Various locations have been identified for erosion control improvements and excavation work to improve flow capacity and minimize the potential for blockages and localized flooding.

Project Description: Undertake projects that improve the structural integrity of channel slopes in various locations. Implement solutions that control and reduce the chances for erosion, which is usually caused by runoff from adjacent properties and burrowing animals.

Perform excavation projects that remove vegetation (e.g. cattails, bulrush, plants/trees) that impede water flow and reduce flood capacity in channels.

Other Alternatives: Continue to perform routine weed abatement activities, and complete erosion control and excavation projects as funding allows.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Erosion control and excavation projects will be completed by the City's contractor as funding allows.

Responsible Office/Partners: Public Works

Cost Estimate: $50,000

Benefits (Losses Avoided): Ensures flood capacity and flow capacity of streams and creeks is not diminished.

Potential Funding: Local Funding - Stormwater Utility Fee

Timeline: To be implemented over 5 years

Project Priority: High

Action 20. Adoption of Hydromodification and Low Impact Development (LID) Standards

Hazards Addressed: Localized Flooding and Drought

Goals Addressed: 1, 2, 3, 4

Issue/Background: As part of the City's region wide NPDES permit, new development and redevelopment projects will be required under certain conditions to incorporate stormwater hydromodification and Low Impact Development into their projects. Development projects that incorporate hydromodification and LID will more closely mimic the natural hydrology of their site which will result in less potential for flooding and erosion of stream banks due to a reduction of stormwater runoff volume into rivers, streams, pipes and culverts. Use of LIDs will also help increase water supply by increasing groundwater recharge.

Project Description: Over the next several years, the City's new region wide NPDES stormwater permit will require permittees to adopt development standards that include the use of hydromodification and LID for new and redevelopment projects.

Other Alternatives: Do Nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: Identified in the City's 5-yr Capital Improvement Plan

Responsible Office/Partners: Public Works

Project Priority: Medium

Cost Estimate: $10,000

Benefits (Losses Avoided): Requiring new development and redevelopment projects to implement hydromodification and LID will reduce flooding and increase groundwater recharge.

Potential Funding: Local funds (Stormwater Utility Fee)

Timeline: To be implemented over 5 years

Action 21. Stormwater Capital Improvement Program Master Plan

Hazards Addressed: Localized Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City experiences localized flooding in older areas of the City where storm drain pipes and culverts are undersized and cannot convey the design storm. Areas along Sunset Blvd. south of White Rock Road are particularly prone to significant flooding due to undersized siphons and over chute that cross the Folsom South Canal.

Project Description: Develop a Stormwater Capital Improvement Program Master Plan that will identify existing flooding problems within the City and provide recommended solutions. The plan will include hydrologic and hydraulic analysis of the City's drainage system, including pipes and culverts and develop a priority list of recommended capital improvement projects including estimated costs and implementation schedule.

Other Alternatives: Do Nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Public Works

Project Priority: High

Cost Estimate: $700,000 -$1,000,000

Benefits (Losses Avoided): Provide a prioritized list of drainage capital improvement projects that will protect property and improve public safety by reduce flooding within the City.

Potential Funding: Local funds (Stormwater Utility Fee)

Timeline: To be implemented over 5 years

Action 22. Sunrise Blvd. & Monier Circle Drainage Improvements

Hazards Addressed: Localized Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Sunrise Blvd. floods between Monier Circle and Fitzgerald during severe rain events due to limited capacity of culverts the Folsom South Canal siphon.

Project Description: Project includes retrofitting existing detention basin located between Sunrise Blvd. and the Folsom South Canal to increase storage capacity and replacing two undersized culverts across Sunrise Blvd between Recycle Road and Monier Circle.

Other Alternatives: Do Nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: Identified in the City's 5-yr Capital Improvement Plan

Responsible Office/Partners: Public Works

Project Priority: High

Cost Estimate: $2,000,000 - $3,000,000

Benefits (Losses Avoided): Project will allow unimpeded public access including access for emergency vehicles along Sunrise Blvd. during significant flooding events

Potential Funding: Local Funds (Stormwater Utility Fee)

Timeline: To be implemented over 5 years

Action 23. Roundabouts

Hazards Addressed: High wind and storms (evacuations)

Goals Addressed: 1, 2, 3

Issue/Background: Traffic control

Project Description: Encourage round-abouts in place of traffic signals where appropriate

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Development Process

Responsible Office/Partners: Planning/Public Works

Project Priority: Medium

Cost Estimate: Staff time; Undetermined as a case by case basis

Benefits (Losses Avoided):

Potential Funding: Local Funds

Timeline: On-going

Annex F City of Sacramento

F.1 Introduction

This Annex details the hazard mitigation planning elements specific to the City of Sacramento, a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This Annex provides additional information specific to the City of Sacramento, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this community.

F.2 Planning Process

As described above, the City of Sacramento followed and met all DMA and CRS planning process requirements detailed in Section 3 of the Base Plan and as documented by Appendix A to this LHMP. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC) and Steering Committee, the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table F-1. Additional details on plan participation and City representatives are included in Appendix A.

Table F-1 City of Sacramento Planning Team

Name	Position/Title	How Participated
Tony Bertrand	Supervising Engineer	Utilities Department - Development Services. Provided information on floodplain management and impacts on development.
Elissa Callman	Senior Engineer	Utilities Department - Environmental and Regulatory Compliance: Provided information on mitigation projects related to water quality issues.
Roberta Deering	Preservation Director	Community Development Department – Planning Design/Preservation: Provided information on cultural and historical resources.
Lisa Deklinski	Program Specialist	Utilities Department - Security and Emergency Preparedness: Provided information on the Department Operations Center, levee security, and emergency management practices.
Brett Ewart	Senior Engineer	Utilities Department - Capital Improvement Program (CIP): Provide information on current and future Capital Improvement Project related to water.
Brett Grant	Supervising Engineer	Utilities Department - Drainage and Sewer CIP: Provided information on current and future conditions of the drainage system. Identified hazard area and possible mitigation projects.

Name	Position/Title	How Participated
Dave Hansen	Supervising Engineer	Utilities Department – Information Technology: Provided information on the technology infrastructure of our utilities. Also, provided background to generator mitigation project.
Kevin Hocker	Arborist/Urban Forester	Public Works - Urban Forestry: Provided information on natural resources.
Sherill Hunn	Supervising Engineer	Utilities Department - Environmental and Regulatory Compliance: Provided input on regulatory mitigation capabilities as well as water quality issues.
Niko King	Deputy Chief	Sacramento Fire Department: Provided information on the Fire Department's public education efforts and ISO rating.
Rick Matsuo	Supervising Engineer	Utilities Department - Integrated Planning and Asset Management: Provided perspective on maintenance and disaster recovery related to city assets.
Jessica McCabe	Program Analyst	Utilities Department - Public Affairs: Provided information on current and future public outreach programs.
Remi Mendoza	Associate Planner	Community Development Department - Long Term Planning: Provided information on the City's development, building procedures, and planning aspects.
Mike Nolan	Consultant	Utilities Department – Floodplain Management: Provided information and status on infrastructure projects. Also, provided possible mitigation projects for flood hazards.
Connie Perkins	Senior Engineer	Utilities Department - Floodplain Management: Provide information on flooding hazards, dam failure, and levee failure.
William Roberts	Superintendent	Utilities Department - Operations and Maintenance: Provided mitigation projects related to levee patrols and flood fighting activities.
Rhea Serran	Media & Communications Specialist	Utilities Department - Public Affairs: Provided insight on emergency public outreach and media relations.
Kelly Sherfey	Program Analyst	Utilities Department - Floodplain Management: Provided information on flood hazards and researched other natural hazards within the City.
Jason Sirney	Emergency Manager	City of Sacramento - Emergency Operation Center: Provided information on the City's hazard history, current preparedness, and identified multiple mitigation projects.
Pravani Vandeyar	Superintendent	Utilities Department - Water Quality Lab and Research & Development: Provided information on the City's water plant and provided mitigation project related to flood recovery.
Steve Winton	Police Lieutenant	City of Sacramento - EOC Coordinator: Provided law enforcement perspective.
Asad Akhtar	Engineering Student Intern	Utilities Department – Intern. Provided many of the mitigation action worksheets for inclusion into the Plan. Provided detailed research on mitigation actions included in this plan.

F.2.1. Coordination with Other Community Planning Efforts

Coordination with other community planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the City integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the City incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table F-2.

Table F-2 2011 LHMP Incorporation

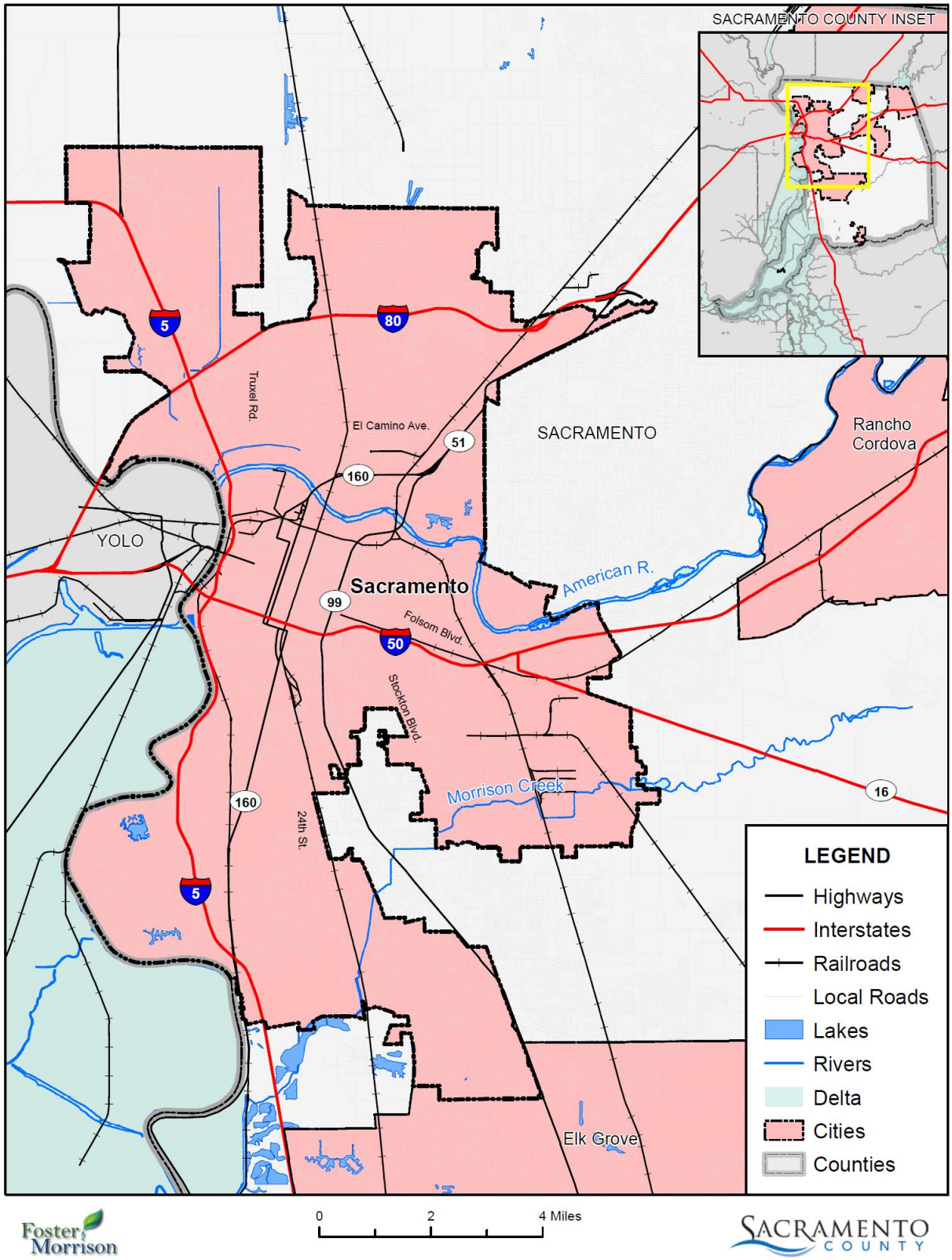
Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
2035 General Plan	Goals and Policies related to fire prevention and suppression and flood protection have been incorporated into the Land Use, Public Health and Safety, and Environmental Constraints elements of the 2035 General Plan. The Public Health and Safety Goal 4.1.1 is to maintain and implement the Sacramento County Multi-Hazard Emergency Plan to address the major hazards facing the City of Sacramento
City Emergency Operations Plan/ Department of Utilities Emergency Action Plan	Plans to set procedures for emergency response based on natural hazards defined in the 2011 LHMP. In addition, critical facilities identified in the 2011 LHMP were incorporated into these plans for emergency notification. The City of Sacramento, situated within Sacramento County, faces a variety of hazards. The city developed this plan on the basis of hazard and vulnerability findings that are identified in the Sacramento County Multi-Hazard Mitigation Plan. The analysis of these threats included both natural and technological hazards that affect the operational area.
Comprehensive Flood Management Plan	Another planning mechanism for the City that addresses flooding related hazards identified in the 2011 LHMP. This Plan discusses future development, internal drainage, Community Rating System program, National Flood Insurance Program, levee security, and flood control projects.
Repetitive Loss Area Analysis	A plan to further analyze repetitive loss properties that have flooded because of a high hazard – flooding, which was identified in the 2011 LHMP.

In addition, the development of this City of Sacramento Annex to the 2016 LHMP Update involved the review and coordination with an exhaustive list of existing studies and plans as detailed and referenced in Chapters 3 and 4 of the Base plan, throughout this Annex, and within the LHMP Appendices. Coordination with key stakeholders, including other communities and agencies and public and private stakeholders was paramount to the development of this Annex and is further discussed herein and within the Base plan and associated appendices.

F.3 Community Profile

The community profile for the City of Sacramento is detailed in the following sections. Figure F-1 displays a map and the location of the City of Sacramento within Sacramento County.

Figure F-1 City of Sacramento



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

F.3.1. Geography and Climate

The City of Sacramento is located in the heart of California's Central Valley at the confluence of the Sacramento and American Rivers. The Great Valley is a flat alluvial plain approximately 50 miles wide and 400 miles long in the central portion of California. Its northern part is the Sacramento Valley drained by the Sacramento River, and its southern part is the San Joaquin Valley drained by the San Joaquin River. It is surrounded by the Sierra Nevada to the east, the Tehachapi Mountains to the south, Coastal Range to the west, and Cascade Range to the north. The topography of the area is relatively flat. There is a gradual slope rising from elevations as low as sea level in the southwestern portion of the Policy Area up to approximately 75 feet above sea level in the northeastern portion.

Sacramento is the cultural and economic center of its six-county metropolitan area (El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba counties) and the largest city in the Central Valley. The regional location of Sacramento, as shown on the map above, is roughly halfway between San Francisco to the west and Lake Tahoe to the east. Sacramento covers a total area of approximately 99 square miles and is the seventh most populous city in California with a 2010 estimated population of 466,087. Sacramento has a Mediterranean climate that is characterized by mild winters and dry, hot summers. Rain typically falls between November and March, with the rainy season tapering off almost completely by the end of April. Average daily high temperatures range from the 50s in December and January to the 90s in July (with many days of over 100).

Sacramento is accessible from Interstate 80 and U.S. Highway 50 (running east/west) and Interstate 5 and U.S. Highway 99 (running north/south). Amtrak serves Sacramento's passenger rail needs, while Sacramento International Airport (SMF) provides domestic and international flights through most major airlines. Within the city and surrounding region, Sacramento Regional Transit provides bus and light rail service.

F.3.2. History

Prior to European settlement, Nisenan (Southern Maidu) and Plains Miwok Indians lived in the area. In the early 1800s, the Spanish explorer Gabriel Moraga "discovered" and named the Sacramento Valley and the Sacramento River after the Spanish term for "sacrament." Sacramento was founded during the California Gold Rush and grew quickly due to the protection of Sutter's Fort, which was established by John Sutter in 1839.

The citizens of Sacramento adopted a city charter in 1849 and became the first incorporated city in California on February 27, 1850. During the California Gold Rush and through the 1800s, Sacramento became a major distribution point, a commercial and agricultural center, a terminus for wagon trains, stagecoaches, riverboats, the telegraph, the Pony Express, and the First Transcontinental Railroad, and in 1854 the state capital of California.

The city's current charter was adopted by voters in 1920, establishing a city council-and-manager form of government, still used today. The City expanded continuously over the years in the first half of the 1900s and in 1964 merged with the city of North Sacramento, just north of the American River. Large

annexations of the Pocket area on the south and Natomas area on the north eventually led to significant population growth throughout the 1970s, 1980s, and 1990s.

Sacramento experienced a massive growth in population in the 1990s and early 2000s. Primary sources of population growth are migration from the San Francisco Bay Area due to lower housing costs, as well as immigration from Asia, Central America, Mexico, Ukraine, and the rest of the former Soviet Union. From 2010 to 2014, the city's population grew by over 4 percent.

F.3.3. Economy and Tax Base

Economy

Sacramento has established itself as an important suburb in the Sacramento region with its solid base of small businesses, retail chains, and food service establishments. With an ongoing commitment to providing high-quality, economical, responsive services to the local community, the City is well-positioned for future commercial redevelopment, neighborhood enhancements, and positive changes.

US Census estimates show economic characteristics for the City of Sacramento. These are shown in Table F-3 and Table F-10. Mean household income in the City was $67,758. Median household income in the City was $50,013.

Table F-3 City of Sacramento Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	1,257	0.6%
Construction	11,162	5.5%
Manufacturing	10,189	5.0%
Wholesale trade	5,421	2.6%
Retail trade	21,928	10.7%
Transportation and warehousing, and utilities	9,875	4.8%
Information	5,065	2.5%
Finance and insurance, and real estate and rental and leasing	13,014	6.4%
Professional, scientific, and management, and administrative and waste management services	25,673	12.5%
Educational services, and health care and social assistance	45,126	22.0%
Arts, entertainment, and recreation, and accommodation and food services	20,512	10.0%
Other services, except public administration	10,025	4.9%
Public administration	25,499	12.5%

Source: US Census Bureau American Community Survey 2010-2014 Estimates

Table F-4 City of Sacramento Family Income

Income Bracket	Population	Percent
>$10,000	6,912	6.6%
$10,000 – $14,999	5,099	4.9%
$15,000 - $24,9999	10,446	10.0%
$25,000 – $34,999	10,087	9.7%
$35,000 – $49,999	14,016	13.5%
$50,000 – $74,999	18,520	17.8%
$75,000 – $99,999	12,882	12.4%
$100,000 – $149,999	15,289	14.7%
$150,000 – $199,999	5,886	5.7%
$200,000 or more	4,997	4.8%

Source: U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates

The largest employers in Sacramento area shown in Table F-5.

Table F-5 Top Employers in Sacramento

Employer	Employees1	Industry/Type
State of California	72,200	Government
Sacramento County	11,450	Local Government
UC Davis Health Center	9,905	Healthcare
Kaiser Permanente	5,421	Healthcare
Sacramento City Unified School District	4,2,00	Education
City of Sacramento	4,140	Local Government
Sutter Health Sacramento Sierra Region	5,765	Healthcare
Raley's	3,289	Retail Grocery
California State University Sacramento	2,999	Education
Los Rios Community College District	2,976	Education
Wells Fargo	2,190	Financial Services
Sacramento Municipal Utility District	2,046	Utilities

Source: Sacramento Business Journal, 2014.

Tax Base

The County has a wide and varied tax base. Tax base information is tracked and maintained by the Sacramento County Assessor's Office. The following tables show the tax base for the City. The County has a wide and varied tax base. Tax base information is tracked and maintained by the Sacramento County Assessor's Office. The following tables show the tax base for the County as well as for the incorporated jurisdictions. Table F-6 shows the secured real property value by property type for the entire County.

Table F-6 2016-2017 Sacramento County Planning Area Distribution of Value by Property Type

Property Type	Assessments	2015-16 Value ($)	2016-2017 Value ($)	Ratio of Total Value to Prior Value
Single Family Residential	380,907	85,511,262,266	90, 146,646,411	1.054
Mobile Homes	7,856	372,879,553	380,928,297	1.028
Multi-Family Residential	21,209	12,544,846,078	12,938,650,086	1.037
Vacant Residential Land	15,035	1,348,538,827	1,555,324,881	1.301
Commercial	13,026	22,075, 156,589	24,043,815,805	1.092
Vacant Commercial Land	2,062	612,388, 949	677,822,995	1.183
Industrial	4,619	5,283,794, 161	5,549,247,547	1.066
Vacant Industrial Land	1,415	364,217,201	318,917,406	0.993
Vacant and Improved Rural	5,680	1,867,233,067	1,956,212,388	1.053
Unrestricted Rural	1,209	712, 115,252	712,712,592	1.042
Restricted Rural	1,444	583,934,662	610,240,481	1.075
Oil, Gas, Mineral Rights	139	92,623,784	61,557,947	0.665
Other*	21,306	1,174,140,141	1,214,259,905	1.040
Totals**	**475,907**	**132,543,130,530**	**140,166,336,741**	**1.062**

Source: Sacramento County Assessor's Office
*Churches, miscellaneous vacant land
**Gross totals, before Exemptions, less Secured Fixtures and Personal Property

Table F-7 shows the secured real property value for the City. Table F-8 breaks out the City by land use.

Table F-7 City of Sacramento – Tax Roll Totals

Jurisdiction	2015-16 Value ($)	2016-17 Value ($)	Current Year Change	Percent of Current Roll*
Sacramento City	44,417,867,548 2	47,118,444,96	6%	32%

Source: Sacramento County Assessor's Office
*Percentages rounded to the nearest whole number

Table F-8 City of Sacramento – Summary of Property Types

Jurisdiction	Single Family with HEX*	Single Family Without HEX*	Multi-Family Residential	Vacant Land	Commercial	Agricultural	Mobile Homes	Other	Total
Sacramento City	61,522	59,451	8,548	8,961	7,217	8	3,230	4,449	153,386

Source: Sacramento County Assessor's Office
*Homeowners' Exemption

F.3.4. Population

The California Department of Finance estimated the January 1, 2015 total population for the City of Sacramento was 480,105.

Select demographic information from the 2014 US Census American Community Survey (the most recent data available) is shown in Table F-9.

Table F-9 City of Sacramento Demographic Information

Demographic Characteristic	Number	Percent
Race		
White	238,054	39.2%
Black or African American	64,668	10.6%
American Indian or Alaska Native	3,936	0.6%
Asian	88,941	14.6%
Hawaiian or Pacific Islander	6,948	1.1%
Hispanic or Latino	131,595	21.7%
Other Race	40,680	6.8%
Two or more races	32,848	5.4%
Households*		
Total Households	177,578	–
Average Household Size	2.63	–

Source: US Census Bureau American Community Survey 2010-2014 Estimates; *US Census Bureau American Community Survey QuickFacts, 2014

F.4 Hazard Identification

Sacramento's planning team identified the hazards that affect the City and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to Sacramento (see Table F-10).

Table F-10 City of Sacramento—Hazard Identification Assessment

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Occasional	Limited	Low
Bird Strike	Limited	Occasional	Negligible	Low
Climate Change	Likely	Extensive	Critical	High
Dam Failure	Extensive	Unlikely	Catastrophic	High
Drought and Water Shortage	Extensive	Occasional	Critical	High
Earthquake	Limited	Occasional	Critical	Medium
Earthquake: Liquefaction	Limited	Occasional	Critical	Low
Flood: 100/200/500-year	Critical	Occasional	Critical	High
Flood: Localized Stormwater Flooding	Significant	Highly Likely	Critical	High
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Significant	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Limited	Likely	Limited	High
Severe Weather: Extreme Temperatures – Cold/Freeze	Limited	Occasional	Limited	Medium
Severe Weather: Extreme Temperatures – Heat	Significant	Likely	Critical	Medium
Severe Weather: Fog	Limited	Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Significant	Likely	Critical	Medium
Severe Weather: Wind and Tornadoes	Limited	Occasional	Limited	Medium
Subsidence	Limited	Likely	Limited	Low
Volcano	Limited	Unlikely	Catastrophic	Low
Wildfire:(Burn Area/Smoke)	Significant	Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

F.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Sacramento's hazards and assess the City's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describe the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City of Sacramento is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City of Sacramento. This vulnerability assessment also includes the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

F.5.1. Hazard Profile

Each hazard vulnerability assessment in Section F.5.3, includes a description as to how the hazard affects the City and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

F.5.2. Vulnerability Assessment and Assets at Risk

This section identifies Sacramento's assets at risk, including values at risk, critical facilities and infrastructure, historic assets, economic assets, and growth and development trends.

Assets at Risk

The following data from the Sacramento County Assessor's Office is based on the 2015 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table F-11 shows the 2015 Assessor's values (e.g., the values at risk) broken down by property type for the City of Sacramento.

Table F-11 City of Sacramento – Total Assets at Risk by Property Use

Property Use	Parcels	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	8	2	$3,139,047	$363,864	$3,502,911
Care / Health	193	155	$94,395,950	$1,011,672,113	$1,106,068,063
Church / Welfare	515	438	$88,746,595	$450,826,711	$539,573,306
Industrial	1,991	1,753	$561,373,838	$1,455,939,263	$2,017,313,101
Miscellaneous	1,239	8	$2,499,937	$264,443	$2,764,380
Office	1,425	1,261	$930,980,040	$3,549,091,415	$4,480,071,455
Public / Utilities	3,348	4	$4,899,884	$1,024,489	$5,924,373
Recreational	117	77	$45,664,143	$99,483,869	$145,148,012
Residential	126,465	124,940	$8,183,541,010	$20,698,119,834	$28,881,660,844
Retail / Commercial	2,672	2,271	$1,051,694,923	$1,847,391,072	$2,899,085,995
Vacant	7,121	171	$628,437,347	$12,994,627	$641,431,974
No Data	8	5	$542,436	$1,460,705	$2,003,141
Total	**145,102**	**131,085**	**$11,595,915,150**	**$29,128,632,405**	**$40,724,547,555**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facilities and Infrastructure

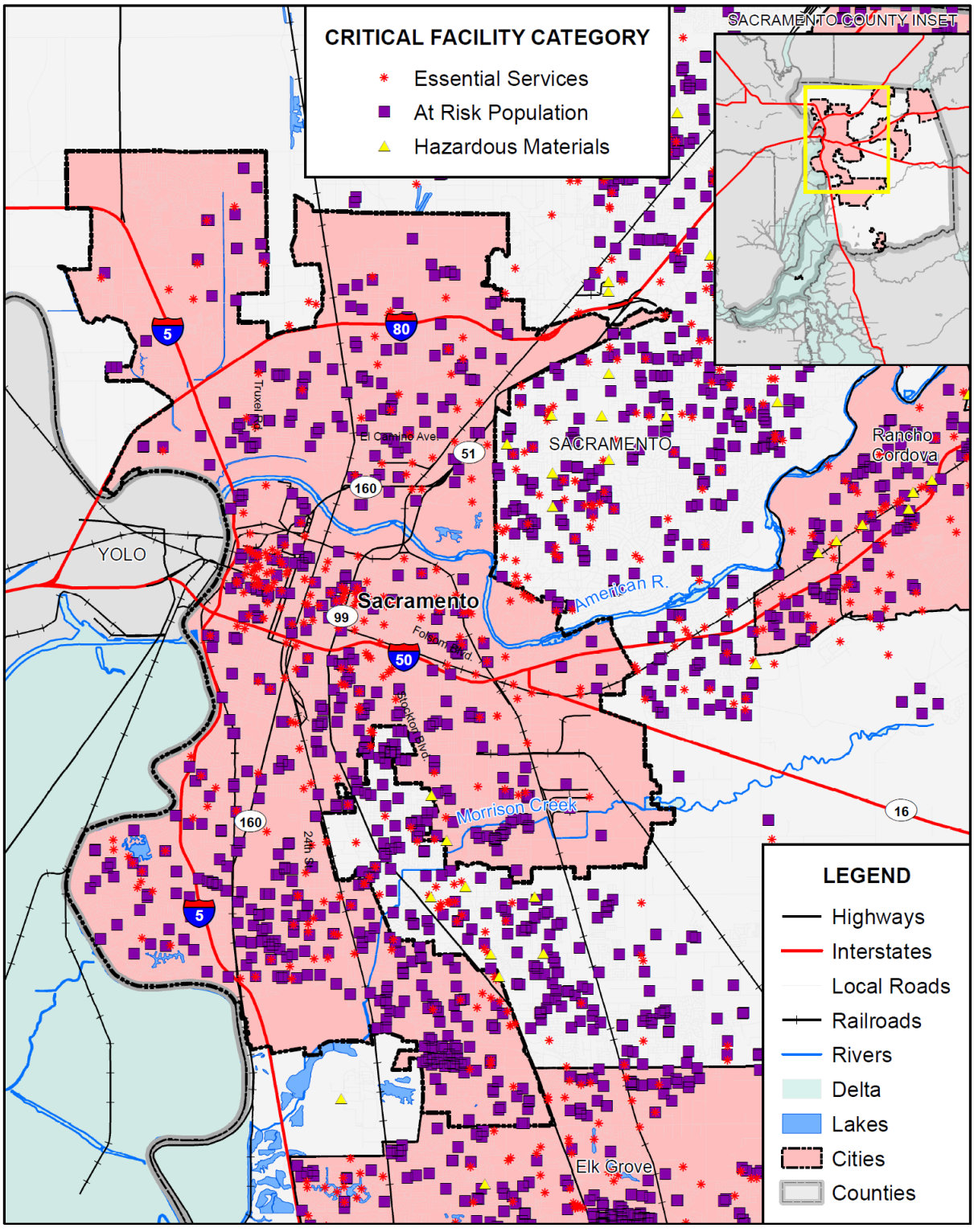
For purposes of this plan, a critical facility is defined as:

> *Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.*

This definition was refined by separating out three classes of critical facilities, that include Essential Services Facilities, At Risk Population Facilities, and Hazardous Materials Facilities, as further described in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Sacramento from the City of Sacramento GIS is shown on Figure F-2 and detailed in Table F-12. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix E.

Figure F-2 City of Sacramento – Critical Facilities



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

Table F-12 City of Sacramento – Critical Facilities Inventory

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Airport	1
	Arena	1
	Bus Terminal	6
	Convention Center	1
	Emergency Evacuation Shelter	76
	Fire Station	21
	General Acute Care Hospital	6
	Government Facilities	29
	Light Rail Stop	36
	Medical Health Facility	97
	Police	3
	Stadium	2
	Train Station	1
	Water Treatment Plant	2
	Total	**282**
At Risk Population Facilities	Adult Day Care	11
	Adult Education School	4
	Adult Residential	119
	Alternative Education School	2
	Assisted Living Centers	1
	Charter School	14
	Children's Home	2
	College/University	4
	Community Day School	4
	Day Care Center	158
	Group Home	19
	Hotel	17
	Independent Study School	1
	Infant Center	14
	Jail	1
	Private Elementary School	18
	Private High School	7
	Private K-12 School	9
	Public Continuation High School	4
	Public Elementary School	83

Critical Facility Category	Facility Type	Facility Count
	Public High School	11
	Public Middle School	13
	Residential Care/Elderly	70
	School-Age Day Care Center	41
	Social Rehabilitation Facility	1
	Total	628
Hazardous Materials Facilities	Oil Collection Center	3
	Total	**3**
Grand Total		**913**

Source: Sacramento County GIS

Natural Resources

Habitats

The City of Sacramento has a variety of natural resources of value to the community:

- Annual Grassland
- Ruderal Habitats
- Riparian Woodland
- Oak Woodlands
- Wetlands
- Rivers, Creeks, and Canals
- Freshwater Marsh
- Vernal Pools and Seasonal Wetlands
- Ornamental Landscaping

Wetlands

The wetland and related habitat areas are some of the most important resources of the City. Wetlands are habitats in which soils are intermittently or permanently saturated or inundated. Wetland habitats vary from rivers to seasonal ponding of alkaline flats and include swamps, bogs, marshes, vernal pools, and riparian woodlands. Wetlands are considered to be waters of the United States and are subject to the jurisdiction of the U.S. Army Corps of Engineers as well as the California Department of Fish and Wildlife (CDFW). Where the waters provide habitat for federally endangered species, the U.S. Fish and Wildlife Service may also have authority.

Wetlands are a valuable natural resource for communities providing beneficial impact to water quality, wildlife protection, recreation, and education, and play an important role in hazard mitigation. Wetlands provide drought relief in water-scarce areas where the relationship between water storage and streamflow regulation is vital, and reduce flood peaks and slowly release floodwaters to downstream areas. When surface runoff is dampened, the erosive powers of the water are greatly diminished. Furthermore, the

reduction in the velocity of inflowing water as it passes through a wetland helps remove sediment being transported by the water.

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flow. Wetlands perform a variety of ecosystem functions including food web support, habitat for insects and other invertebrates, fish and wildlife habitat, filtering of waterborne and dry-deposited anthropogenic pollutants, carbon storage, water flow regulation (e.g., flood abatement), groundwater recharge, and other human and economic benefits.

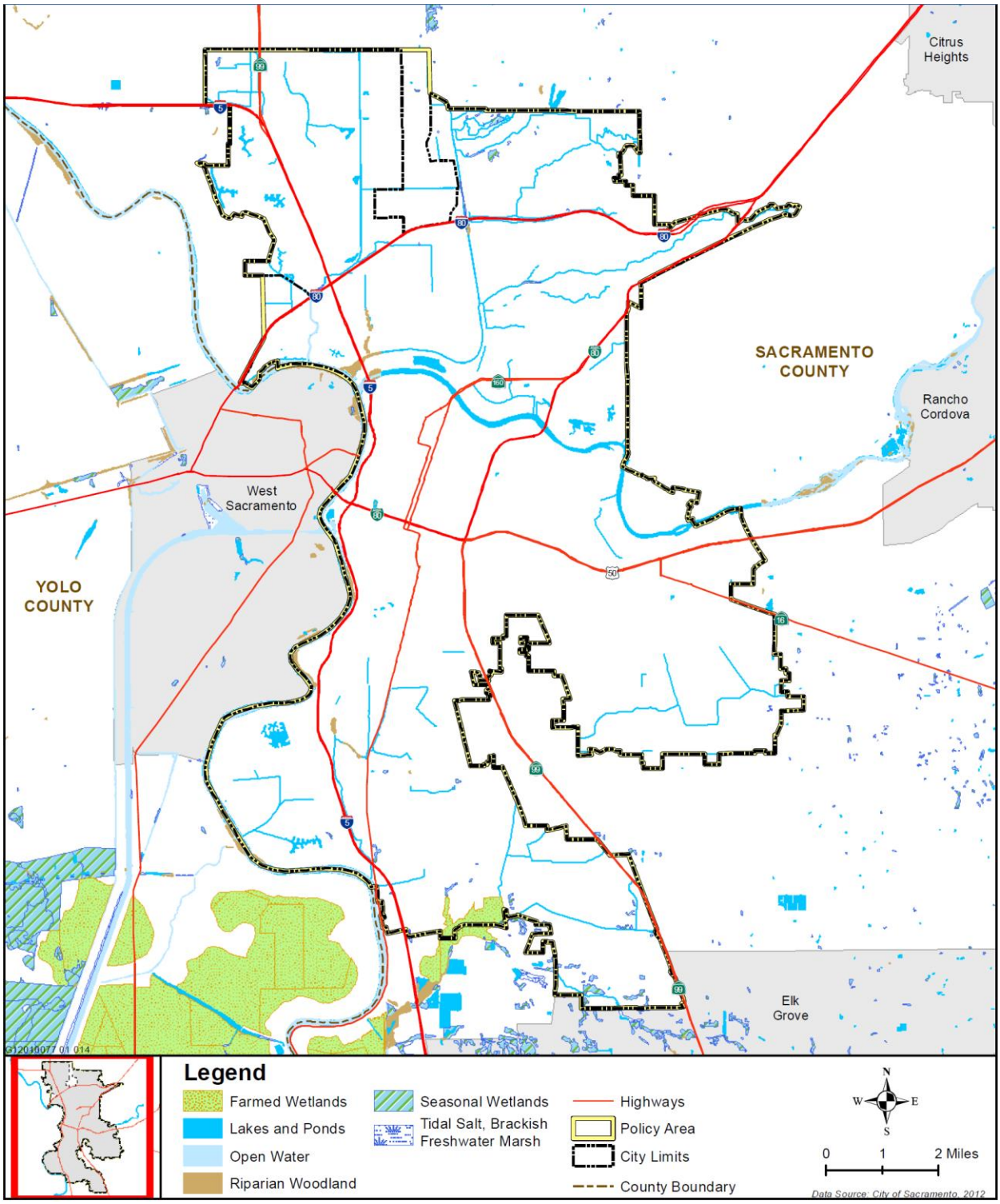
Wetlands, and other riparian and sensitive areas, provide habitat for insects and other invertebrates that are critical food sources to a variety of wildlife species, particularly birds. There are species that depend on these areas during all parts of their lifecycle for food, overwintering, and reproductive habitat. Other species use wetlands and riparian areas for one or two specific functions or parts of the lifecycle, most commonly for food resources. In addition, these areas produce substantial plant growth that serves as a food source to herbivores (wild and domesticated) and a secondary food source to carnivores.

Wetlands slow the flow of water through the vegetation and soil, and pollutants are often held in the soil. In addition, because the water is slowed, sediments tend to fall out, thus improving water quality and reducing turbidity downstream.

These natural floodplain functions associated with the natural or relatively undisturbed floodplain that moderates flooding, such as wetland areas, are critical for maintaining water quality, recharging groundwater, reducing erosion, redistributing sand and sediment, and providing fish and wildlife habitat. Preserving and protecting these areas and associated functions are a vital component of sound floodplain management practices for the City of Sacramento.

Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and flood waters. Trees, root mats, and other wetland vegetation also slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion. Wetlands within and downstream of urban areas are particularly valuable, counteracting the greatly increased rate and volume of surface- water runoff from pavement and buildings. The holding capacity of wetlands helps control floods and prevents water logging of crops. Preserving and restoring wetlands, together with other water retention, can often provide the level of flood control otherwise provided by expensive dredge operations and levees. Figure F-3 provides a map of the City's wetland areas.

Figure F-3 City of Sacramento – Wetlands Location Map



Source: City of Sacramento 2035 General Plan

Special Status Species

The following special-status species are known to occur within the natural habitats most likely to be present within the Policy Area boundaries. These and other species potentially occurring in the Policy Area can be found in Table F-13. Figure F-4 shows the locations of sensitive elements within the Policy Area.

Table F-13 Special-Status Species Potentially Occurring in the City of Sacramento

Scientific Name	Common Name	Status	Habitat
Plants			
Astragalus tener var. tener	Alkali milk-vetch	1B.2	Vernal pools, playas and Valley grasslands on adobe clay and/or alkaline soils.
Atriplex depressa	Brittlescale	1B.2	Chenopod scrub, meadows, playas, valley grassland, vernal pools. Usually in alkali scalds or alkali clay in meadows or annual grassland.
Atriplex joaquiniana	San Joaquin saltbush	1B.2	Chenopod scrub, alkali meadow, valley and foothill grassland.
Balsamorhiza macrolepis var. macrolepis	Big-scale balsamroot	1B.2	Grassland
Chloropyron molle ssp. hispidum	Hispid bird's beak	1B.1	Grassland/ vernal pool.
Chloropyron palmatum	Palmate-bracted bird's-beak	FE, CE, 1B.1	Chenopod scrub, valley and foothill grassland. usually on alkaline clay, with Distichlis, Frankenia, etc.
Downingia pusilla	Dwarf downingia	2.2	Vernal pool
Gratiola heterosepala	Boggs Lake hedge-hyssop	CE, 1B.2	Vernal pool
Hibiscus lasiocarpus	Woolly rose-mallow	2.2	Freshwater marshes and swamps in the Central Valley.
Juglans hindsii	Northern California black walnut	1B.1	Riparian forest, and woodland. Few extant native stands remain; but is widely naturalized from rootstock plants
Juncus leiospermus var. ahartii	Ahart's dwarf rush	1B.2	Vernal pool
Legenere limosa	Legenere	1B.1	Vernal pool
Lepidium latipes var. heckardii	Heckard's pepper-grass	1B.2	Valley and foothill grassland and vernal pools on alkaline soils
Navarretia myersii ssp. myersii	Pincushion navarretia	1B.1	Vernal pool
Orcuttia tenuis	Slender orcutt grass	FT/CE/1B.1	Vernal pool
Orcuttia viscida	Sacramento orcutt grass	FE, 1B.1	Vernal pool and occasionally seasonal wetlands
Sagittaria sanfordii	Sanford's arrowhead	1B.2	Marshes and swamps (assorted shallow fresh water).
Invertebrates			
Branchinecta lynchi	Vernal pool fairy shrimp	FT	Vernal pools and seasonal wetlands in grassland habitats

Scientific Name	Common Name	Status	Habitat
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	FT (under review for de-listing)	Elderberry shrubs, typically in or near riparian areas.
Lepidurus packardi	Vernal pool tadpole shrimp	FE	Vernal pools and seasonal wetlands in grassland habitats
Fish			
Archoplites interruptus	Sacramento Perch	CSC	Historically found in the sloughs, slow-moving rivers, and lakes of the central valley. Prefer warm water. Aquatic vegetation is essential for young. Tolerant of a wide range of physiochemical water conditions.
Acipenser medirostris	Green Sturgeon	FT, CSC	Long-lived anadromous species that migrates through the Sacramento River to spawning grounds in the Feather and upper Sacramento rivers. Occurs in low numbers in the San Francisco Estuary and Sacramento River. Thought to spawn in deep holes with fast moving water over cobble substrates. Larvae develop within freshwater systems, migrate downstream and remain in the estuaries for between one and four years before migrating to the ocean. Mature adults move into estuaries in the spring, and spawning adults continue into natal rivers in late spring/early summer. Post spawning adults return to the estuary before migrating back to the ocean in late fall. Sub-adult fish are also thought to enter estuaries during the summer and fall months. The Sacramento River adjacent to the Policy Area does not support spawning habitat for adult fish or rearing habitat for juveniles.
Hypomesus transpacificus	Delta smelt	FT, CE	Occurs in Sacramento-San Joaquin Delta most of the year. Spawns in tidally influenced freshwater wetlands and seasonally submerged uplands along the Sacramento River, downstream from its confluence with the American River
Oncorhynchus mykiss	Central Valley steelhead	FT	Occurs in the Pacific Ocean for most of its life. Travels to clean gravel beds in the upper Sacramento and portions of the American River for spawning
Oncorhynchus tshawytscha	Central Valley spring run Chinook salmon	FT, CT	Occurs in the Pacific Ocean for most of its life. Travels to clean gravel beds in the upper Sacramento and portions of the American River for spawning

Scientific Name	Common Name	Status	Habitat
Oncorhynchus tshawytscha	Central Valley Winter run Chinook salmon	FE, CE	Occurs in the Pacific Ocean for most of its life. Travels to clean gravel beds in the upper Sacramento and portions of the American River for spawning.
Pogonichthys macrolepidotus	Sacramento splittail	SC/CSC	Endemic to the lakes and rivers of the central valley, but now confined to the Delta, Suisun Bay & associated marshes. Prefers slow moving river sections, dead end sloughs. Requires flooded vegetation for spawning & foraging for young.
Amphibians			
Spea hammondii	Western spadefoot	CSC	Breeds in seasonal wetlands and large vernal pools, spends most of the year underground in adjacent upland areas.
Reptiles			
Actinemys marmorata	Western pond turtle	CSC	Ponds, streams, rivers, marshes and canals with suitable basking sites and vegetative cover. Nests and aestivates in adjacent uplands.
Phrynosoma coronatum frontale	California horned lizard	CSC	Annual grassland, chaparral, saltbush scrub, alkali flats, oak woodland, riparian woodland, and coniferous forest; open habitats with loose fine (often sandy) soils.
Thamnophis gigas	Giant garter snake	FT, CT	Cattail and tule marshes, low gradient streams, rice fields and canals on the Valley floor
Birds			
Agelaius tricolor	Tricolor blackbird	CSC (nesting)	Nest in dense stands of cattails, thickets of willows, blackberries, or tall herbs adjacent to open grasslands
Athene cunicularia	Burrowing owl	CSC (burrow sites)	Grassland, deserts and other open habitats. Requires ground squirrel or other small mammal burrows for nesting
Buteo swainsoni	Swainson's hawk	CT	Nests in riparian trees; forages in open fields
Circus cyaneus	Northern harrier	CSC (nesting)	Nests in freshwater marsh and agricultural fields; forages in marshes, grasslands and agricultural fields
Elanus leucurus	White-tailed kite	CFP (Nesting)	Nests colonially in large trees adjacent to open grasslands for foraging.
Lanius ludovicianus	Loggerhead shrike	CSC (nesting)	Nests in woodlands adjacent to grassland foraging habitat
Melospiza melodia	Song sparrow "Modesto" population	CSC (year round)	Associated with emergent freshwater marshes, irrigation canals, riparian scrub, riparian woodland.

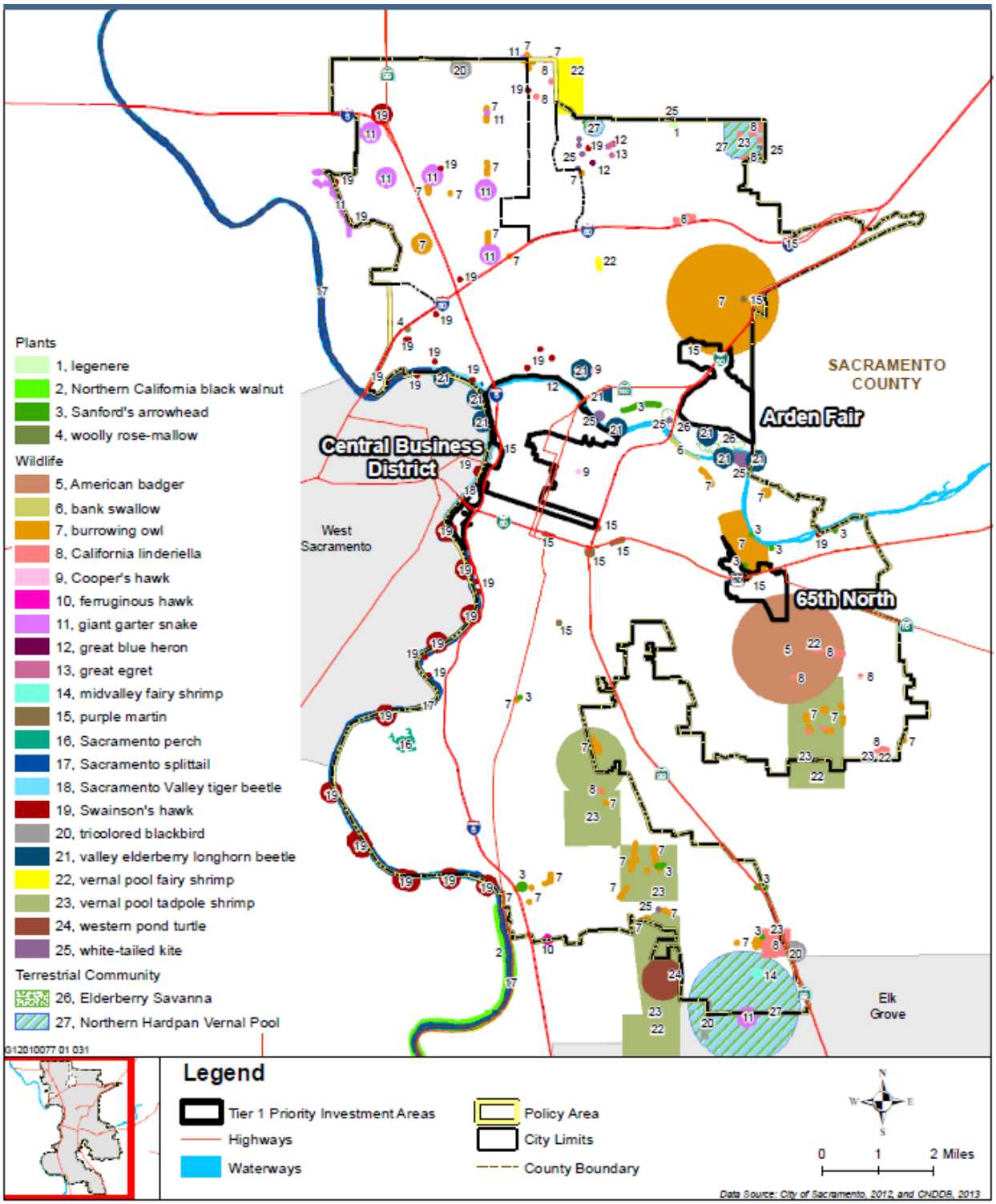
Scientific Name	Common Name	Status	Habitat
Progne subis	Purple martin	CSC (nesting)	Nest in cavities in trees, under bridges and other human-made structures
Riparia riparia	Bank swallow	CT	Nests in sandy banks or cliffs, usually over water (typically rivers and streams).
Mammals			
Antrozous pallida	Pallid bat	CSC	Roosts in crevices in caves, mines, large rock outcrops, under bridges and in abandoned buildings. Forages on or near the ground in a wide variety of open habitats
Corynorhinus townsendii townsendii	Pacific western big eared bat	CSC	Roosts in the open in large caves, abandoned mines and buildings. Very sensitive to roost disturbance
Lasiurus blossevillii	Western red bat	CSC	Roosts primarily in tree foliage, especially in cottonwood, sycamore, and other riparian trees or orchards. Although potential habitat for these species is present within the Policy Area, none have been recorded. Distribution of special-status bat species is difficult to study and therefore poorly known. Bat colonies that may harbor some or all of these specialstatus species are present in several of the older buildings in downtown Sacramento and in humanmade structures along the American and Sacramento rivers.
Taxidea taxus	American Badger	CSC	Principal habitat requirements include: sufficient prey base; friable soils; and relatively open, uncultivated ground such as grasslands. Prey primarily on burrowing rodents such as gophers, ground squirrels, marmots, and kangaroo rats. Badgers survive only in low numbers in peripheral parts of the Central Valley. The CNDDB includes one recorded occurrence in the Policy Area near Power Inn and Fruitridge roads.

Scientific Name	Common Name	Status	Habitat

Notes: Status =
Federal:
FE = Endangered, legally protected by the Federal Endangered Species Act (ESA)
FT = Threatened, legally protected by the Federal Endangered Species Act (ESA)
State:
CE = Endangered, legally protected by the California Endangered Species Act (CESA)
CFP = Fully Protected species (legally protected under Fish and Game Code)
CSC = California Species of Concern by DFG (no formal protection other than CEQA consideration)
CT = Threatened, legally protected by the California Endangered Species Act (CESA)
SA = Animal included on the CDFW's Special Animal List.
California Rare Plant Ranks (no formal protection other than CEQA consideration):
1B - Plant species that is rare or endangered in California or elsewhere.
2 - Plant species that is rare or endangered in California, but is more common elsewhere.
Threat code extensions:
.1 - Seriously endangered in California
.2 – Fairly endangered in California
.3 – Not very endangered in California

Source: California Department of Fish and Game 2011, California Natural Diversity Database, 2007.

Figure F-4 City of Sacramento Biological Resources



Source: City of Sacramento 2035 General Plan Environmental Resources Background Report

Historic and Cultural Resources

Table F-14 shows registered historic sites the in the City of Sacramento.

Table F-14 Registered Historic Sites in the City of Sacramento

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
A. W. Clifton House, Compton Mansion (C17)			X		2/1/2002
Adams And Company Building (607)		X			5/22/1957
Alkali Flat Central Historic District (N1294)	X				7/26/1984
Alkali Flat North Historic District (N1279)	X				4/19/1984
Alkali Flat West Historic District (N1295)	X				7/26/1984
B. F. Hastings Building (606)		X			5/22/1957
Blue Anchor Building (N1171)	X		X		2/3/1983
Brighton School (N952)	X				4/3/1981
Business & Professional Building, Consumer Affairs Building (C8)			X		2/10/2000
California Almond Growers Exchange Processing Facility (967)		X			10/1/1985
California Governor's Mansion (N60)	X				11/10/1970
California State Capitol (N222)	X		X		4/3/1973
California's Capitol Complex (872)	X	X	X		5/6/1974
California's First Passenger Railroad (526)		X			3/7/1955
Calpak Plant No. 11 (N1285)	X		X		5/17/1984
Camp Union, Sutterville (666)		X			11/5/1958
Capitol Extension District (N1288)	X				5/24/1984
Chevra Kaddisha (Home Of Peace Cemetery) (654)		X			7/28/1958
Coloma Road At Sutter's Fort (745)		X			7/5/1960
Coolot Company Building (N671)	X		X		9/20/1978
Cranston--Geary House (N2010)	X		X		1/23/1998
Crocker, E. B., Art Gallery (N86)	X	X	X		5/6/1971
Curran Farmhouse (P666)				X	12/17/1985
D. O. Mills Bank Building (609)		X			5/22/1957
Dunlap's Dining Room (N1764)	X		X		4/2/1992
Eagle Theater (595)		X			5/22/1957
Eastern Star Hall (P754)	X		X	X	8/8/1991
Ebner's Hotel (602)		X			5/22/1957
Fire Station No. 6 (N1686)	X		X		4/25/1991

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
Firehouse No. 3 (N1743)	X				10/29/1991
First Transcontinental Railroad (780)		X			11/20/1962
First Transcontinental Railroad-Western Base Of The Sierra Nevada (780)		X			11/20/1962
Five Mile House-Overland Pony Express Route In California (697)		X			9/11/1959
Galarneaux, Mary Haley, House (N2121)	X				2/12/2001
George Hack House (P800)				X	8/5/1994
Goethe House (N1036)	X		X		2/19/1982
Governor's Mansion (823)		X			6/7/1968
Greene, John T., House (N1092)	X		X		4/15/1982
Headquarters Of The Big Four (600)		X			5/22/1957
Heilbron House (N462)	X		X		12/12/1976
Hotel Regis (N1147)	X		X		10/29/1982
Hotel Senator (N782)	X		X		5/30/1979
Howe, Edward P., Jr., House (N1037)	X		X		2/19/1982
Hubbard-Upson House (N543)	X		X		12/2/1977
I Street Bridge (N1094)	X		X		4/22/1982
J Street Wreck (N1692)	X		X		5/16/1991
Joe Mound (N121)	X		X		10/14/1971
Johnson, J. Neely, House (N438)	X		X		9/13/1976
Joseph Hampton Kerr Homesite (P126)				X	6/6/1969
Judah, Theodore, School (N1985)	X		X		7/25/1997
Kuchler Row (N1121)	X		X		6/25/1982
Lady Adams Building (603)		X			5/22/1957
Lais, Charles, House (N1350)	X		X		2/28/1985
Libby Mcneil And Libby Fruit And Vegetable Cannery (N1050)	X		X		3/2/1982
McClatchy, C.K., Senior High School (N2148)	X		X		11/2/2001
Merchants National Bank Of Sacramento (N1936)	X		X		2/16/1996
Merrium Apartments (N1654)	X				9/13/1990
Mesick House (N1002)	X		X		1/21/1982
Michigan (468)		X			8/30/1950
Motor Vehicle Building, Department Of Food & Agriculture (C4)			X		11/5/1999
New Helvetia Cemetery (592)		X			5/22/1957

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
Nisipowinan Village Site (900)	X	X	X		6/16/1976
Old Elk Grove Hotel Site (P532)				X	6/29/1979
Old Folsom Powerhouse-Sacramento Station A (633)		X			3/3/1958
Old Sacramento (812)	X	X			12/30/1965
Old Tavern (N1242)	X		X		9/15/1983
Original Sacramento Bee Building (611)		X			5/22/1957
Overton Building (610)		X			5/22/1957
Pioneer Telegraph Station (366)		X			10/9/1939
Pony Express Terminal (N66000220)	X				10/15/1966
Public Works Office Building, Caltrans Building (C5)			X		11/5/1999
River Mansion (P149)				X	11/3/1969
Ruhstaller Building (N1003)	X		X		1/21/1982
Sacramento Bank Building (N1004)	X				1/21/1982
Sacramento City Cemetery (566)		X			2/25/1957
Sacramento City Library (N1784)	X		X		7/30/1992
Sacramento Hall Of Justice (N2067)	X		X		9/24/1999
Sacramento Junior College Annex And Extensions (N1874)	X		X		8/22/1994
Sacramento Masonic Temple (N2131)	X		X		5/17/2001
Sacramento Memorial Auditorium (N566)	X		X		3/29/1978
Site Of China Slough (594)		X			5/22/1957
Site Of Congregational Church (613)		X			5/22/1957
Site Of First And Second State Capitols At Sacramento (869)		X			1/11/1974
Site Of Home Of Newton Booth (596)		X			5/22/1957
Site Of Orleans Hotel (608)		X			5/22/1957
Site Of Sacramento Union (605)		X			5/22/1957
Site Of Sam Brannan House (604)		X			5/22/1957
Site Of Stage And Railroad (First) (598)		X			5/22/1957
Site Of The First African American Episcopal Church Established On The Pacific Coast (1013)		X			5/5/1994
Site Of Pioneer Mutual Volunteer Firehouse (612)		X			5/22/1957
Southern Pacific Railroad Company's Sacramento Depot (N353)	X				4/21/1975

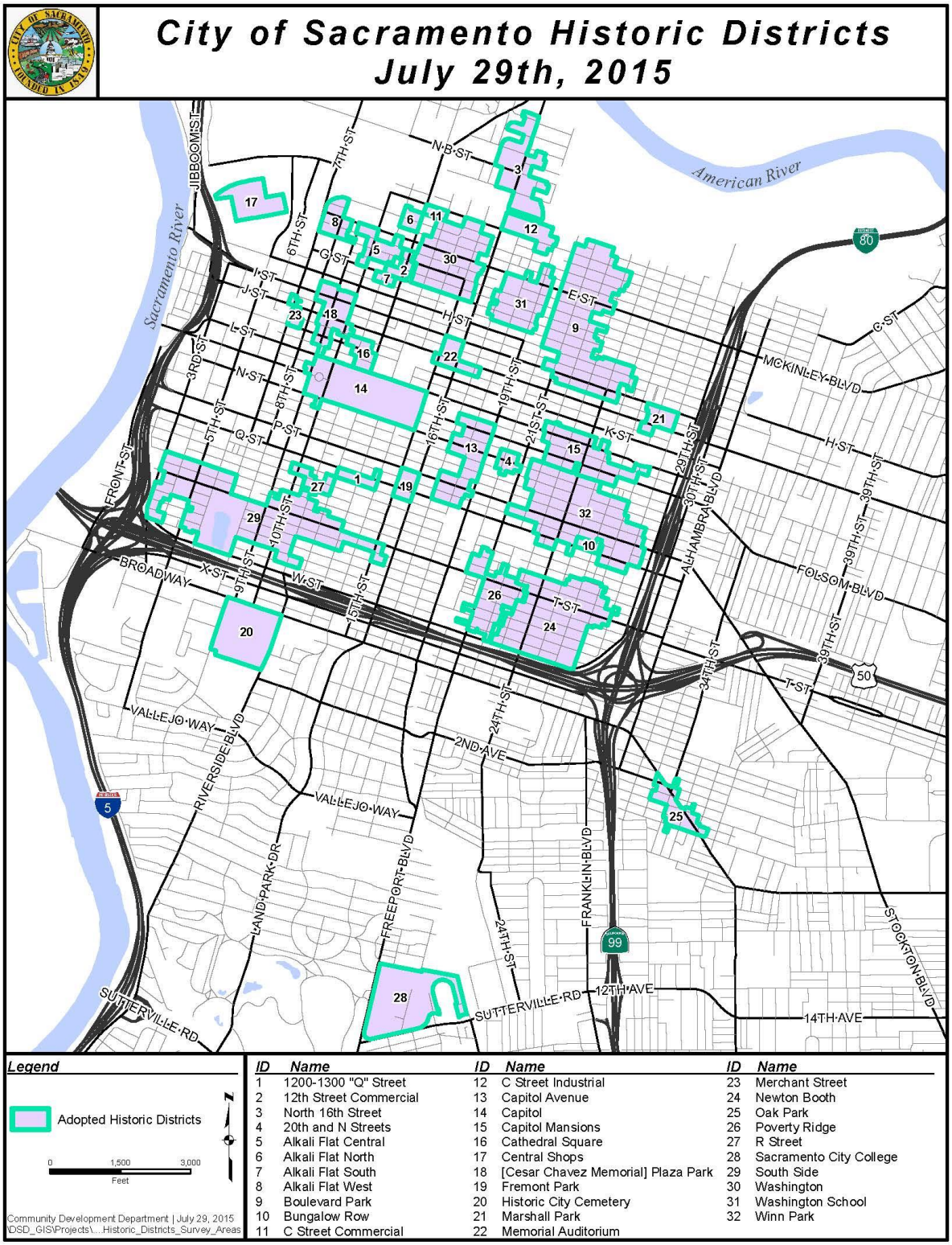
Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
Southern Pacific Railroad Section Superintendent House (N2411)	X		X		6/13/2008
St. Elizabeth's Church (P611)				X	3/2/1983
Stanford-Lathrop House (614)	X	X	X		5/22/1957
Sutter's Fort (525)	X	X	X		11/1/1954
Sutter's Landing (591)		X			5/22/1957
Sutterville (593)		X			5/22/1957
Temporary Detention Camps For Japanese Americans-Sacramento Assembly Center (934)		X			5/13/1980
Tower Bridge (N1116)	X		X		6/24/1982
Travelers' Hotel (N680)	X		X		10/19/1978
U.S. Post Office, Courthouse And Federal Building (N855)	X				1/25/1980
Van Voorhies House (N535)	X		X		11/17/1977
Wagner, Anton, Duplex (N923)	X		X		11/10/1980
Western Hotel (601)		X			5/22/1957
Westminster Presbyterian Church (N2203)	X		X		5/22/2003
Wetzlar, Julius, House (N1183)	X		X		3/31/1983
What Cheer House (597)		X			5/22/1957
Whitter Ranch (Originally Saylor Ranch), Witter Ranch (P744)				X	5/8/1991
Winters House (N2046)	X		X		1/25/1999
Witter, Edwin, Ranch (N1675)	X				3/14/1991
Woodlake Site (N88)	X				5/6/1971
State Indian Museum (991)		X			(Could not Find)
Sloughhouse (575)		X			9/15/1957
Pioneer Congregational United Church of Christ (613)		X			(Could Not Find)
Folsom Terminal (558)		X			5/29/1981
Shiloh Baptist Church	X				7/3/2012
PG&E Powerhouse	X		X		9/23/2012
New Helvetia Historic District	X				4/4/2014
Maydestone Apartments	X				9/25/2012
Lawrence Warehouse	X				1/15/2014
DELTA KING	X		X		3/31/1978
J.C. Carly House	X				3/22/2006
Boulevard Park	X				10/6/2012

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
American Cash Apartments-American Cash Store	X				3/22/2016
First Jewish Synagogue owned by a congregation on the west coast (654)		X			(Could Not Find)

Source: Sacramento Register of Historic & Cultural Resources, 2016

Over the years the City of Sacramento has undertaken several historic building surveys in an effort to establish specific Historic Districts. As of the date of this document's publication, the City of Sacramento has designated 32 Historic Districts and 14 Design Review Districts. The City Code provides for the compilation of Landmarks, Contributing Resources, and Historic Districts into the Sacramento Register of Historic and Cultural Resources (Sacramento Register). The Sacramento Register includes all listed or surveyed historic resources in the city of Sacramento. The Sacramento Register also includes listings or maps of the properties within the city's Design Review Districts that have been afforded preservation protection by ordinance, but are not designated as a Historic District. The historic districts are shown in Figure F-5.

Figure F-5 Historic Districts in the City of Sacramento



ID	Name	ID	Name	ID	Name
1	1200-1300 "Q" Street	12	C Street Industrial	23	Merchant Street
2	12th Street Commercial	13	Capitol Avenue	24	Newton Booth
3	North 16th Street	14	Capitol	25	Oak Park
4	20th and N Streets	15	Capitol Mansions	26	Poverty Ridge
5	Alkali Flat Central	16	Cathedral Square	27	R Street
6	Alkali Flat North	17	Central Shops	28	Sacramento City College
7	Alkali Flat South	18	[Cesar Chavez Memorial] Plaza Park	29	South Side
8	Alkali Flat West	19	Fremont Park	30	Washington
9	Boulevard Park	20	Historic City Cemetery	31	Washington School
10	Bungalow Row	21	Marshall Park	32	Winn Park
11	C Street Commercial	22	Memorial Auditorium		

Source: Sacramento Register of Historic & Cultural Resources, 2016

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) document America's architectural and engineering heritage. The HABS and HAER structures in the City of Sacramento are listed below:

Albert Gallatin Mansion (Governor's Mansion)
Source: Sacramento Register of Historic & Cultural Resources

- Adams & Company Building, 1014 Second Street, Sacramento, CA
- Albert Gallatin House, 1527 H Street, Sacramento, CA
- Apollo Building, 228-230 K Street, Sacramento, CA
- Aschenauer Building, 1022 Third Street, Sacramento, CA
- B. F. Hastings Bank Building, 128-132 J Street, Sacramento, CA
- Bank Exchange Building, 1030 Second Street, Sacramento, CA
- Bee Building, 1016-1020 Third Street, Sacramento, CA
- Big Four Building, 220-226 K Street, Sacramento, CA
- Blake-Waters Assay Office, 222 J Street, Sacramento, CA
- Booth Building, 1019-1021 Front Street, Sacramento, CA
- Brannon Building, 106-110 J & Front Streets, Sacramento, CA
- California State Library & Courts Building, 914 Capitol Mall, Sacramento, CA
- California State Office Building No. 1, 915 Capitol Mall, Sacramento, CA
- California State Printing Office, 1020 O Street, Sacramento, CA
- Cavert Building, 1207 Front Street, Sacramento, CA
- Central Pacific Transcontinental Railroad, Sacramento to Nevada state line, Sacramento, CA
- Cienfugo Building, 1119 Second Street, Sacramento, CA
- City Market, 118 J Street, Sacramento, CA
- Collicott Drug Store, 129 J Street, Sacramento, CA
- Coolot Building, 812 J Street, Sacramento, CA
- Crocker Art Gallery, 216 O Street, Sacramento, CA
- Democratic State Journal Building, Second & K Streets, Sacramento, CA
- Diana Saloon, 205 J Street, Sacramento, CA
- Dingley Spice Mill, 115 I Street, Sacramento, CA
- E. P. Figg Building, 224 J Street, Sacramento, CA
- Ebner's Hotel, 116 K Street, Sacramento, CA
- Esquire Theater, 1217 K Street, Sacramento, CA
- Eureka Swimming Baths, 908-910 Second Street, Sacramento, CA
- Fashion Saloon, 209 J Street, Sacramento, CA
- Francis William Fratt Building, 1103-1109 Second Street, Sacramento, CA
- Gregory-Barnes Store, 126 J Street, Sacramento, CA
- Heywood Building, 1001-1009 Second Street, Sacramento, CA
- Howard House, 109-111 K Street, Sacramento, CA
- Hudson-Cippa-Wolf Ranch, Bunkhouse, Sorento Road, Sacramento, CA
- Hudson-Cippa-Wolf Ranch, Granary, Sorento Road, Sacramento, CA
- Hudson-Cippa-Wolf Ranch, Hay Barn, Sorento Road, Sacramento, CA
- Hudson-Cippa-Wolf Ranch, Main House, Sorento Road, Sacramento, CA
- Hudson-Cippa-Wolf Ranch, Milk Barn, Sorento Road, Sacramento, CA
- Hudson-Cippa-Wolf Ranch, Sorento Road, Sacramento, CA

- I. & S. Wormser Building, 128 J Street, Sacramento, CA
- J Street (Commercial Buildings), Sacramento, CA
- Lady Adams Building, 113-115 K Street, Sacramento, CA
- Latham Building, 221-225 J Street, Sacramento, CA
- Leggett Ale House, 1023 Front Street, Sacramento, CA
- Leland Stanford House, 800 N Street, Sacramento, CA
- Lincoln School, 418 P Street, Sacramento, CA
- Luhrs Hall & Company Building, 912-916 Second Street, Sacramento, CA
- Mechanics Exchange Hotel, 116-122 I Street, Sacramento, CA
- Morse Building, 1025-1031 Second Street, Sacramento, CA
- Old U. S. Post Office, K & Seventh Streets, Sacramento, CA
- Our House Saloon, 926 Second Street, Sacramento, CA
- P. B. Cornwall Building, 1011-1013 Second Street, Sacramento, CA
- Pioneer Hall & Bakery, 120-124 J Street, Sacramento, CA
- Pioneer Telegraph Building, 1015 Second Street, Sacramento, CA
- Reclamation District 1000, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
- Reclamation District 1000, Pump Plant No. 1, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
- Reclamation District 1000, Pump Plant No. 2, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
- Reclamation District 1000, Pump Plant No. 3, Northwest Sacramento County & southwest Sutter County, bisected by State Highway No. 99, Sacramento vicinity, Sacramento, CA
- Rialto Building, 225-230 J Street, Sacramento, CA
- Rivett-Fuller Building, 128 K Street, Sacramento, CA
- Sacramento Army Depot, Fruitridge Road, Sacramento, CA
- Sacramento City Hall, 915 I Street, Sacramento, CA
- Sacramento Engine Company No. 3, 1112 Second Street, Sacramento, CA
- Sacramento Junior College, Library, 3835 Freeport Boulevard, Sacramento, CA
- Sacramento River Bridge, Spanning Sacramento River at CA State Highway 275, Sacramento, CA
- Sacramento River Water Treatment Plant Intake Pier & Access Bridge, Spanning Sacramento River approximately 175 feet west of eastern levee on river; roughly .5 mile downstream from confluence of Sacramento & American Rivers, Sacramento, CA
- Sacramento, General View, Sacramento, CA
- Sacramento, General View,1865, Sacramento, CA
- Sacramento, Historic View, Sacramento, CA
- Sacramento, Historic View, Sacramento, CA
- Sazerac Building, 131 J Street, Sacramento, CA
- Southern Pacific Railroad Depot, Railroad Terminal Post Office & Express Building, Fifth & I Streets, Sacramento, CA
- Southern Pacific, Sacramento Shops, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Blacksmith Shop, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Boiler Shop, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Car Machine Shop, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Car Shop No. 3, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Erecting Shop, 111 I Street, Sacramento, CA

California State Capitol
Source: Sacramento Register of Historic & Cultural Resources

- Southern Pacific, Sacramento Shops, Paint Shop, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Pitless Transfer Table, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Planing Mill, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Privy, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Turntable, 111 I Street, Sacramento, CA
- Southern Pacific, Sacramento Shops, Water Tower, 111 I Street, Sacramento, CA
- Stanford Brothers Store, 1203 Front Street, Sacramento, CA
- Stein Building, 218 J Street, Sacramento, CA
- Strub Building, Sacramento, CA
- Studio Theater, 1227 K Street, Sacramento, CA
- Sutter's Fort, L & Twenty-Seventh Streets, Sacramento, CA
- Union Hotel (Annex), 125 K Street, Sacramento, CA
- Union Hotel, 1024-1028 Second Street, Sacramento, CA
- Vernon-Brannan House, 112-114 J Street, Sacramento, CA
- W.I. Elliott Building, 1530 J Street, Sacramento, CA

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

Growth and Development Trends

Past growth within the City of Sacramento has been strong and steady. Current California Department of Finance estimates for July 1, 2015 were 480,105. Table F-15 shows past growth trends since 1970.

Table F-15 Past Growth in the City of Sacramento

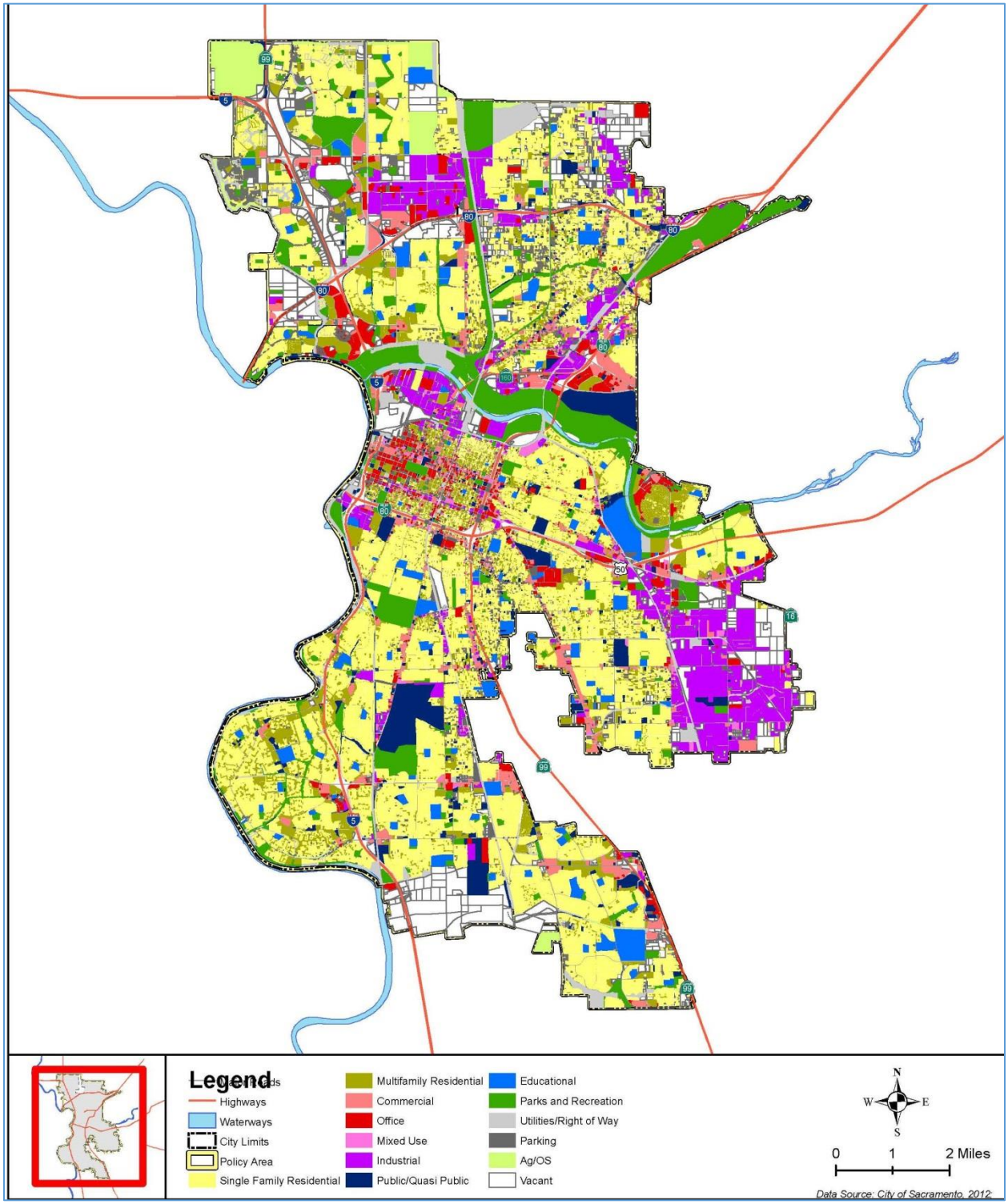
Year	Population	Change	Percent Change
1970	257,105	–	–
1980	282,400	25,295	9.8%
1990	366,500	84,100	29.8%
2000	407,018	40,518	11.1%
2010	466,488	59,470	14.6%

Source: State of California Department of Finance, US Census Bureau 2010

Land Use

Current land use in the City of Sacramento is shown in Figure F-6.

Figure F-6 Existing Land Use in Sacramento County



Source: City of Sacramento General Plan Update Technical Background Report

Table F-16 presents the proposed land uses for the 2035 General Plan Policy Area. The land use designations included in the table provides a summary and combines all the applicable land use

designations designated on the land use diagram included within the Policy Area boundaries. Figure F-7 shows the land uses in the Policy Area.

Table F-16 Land Uses for the 2035 General Plan

Land Use	Acres	Percent of City's Total[4]
Neighborhoods[1]	34,880	54%
Centers[2]	4,658	7%
Corridors[3]	3,111	5%
Employment Center/Industrial	9,163	14%
Public/Quasi Public	4,716	7%
Open Space, Parks, Recreation	8,554	13%
Total	**2**	**100%**

Source: City of Sacramento, GIS Database, 2012.

Notes:

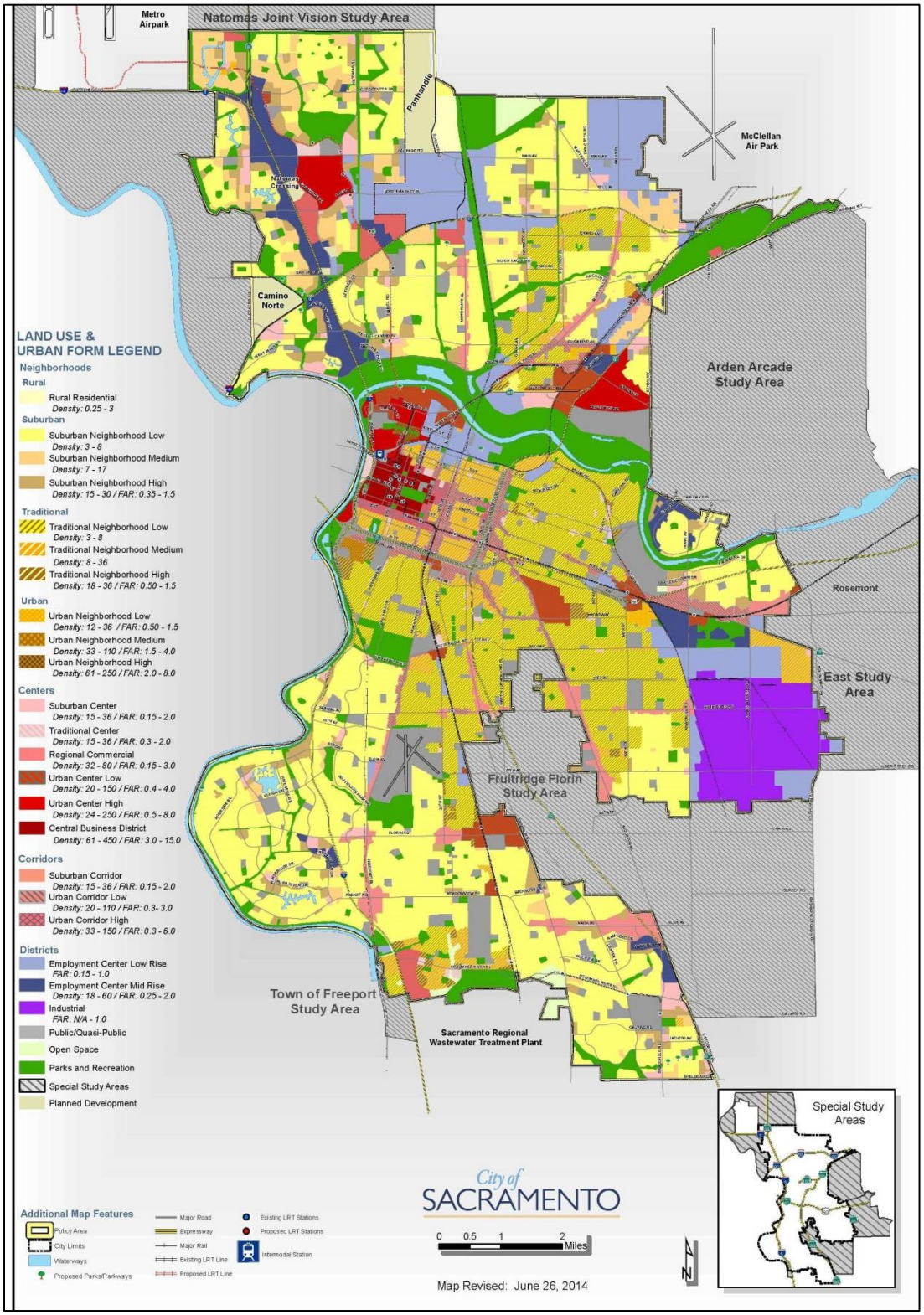
[1] Includes all residential designations including Planned Development/Special District, Rural Residential, Suburban Low Density, Suburban Medium Density, Suburban High Density, Traditional Low Density, Traditional Medium Density, Traditional High Density, Urban Low Density, Urban Medium Density, and Urban High Density.

[2] Includes Suburban Center, Traditional Center, Urban Center Low and High and CBD.

[3] Includes Suburban Corridor and Urban Corridor High and Low.

[4] Due to rounding the City's total % may be slightly higher than 100%.

Figure F-7 2035 General Plan Land Use and Urban Form



Source: City of Sacramento General Plan Environmental Impact Report

The Shovel-Ready Sites Program was established in FY2004/2005 with the intent of encouraging economic development at key areas in the City. These sites are based on the 2035 General Plan opportunity areas. They are broken down into Tier 1 and Tier 2 based on economic development potential. Tier 1 sites are more likely to generate a return on investment (e.g., property taxes, sales taxes, new jobs) sooner than Tier 2 sites.

Each tier is also broken down by the following types: Centers, Corridors, Neighborhoods, New Growth Areas, and Transit Centers. Table F-17 shows counts of all parcels centroids (geographic center of parcel polygon) that intersect these opportunity areas, sorted by opportunity area tier and type. There are a total of 17,229 parcels in the Opportunity Area. The two categories with the highest parcel counts within this area are Tier 2 Corridors and Neighborhoods.

Table F-17 Number of Parcels in Opportunity Areas - City of Sacramento

Tier	Type	Parcel Count
1	Centers	2,400
1	New Growth Areas	58
1	Transit Center	726
2	Centers	1,639
2	Corridors	4,907
2	Neighborhoods	6,252
2	New Growth Areas	311
2	Transit Center	1,325
Total		**17,618**

Source: City of Sacramento GIS

Development since 2011 Plan

As shown in Table F-18, Sacramento has seen a growth of 2.9% of population between 2010 and January 1, 2015.

Table F-18 City of Sacramento Population Changes Since 2011

Year	Population	Change	% Change
2010[1]	466,488	–	–
2015[2]	480,105	13,617	2.9%

Source: [1]US Census Bureau, [2]California Department of Finance

The Sacramento Community Development Department tracked total building permits issued since 2011 for the City. These are tracked by total development, property use type, and hazard risk area. These are shown in Table F-19 and Table F-20. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people living in the area potentially exposed to natural

hazards, this growth should not cause a significant change in vulnerability of the City to identified priority hazards.

Table F-19 City of Sacramento Total Development Since 2011

Property Use	2011	2012	2013	2014	2015
Residential	166*	205*	431*	477*	267*
Commercial	73,931 sq.ft.	77,948 sq.ft.	133,761 sq.ft.	295,164 sq.ft.	302,434 sq.ft.
Industrial	21,553 sq.ft.	22,298 sq.ft.	25,185 sq.ft.	3,748 sq.ft.	174,456 sq.ft
Office	0 sq.ft.	52,012 sq.ft.	28,075 sq.ft.	11,489 sq.ft.	50,512 sq.ft.
Total	**95,484 sq.ft.**	**152,258 sq.ft.**	**187,021 sq.ft.**	**310,401 sq.ft.**	**527,402 sq.ft.**

Source: City of Sacramento GIS
*Dwelling units

Table F-20 City of Sacramento Development in Hazard Areas since 2011

Property Use	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Residential	34 Units	1,327 Units	671 Units	–
Commercial	78,336 Sq Ft	826,487 Sq Ft	360,764 Sq Ft	–
Industrial	117,617 Sq Ft	244,161 Sq Ft	185,675 Sq Ft	–
Office	2,454 Sq Ft	69,524 Sq Ft	112,370 Sq Ft	–
Total	**198,407 Sq Ft**	**1,140,172 Sq Ft**	**658,809 Sq Ft**	**–**

Source: City of Sacramento GIS
[1]Moderate or higher wildfire risk area

Future Development

The Sacramento Council of Governments (SACOG) modeled population projections for the City of Sacramento and other areas of the region in 2012 for a Metropolitan Transportation Plan/Sustainable Communities Strategy report. This forecast uses a 2008 base year estimate with projections to 2020 and 2035 for population, housing units, households and employment. SACOG estimated the City population in 2020 and 2035 to be 517,401 and 630,131 respectively.

The 2016 City of Sacramento Comprehensive Flood Management plan noted that:

> *It is anticipated that by the year 2035, Sacramento will have added 168,000 individuals; 86,000 jobs; and 68,000 residential units. The City has historically relied on Greenfield development to meet the housing, retail, and service needs generated by growth. The City's 2035 General Plan, adopted in March 2015, takes a different approach and focuses growth inward, encouraging infill development.*

GIS Analysis

Table F-21 shows counts of all parcels centroids (geographic center of parcel polygon) of the Shovel Ready Sites that intersect these opportunity areas, sorted by opportunity area tier and type. There are a total of 17,267 parcels in the Opportunity Area.

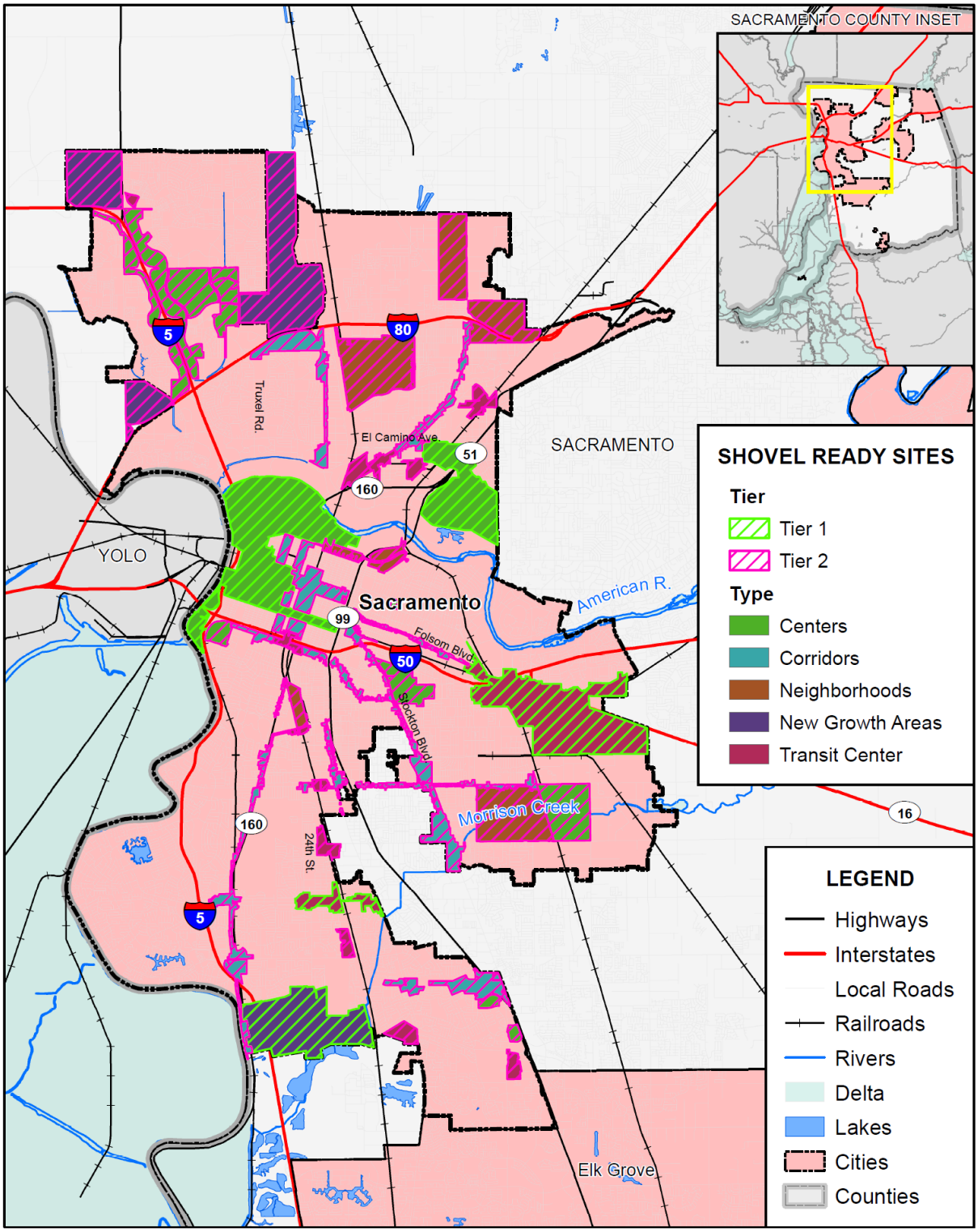
Table F-21 City of Sacramento – Number of Parcels in Opportunity Areas

Type	Parcel Count	Acres
Tier 1		
Centers	2,356	2,403
Corridors	0	0
Neighborhoods	0	0
New Growth Areas	56	1,158
Transit Center	711	1,711
Tier 1 Total	**3,123**	**5,272**
Tier 2		
Centers	1,580	2,142
Corridors	4,806	2,089
Neighborhoods	6,112	2,391
New Growth Areas	320	2,250
Transit Center	1,326	616
Tier 2 Total	**14,144**	**9,487**
Grand Total	**17,267**	**14,759**

Source: City of Sacramento GIS

Figure F-8 identifies those areas where future development is anticipated to occur over the next 25 years in different parts of the City.

Figure F-8 City of Sacramento Future Development Areas



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

More general information on growth and development in Sacramento County as a whole can be found in "Growth and Development Trends" in Section 4.3.1 Sacramento County Vulnerability and Assets at Risk of the main plan.

F.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table F-10 as high or medium significance hazards and primary hazards to the State of California. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the Base Plan. In general, the most vulnerable structures are those located within the flood risk areas, wildfire risk areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Climate change will require the City of Sacramento to prepare for warmer and more extreme temperatures, decreased water supply, drought, flooding, increasing energy and water demand, and public health risks. In California average temperatures are projected to rise as much as 9 degrees Fahrenheit by 2100. This is especially pertinent for Sacramento where extreme heat events are likely to increase and urban heat islands may intensify already high temperatures. Characterized by asphalt roads, concrete roofs, and energy use, urban developments modify the natural landscape using materials that create and/or retain heat.

Past Occurrences

- 1973-74: La Nina
- 1975-76: La Nina
- 1982-83: El Nino
- 1988-89: La Nina
- 1997-98: El Nino
- 2006: California Heat Wave
- 2012-15: North American Drought
- 2015-16: El Nino

Vulnerability to Climate Change

Assets at Risk

The City's population, resources, and economy are vulnerable to climate change impacts, particularly flooding, extreme heat, and water supply. Without reduction strategies in place, community-wide greenhouse gases (GHG) emissions are anticipated to increase by about 18 percent by 2020, and by about 31 percent by 2030 based on the City's anticipated growth.

Future Development

The Sacramento 2035 General Plan meets the State's standards as a qualified plan for the reduction of greenhouse gas emissions. The overall framework of the General Plan provides the foundation for Sacramento's overall approach to achieve sustainable land use. The places we live, the methods used to construct our homes, and where we work dictate how far and by what means we travel and how much energy we use. Goals and policies of the 2035 General Plan are intended to result in more compact development patterns, infill and reuse of underutilized properties, intensify development near transit and mixed use activity centers, and locate jobs closer to housing. Similarly, "green" buildings and development projects, as part of a broader sustainability plan, will consume less energy, produce fewer emissions, protect occupant health, minimize waste, and create jobs. Future development in the City is subject to the standards of 2035 General Plan.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–High

Hazard Profile and Problem Description

Dam failures can result from a number of natural or man-made causes such as earthquakes, erosion of the face or foundation, improper siding, rapidly rising flood waters, structural/design flaws, and deliberate human actions.

Past Occurrences

July 17, 1995: Folsom Dam Spillway Gate Failure – The failure resulted in the uncontrolled release of nearly 40 percent of Folsom Lake at a peak rate of approximately 40,000 cubic feet per second (1,100 m^3/s). The freshwater reaching San Francisco Bay was atypical for the summer season and confused salmon and striped bass, whose instincts told them that fall rains had arrived; they began their annual fall migrations months ahead of schedule.

Vulnerability to Dam Failure

Folsom and Nimbus Dams are the two major dams which affect the City of Sacramento and the populations in their respective inundation areas. Of prime concern are the failures of the Folsom and/or Nimbus Dams, which are owned by the US Bureau of Reclamation. The flood waters from either dam would affect the City of Sacramento and the surrounding unincorporated areas.

The Sacramento Municipal Utility District (SMUD) inundation map indicates that a failure of the Rancho Seco Dam would flow to the Laguna Creek Basin and stop approximately at Stockton Boulevard. Failure of Shasta Dam would affect populations south along the Sacramento River basin to about Knights Landing where the water would lose momentum. An Oroville Dam failure would impact populations southwest along the Feather River basin to about the Yolo Bypass.

Warning ability is generally determined by the frequency of inspections for structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate. Having an evacuation plan that is updating and exercised frequently assists in the warning and evacuation functions.

A dam failure will cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to electric generating facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas.

A catastrophic dam failure, depending on size of dam and population downstream, could exceed the response capability of local communities. Damage control and disaster relief support would be required from other local governmental and private organizations, and from the state and federal governments. Mass evacuation of the inundation areas would be essential to save lives, if warning time should permit. Extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food, and temporary shelter would be required for injured or displaced persons. These and other emergency operations could be seriously hampered by the loss of communications, damage to transportation routes, and the disruption of public utilities and other essential services.

Governmental assistance could be required and may continue for an extended period. These efforts would be required to remove debris and clear roadways, demolish unsafe structures, assist in re-establishing public services and utilities, and provide continuing care and welfare for the affected population including, as required, temporary housing for displaced persons.

Figure 4.75 in Section 4.3.6 shows the inundation areas in the City of Sacramento and the County.

major concern. Many families would be separated, particularly if the failure should occur during working hours, and a personal inquiry or locator system would be essential.

Values at Risk

Sacramento County provided inundation as a GIS layer for the Folsom Dam system, as part of the following breaks:

- Folsom Right Wing
- Folsom Mormon
- Folsom Dike 4
- Folsom Dike 5
- Folsom Dike 6
- Folsom Dike 7
- Folsom Dike 8
- Folsom Dam

GIS was used to determine the possible impacts of dam failure flooding within the City of Sacramento. The methodology described in Section 4.3.6 of the Base Plan was followed in determining structures and values at risk in potential dam inundation areas. Table F-22 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a floodplain in the City.

Table F-22 City of Sacramento – Count of Parcels and Values in Dam Inundation Zones

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	8	2	$3,139,047	$363,864	$3,502,911
Care / Health	189	151	$93,639,050	$1,001,284,994	$1,094,924,044
Church / Welfare	496	421	$86,643,945	$436,820,261	$523,464,206
Industrial	1,890	1,659	$533,537,335	$1,360,701,794	$1,894,239,129
Miscellaneous	1,145	8	$2,341,766	$264,443	$2,606,209
Office	1,419	1,255	$930,077,177	$3,546,609,472	$4,476,686,649
Public / Utilities	3,163	4	$4,088,725	$1,024,489	$5,113,214
Recreational	112	76	$45,466,233	$98,792,491	$144,258,724
Residential	122,989	121,544	$7,994,777,549	$20,189,320,019	$28,184,097,568
Retail / Commercial	2,635	2,240	$1,041,984,551	$1,824,488,753	$2,866,473,304
Vacant	6,612	168	$601,613,685	$12,938,229	$614,551,914
No Data	8	5	$542,436	$1,460,705	$2,003,141
Total	**140,666**	**127,533**	**$11,337,851,499**	**$28,474,069,514**	**$39,811,921,013**

Sacramento County 2016 Parcel/2015 Assessor's Data

Table F-23 shows potential losses from a Folsom Dam failure with loss estimate and loss ratios for the City. The loss ratio is the loss estimate (i.e., total of improved and contents value for all parcels located in the dam inundation zone in the City) divided by the total potential exposure and displayed as a percentage

of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3-foot flood depth (30% damage), 6-foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table F-23 City of Sacramento – Dam Inundation Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
Folsom Dam Inundation	127,533	$28,474,069,514	$19,046,822,173	$47,520,891,687	$14,256,267,506.10 $28,512,535,012.20 $47,520,891,687.00	35.0% 70.0% 100%

Source: Sacramento County GIS, Sacramento County 2016 Parcel/2015 Assessor's Data

*Three values are shown here due to varying flood depths expected – 3 foot, 6 foot, and total loss.

According to the information in Table F-22 and Table F-23, the City of Sacramento has 127,533 improved parcels and roughly $47.5 billion of structure and contents value in the Folsom Dam inundation area. The 3-foot loss ratio of 35.0%, the 6-foot loss ratio of 70.0%, and the total loss ratio of 100% indicates that the City has large amounts of assets at risk to a possible Folsom Dam failure.

Population at Risk

The dam inundation zones were overlayed on the parcel layer using GIS. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for the City. According to this analysis, there is a total population of 318,445 residents of the City at risk to dam inundation. This is shown in Table F-37.

Table F-24 City of Sacramento – Count of Improved Residential Parcels and Population in Dam Inundation Zones

Improved Residential Parcels	Population*
121,544	318,445

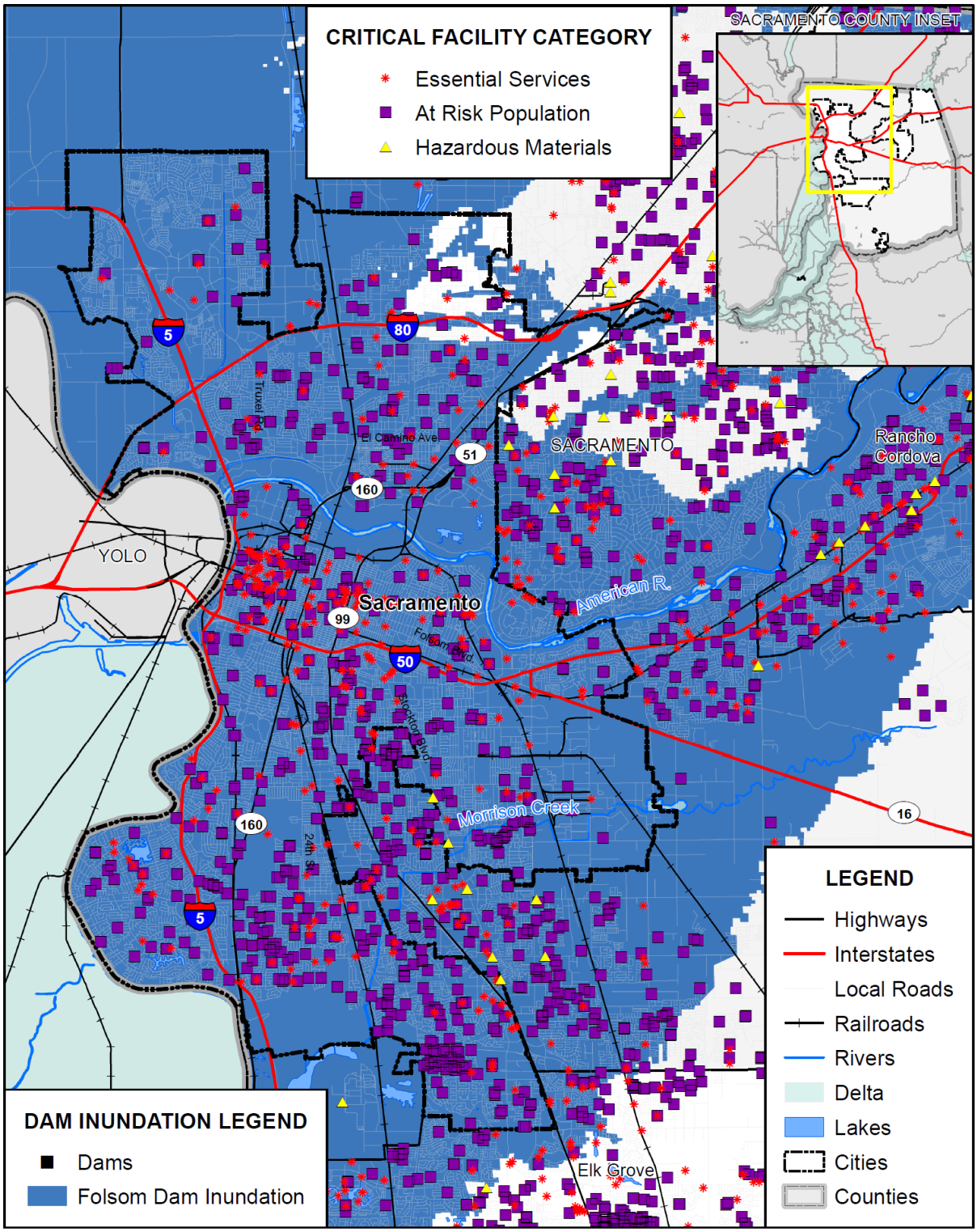
Source: FEMA4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data, 2010 US Census Bureau

* Average household populations from the 2010 US Census were used: Sacramento – 2.62.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in the City of Sacramento in identified Folsom Dam inundation zones. GIS was used to determine whether the facility locations intersects the inundation area. Details of critical facilities in the inundation area in Sacramento are shown in Figure F-9 and Table F-25. As shown on the table and figure, Sacramento has 897 critical facilities located in the Folsom Dam inundation areas. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure F-9 City of Sacramento – Critical Facilities in Dam Inundation Zones



Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table F-25 City of Sacramento – Critical Facilities in Dam Inundation Zones

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Airport	1
	Arena	1
	Bus Terminal	6
	Convention Center	1
	Emergency Evacuation Shelter	76
	Fire Station	20
	General Acute Care Hospital	6
	Government Facilities	28
	Light Rail Stop	36
	Medical Health Facility	97
	Police	3
	Stadium	2
	Train Station	1
	Water Treatment Plant	2
	Total	**280**
At Risk Population Facilities	Adult Day Care	11
	Adult Education School	4
	Adult Residential	118
	Alternative Education School	2
	Assisted Living Centers	1
	Charter School	13
	Children's Home	1
	College/University	4
	Community Day School	2
	Day Care Center	157
	Group Home	18
	Hotel	17
	Independent Study School	1
	Infant Center	14
	JAIL	1
	Private Elementary School	18
	Private High School	7
	Private K-12 School	7
	Public Continuation High School	3
	Public Elementary School	81

Critical Facility Category	Facility Type	Facility Count
	Public High School	11
	Public Middle School	13
	Residential Care/Elderly	69
	School-Age Day Care Center	40
	Social Rehabilitation Facility	1
	Total	**614**
Hazardous Materials Facilities	Oil Collection Center	3
	Total	**3**
Grand Total		**897**

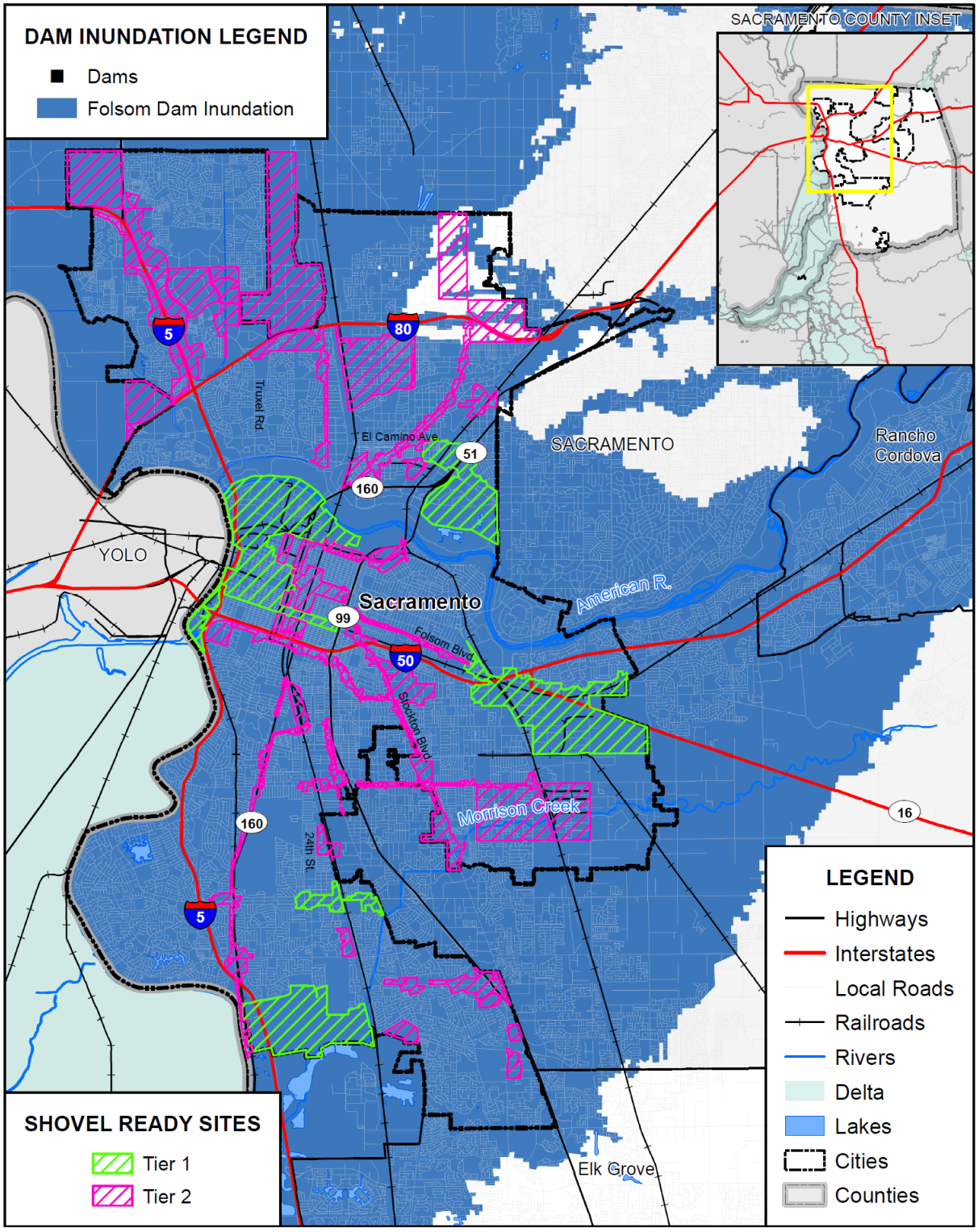
Source: Sacramento County GIS

Future Development

GIS Analysis

Hazard analysis was performed to determine the number of parcels in the dam inundation zones within the Opportunity Areas. Results can serve as a vulnerability analysis guide for future development. Figure F-10 shows the Opportunity Areas overlaid on the Folsom Dam Inundation zone. Table F-21 shows results of the parcel hazard analysis, sorted by Opportunity Area tier and type. There are 16,324 parcels in the inundation zones. This represents a great majority of Opportunity Areas.

Figure F-10 City of Sacramento – Future Development in Dam Inundation Zones



Foster Morrison

SACRAMENTO COUNTY

Data Source: Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Table F-26 City of Sacramento – Future Development in Dam Inundation Zones

Type	Parcel Count	Acres
Tier 1		
Centers	2,356	2,403
Corridors	0	0
Neighborhoods	0	0
New Growth Areas	56	1,158
Transit Center	711	1,711
Tier 1 Total	**3,123**	**5,272**
Tier 2		
Centers	1,580	2,142
Corridors	4,754	2,075
Neighborhoods	5,221	1,823
New Growth Areas	320	2,250
Transit Center	1,326	616
2 Total	**13,201**	**8,905**
Grand Total	**16,324**	**14,177**

Source: Sacramento County GIS, City of Sacramento GIS

Drought and Water Shortage

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for manufacturing, tourism, recreation, and commercial and domestic use. The demand for water will be ever present as the city grows.

Past Occurrences

Based on historical information, the occurrence of drought in California, including the City of Sacramento, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users.

California Droughts:

- 1928-1934
- 1987-1992
- 2012-2015

Vulnerability to Drought and Water Shortage

Assets at Risk

The vulnerability of the City of Sacramento to drought is City-wide, but impacts may vary and include reduction in water supply, new algae growth due to warmer temperatures of the water and an increase in dry fuels increasing the risk of fire and pressure in the system.

Future Development

The demand for water will be ever present as the population of the city grows. Water shortages in the future may be worsened by drought, as the City relies on surface water for its water source. Increased planning will be needed to account for population growth and increased water demands.

Earthquake

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

There are no known faults within the City of Sacramento. However, significant earthquakes have occurred on previously undetected faults. Known faults located nearest to Sacramento are Foothills fault system to the east, the Midland Fault to the west, and the Dunnigan Hills Fault to the northwest.

The Foothills fault system is located on the western edge of the Sierra Nevada Range over 20 miles from the Policy Area and consists of a complex of north-south trending faults. The active Bear Mountain fault zone is at the western edge of the system (California Division of Mines and Geology 1978). The anticipated maximum magnitude of an earthquake originating from this fault zone is 6.5 moment magnitude (Mw). The Sacramento region has experienced groundshaking originating from faults in the Foothills fault system in the past. The Midland fault zone is considered to be a deep pre-Pleistocene subsurface feature extending nearly 50 miles along the west side of the Sacramento Valley, from the Delta to Lake Berryessa. This fault has been only approximately located from natural gas exploration work. Subsurface data indicate that there has been no appreciable movement on the Midland fault in the last 24 to 36 million years, and no evidence of surface expression has yet been found (Harwood and Helley 1987). The Dunnigan Hills Fault is located approximately 20 miles northwest of the City of Sacramento. The active fault is not within an Alquist-Priolo Earthquake Fault Zone.

Other faults in the region include the Great Valley fault (segments 3 and 4), located over 25 miles from the Policy Area and capable of producing a 6.5 – 6.8 Mw earthquake. The Concord-Green Valley fault and Hunting Creek-Berryessa fault are both located approximately 40 miles from the Policy Area and are capable of producing 6.9 Mw earthquakes. The Greenville fault is located approximately 50 miles from

the Policy Area and is capable of producing a 6.8 Mw earthquake. The West Napa fault is also located approximately 50 miles from the Policy Area and could produce a 6.5 Mw earthquake.

Past Occurrences

- 1892: Winters Earthquake (Magnitude 6.6) – Undetermined fault
- 1906: San Francisco Earthquake (Magnitude 7.8) – San Andreas Fault
- 1989 Loma Prieta Earthquake (Magnitude 6.9) – San Andreas Fault

Vulnerability to Earthquake

There are no known faults running under the City of Sacramento, however there are major faults close enough to cause the City to prepare for an earthquake.

Assets at Risk

The City Planning Team noted that the City's infrastructure and levee system may be impacted by an earthquake.

Natural Resources at Risk

The City Planning Team noted that there are no natural resources at notable risk from earthquake.

Historic and Cultural Resources at Risk

The City Planning Team noted that the City's historical buildings and historic districts would be at risk to earthquakes.

Future Development

The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from earthquakes. Future development in the City is subject to these building codes.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional(100-year)/Unlikely (200-/500-year)
Vulnerability–High

Hazard Profile and Problem Description

Flooding is the rising and overflowing of a body of water onto normally dry land. History clearly highlights floods as one of the most frequent natural hazards impacting the City of Sacramento. Floods are among the most costly natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into

deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

Health Hazards from Flooding

Certain health hazards are also common to flood events. While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where cattle and other livestock are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e. coli and other disease causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a city or county water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

The HMPC for the City also noted another issue. When the City's combined sewer system is overloaded with stormwater, it frequently backs up into the streets causing a health hazard.

Warning and Evacuation Procedures

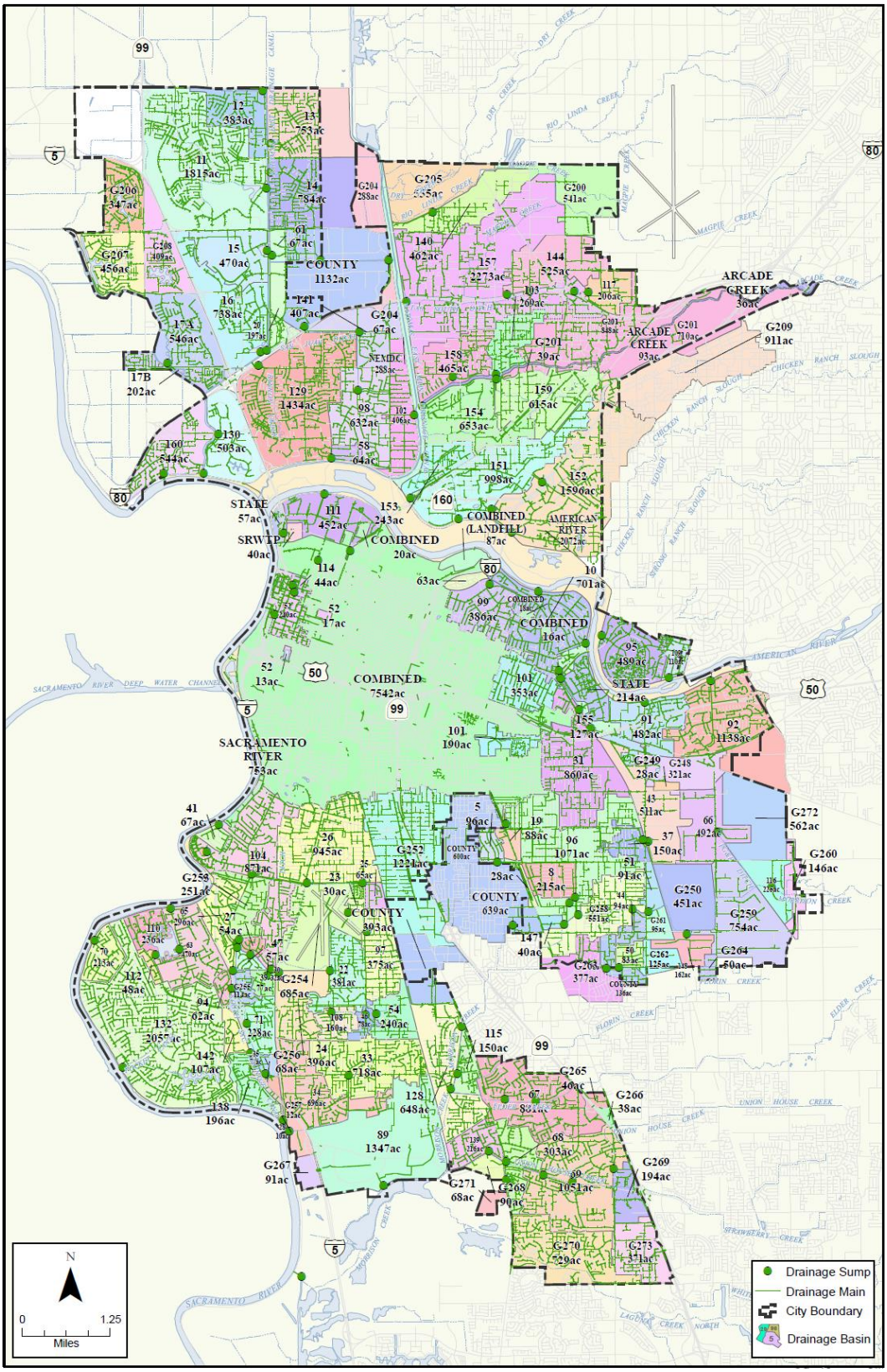
The City of Sacramento in conjunction with Sacramento County and other incorporated communities have a variety of systems and procedures established to protect its residents and visitors to plan for, avoid, and respond to a hazard event including those associated with floods and wildfires. This includes Pre-Disaster Public Awareness and Education information which is major component in successfully reducing loss of life and property in a community when faced with a potentially catastrophic incident. Much of this information is not specific to a given hazard event and is always accessible to the public on local City and County websites. Specific warning and evacuation systems and procedures include information relative to: Flood Forecasting (e.g., California Data Exchange Center), ALERT System, Warning Systems, dam protocols, evacuation procedures, and sheltering in place. Additional information on these warning and evacuation procedures as well as post-disaster mitigation policies and procedures can be found within the Capability Section of this Annex and in Section 4.4, Capabilities, of the Base plan and in the Emergency Management discussions in Appendix C.

Major Sources of Flooding

The City of Sacramento is traversed by several stream systems and is at risk to both riverine flooding and localized stormwater flooding. As previously described in Section 4.2.14 of the main plan, the Sacramento County Planning Area and the City of Sacramento have been subject to previous occurrences of flooding. In the City of Sacramento, much of the riverine flood damage occurs in the floodplains of the Sacramento River and the American River.

Six small tributaries of the Sacramento River pass through and provide drainage for the City of Sacramento. These tributaries are Dry Creek, Magpie Creek, and Arcade Creek in the northern portion of the city (north of the American River), and Morrison Creek, Elder Creek, Florin Creek, Unionhouse Creek, and Laguna Creek in the southern portion of the city (south of the American River). Waterways and drainages in the City are shown on Figure F-11.

Figure F-11 City of Sacramento Waterways and Drainage

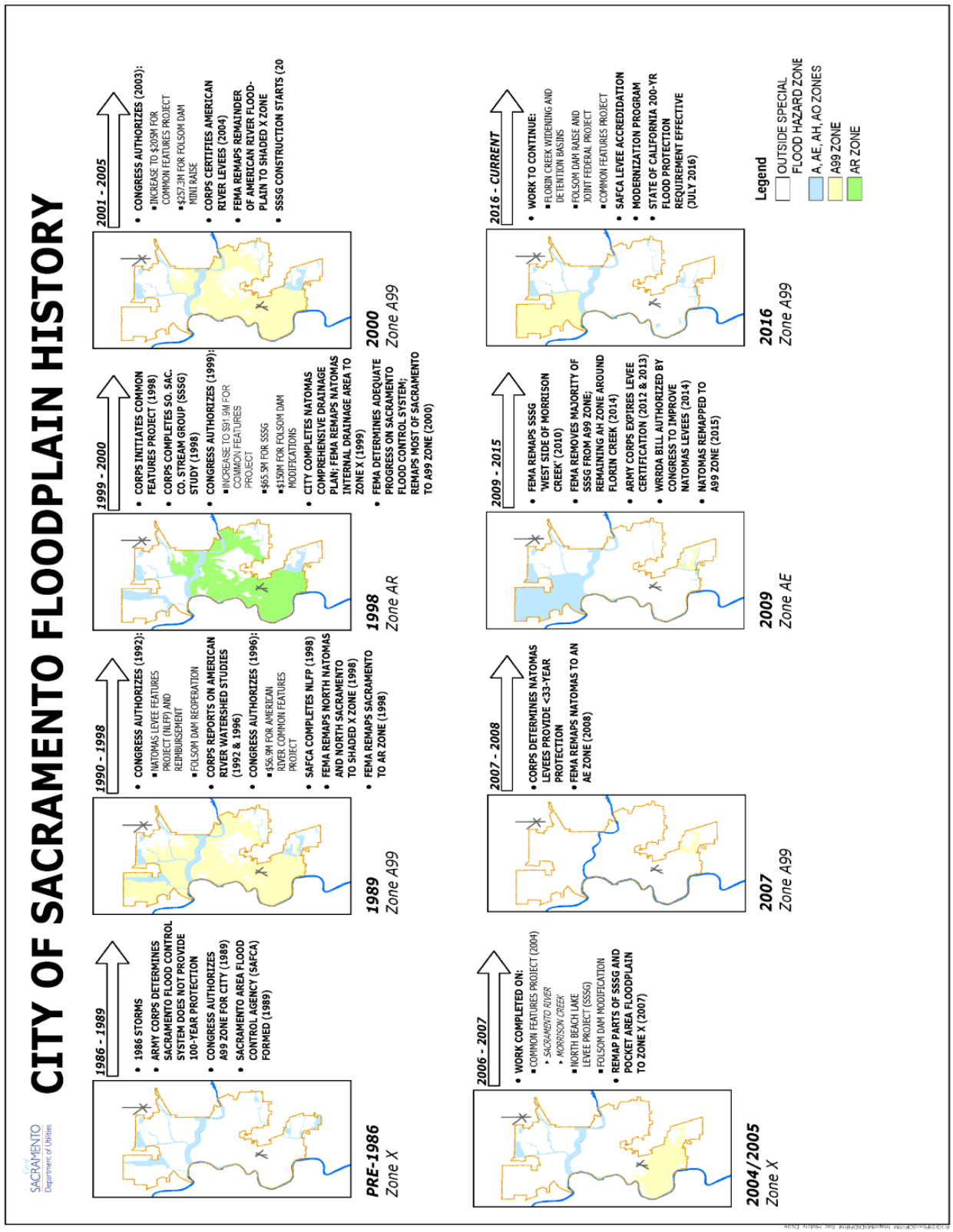


Source: City of Sacramento Department of Utilities

The City Planning Area contains many natural and man-made drainage features that ultimately drain into the Sacramento River. In addition to those listed above, local surface water drainages or creeks such as Chicken Ranch and Strong Ranch sloughs, Florin Creek, and Robla Creek are additional major natural drainages within the Policy Area. Man-made drainage canals, such as the Natomas East Main Drain Canal and the East, West, and Main Drainage Canals provide drainage for a large portion of the urbanized areas within the Policy Area that are not served by the City's combined sewer system or the City's storm drainage collection system.

The City Planning area has had many changes to the designated floodplain since the 1986 flooding base on Flood Insurance Rate Maps provided by FEMA. These changes are shown in Figure F-12.

Figure F-12 City of Sacramento Floodplain History



Past Occurrences

Sacramento experienced great floods in 1850, 1852, 1862, 1911, 1913, 1951, 1956, 1963, 1964, 1986, 1995, 1997, and 2005. Record breaking flood events are detailed further below:

1850 Flood - During the night of January 7, 1850, a great storm swept in from the west. Almost overnight the water posed a grave threat to life and property. Within two days of the storms beginnings, downpours that reached an inch an hour, had transformed the rivers into raging torrents. There was no levee protecting the new city which started right at the river banks. Within hours, the entire community, for a mile back from the river, was deep under rushing waters. Houses were toppled; businessmen watched as thousands of dollars in inventory was washed out their doors; and a small steamboat navigated the town's streets to deliver goods. Very few homes escaped having water on the first floors. Many were swept from their underpinnings.

Figure F-13 Sketch of the City of Sacramento during the Flood of 1850

Source: California State Library

1852-53 Flood – In December of 1852, the Sacramento Valley was again inundated, even more deeply than they had in the high water of 1850. On March 29, 1853, the Sacramento River rose twelve feet within twenty-four hours. When the water finally broke through the levees, it was at a point south of the city, toward Sutterville. The out rush of waters on the flatlands were sweeping and violent. By April 2, 1853, the water had backed up into the city. Again the City was under water. Sacramento was a city submerged. The City was a lake, boats were in the streets and the water didn't drain away for two months. The City had levees along both the Sacramento and American Rivers. Although levees served to prevent the rivers from invading the growing city, they also served to trap storm and refuse water that would otherwise drain directly into those rivers.

1861-1862 Flood – Sacramento had enjoyed eight winters of the rivers staying in-bank. The City had prospered and became the State capital. On December 9, 1861, at 8:00 A.M., the American River suddenly went over the levee at Smith's Gardens, about 31st & B Streets, in the northeastern part of the City. The water took its old channel, rushed through the slough west of the Fort and over its banks in less than 30 minutes, the low lots between 0 & R Streets were overflowed two to three feet deep. The R Street levee stopped its flow, causing it to back up into the City. By 9 A.M., the entire City, south of J Street,

was inundated. By 11:30 A.M., only J, K and the levee streets (1, R, and Front) were above water. Within an hour and a half, J and K Streets were under water.

1951 Record Flood – Just after ground is broken on Folsom Dam, the American River watershed experiences the first of five record storms.

1956 Record Flood – Though engineers had been predicting it would take a year to fill the nearly completed upstream Folsom Dam, the second record storm filled the dam in a week and Sacramento is saved from flooding.

1964 Record Flood – the 3rd record flood in less than 15 years. Engineers concluded that Folsom Dam was only designed to handle a 120-year storm, not a 500-year storm.

1986 Record Flood: In February 1986, major storms in northern California caused record flood flows in the American River basin. Overflows from Folsom Reservoir, together with high flows in the Sacramento River, caused water levels to rise above the safety margin on levees protecting the Sacramento area. A series of tropical storms roared through the State that month. Ten inches of rain fell in 11 days. The levee overtopped in a low spot of Strawberry Manor, flooding approximately 500 homes. Outflows from Folsom Reservoir, together with high flows in the Sacramento River, caused water levels to rise above the safety margin on levees protecting the Sacramento area. The storm brought large flood flows into Folsom Reservoir with a maximum six-day record inflow of 1.14 million acre-feet, exceeding the six-day design inflow of 987,000 acre- feet. To relieve the pressure on the dam, 115,000 cubic feet per second (cfs), the design capacity of the levees downstream, was released from the reservoir for two days. As the rain continued, officials boosted those releases to 130,000 cfs for 24 hours. Officials considered increasing releases to 150,000 cfs, but the rain let up, and disaster was averted. At that point, it was estimated by flood officials that three more hours of rainfall would have overwhelmed the system, flooding thousands of homes. Runoff in the American River quickly filled the temporary diversion dam built at the Auburn Dam site, approximately ten years earlier, causing it to burst, and sending 100,000 acre feet of water rushing into Folsom Reservoir. Folsom Dam was downgraded to about a 60-year storm. The USACE determined that a majority of the City did not have 100-year level of flood protection.

Figure F-14 Ariel View of 1986 Flood

Source: SAFCA

1997 Record Flood: The fifth record flood in 46 years occurs over the New Year's holiday. Unprecedented flows from rain and melted snow surge into the Feather and the San Joaquin. Sacramento is spared when the fury of the storm hits 40 miles north in the Feather River. Levee failures flood Olivehurst, Adboga, Wilton, Manteca, and Modesto. By the end of January 1997, 48 counties were declared disaster areas and 290 square miles of property, valued at about $2 billion, including homes, farmlands, bridges, roads and flood management infrastructures were damaged. Nine people were killed and 120,000 people were evacuated from their homes.

Other large flood events will certainly occur in the future, leaving the City vulnerable to additional, potentially catastrophic flooding. Further localized flooding problems both in and outside of the natural floodplains are likely to continue as drainage channels are altered and confined with new development.

December 2012: McKinley Park Flooding - Several houses were flooded during a rain storm due to a failed programmable logic controller. DOC activation due to weather forecast.

Figure F-15 January 2003 Tower Bridge

Source: The Sacramento Area Flood Control Agency

Figure F-16 December 30, 2005 Pomegranate Avenue along Florin Creek in South Sacramento

Source: The Sacramento Area Flood Control Agency

Flood Hazard Assessment

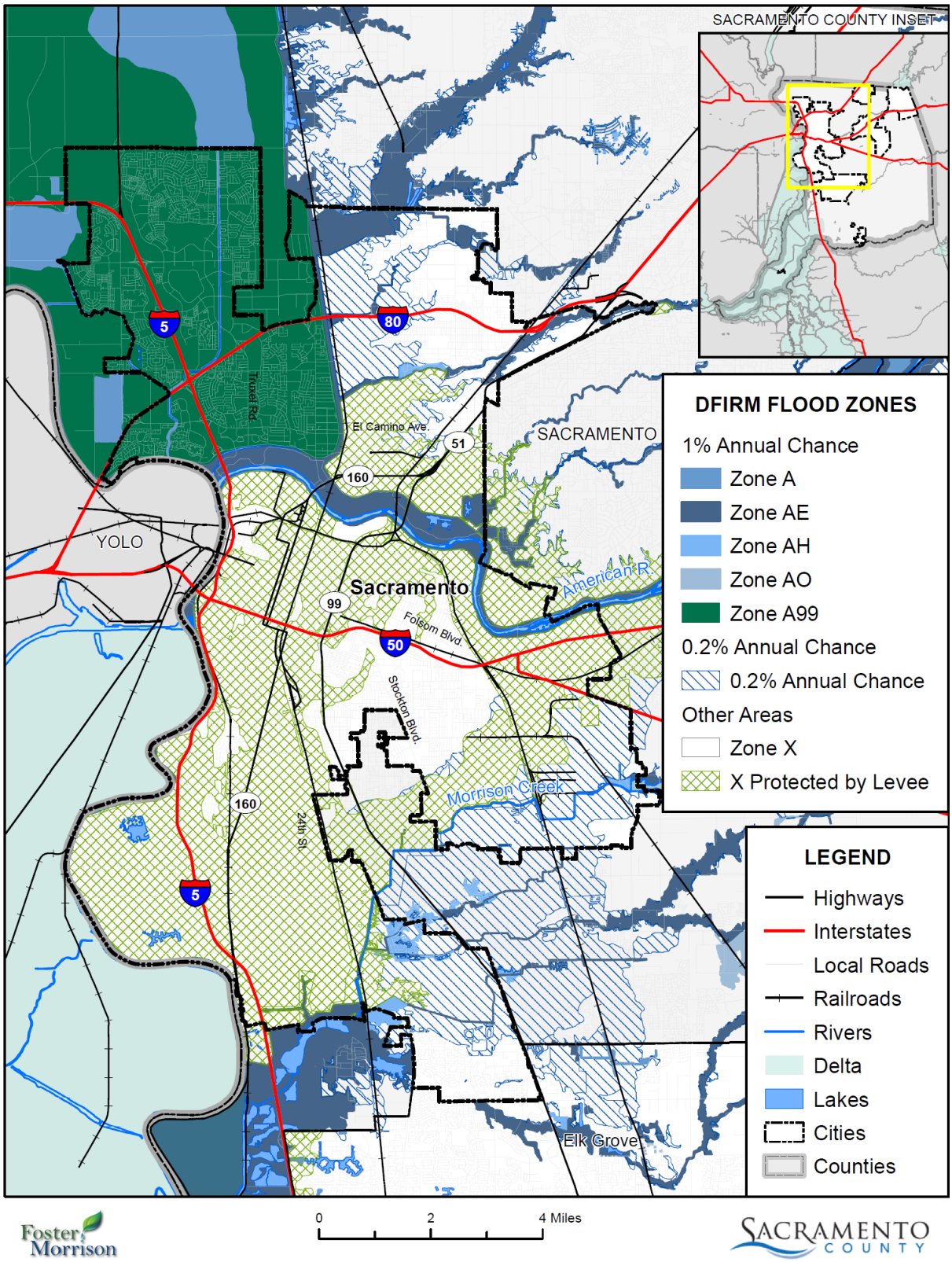
This risk assessment for the City of Sacramento's Annex to the Sacramento County LHMP Update assessed the flood hazard specific to the City. This included an evaluation of multiple flood hazards including the Special Flood Hazard Area (SFHA) shown on the DFIRM; Repetitive Loss (RL) Areas; localized, stormwater flooding areas; other areas that have flooded in the past, but not identified on the DFIRM; other areas of shallow flooding identified through other studies and sources; levee failure flooding; dam failure flooding; erosion based flooding, and flooding caused by land subsidence. This comprehensive flood risk assessment included an assessment of less-frequent flood hazards, areas likely to be flooded, and flood problems that are likely to get worse in the future as a result of changes in floodplain development and demographics, development in the watershed, and climate change or sea level rise. Existing studies, maps, historical data, and federal, state, and local community expertise and knowledge contributed to this current flood assessment for the City of Sacramento. An evaluation of the success of completed and ongoing flood control projects and associated maintenance aspects contributed to this flood hazard assessment and the resulting flood mitigation strategy for the City. This flood risk assessment for this LHMP Update includes an assessment of future flooding conditions based on historic development in the floodplains, proposed future development, climate change influences, and worst case flood scenarios such as the ARkStorm as further described throughout this plan. Due to GIS mapping constraints, the remainder of this flood vulnerability assessment focuses on the flood hazard based on the updated FEMA DFIRMs.

Flood Mapping and Flood Zones

A small portion of the City is located inside of the 100-year flood zone as defined by the Federal Emergency Management Agency (FEMA). Portions of the City are located in the 500-year flood zone, X Protected by Levee zone, and A99 zone. This is seen in Figure F-17. More information on the levees can be found in the levee vulnerability section of this annex.

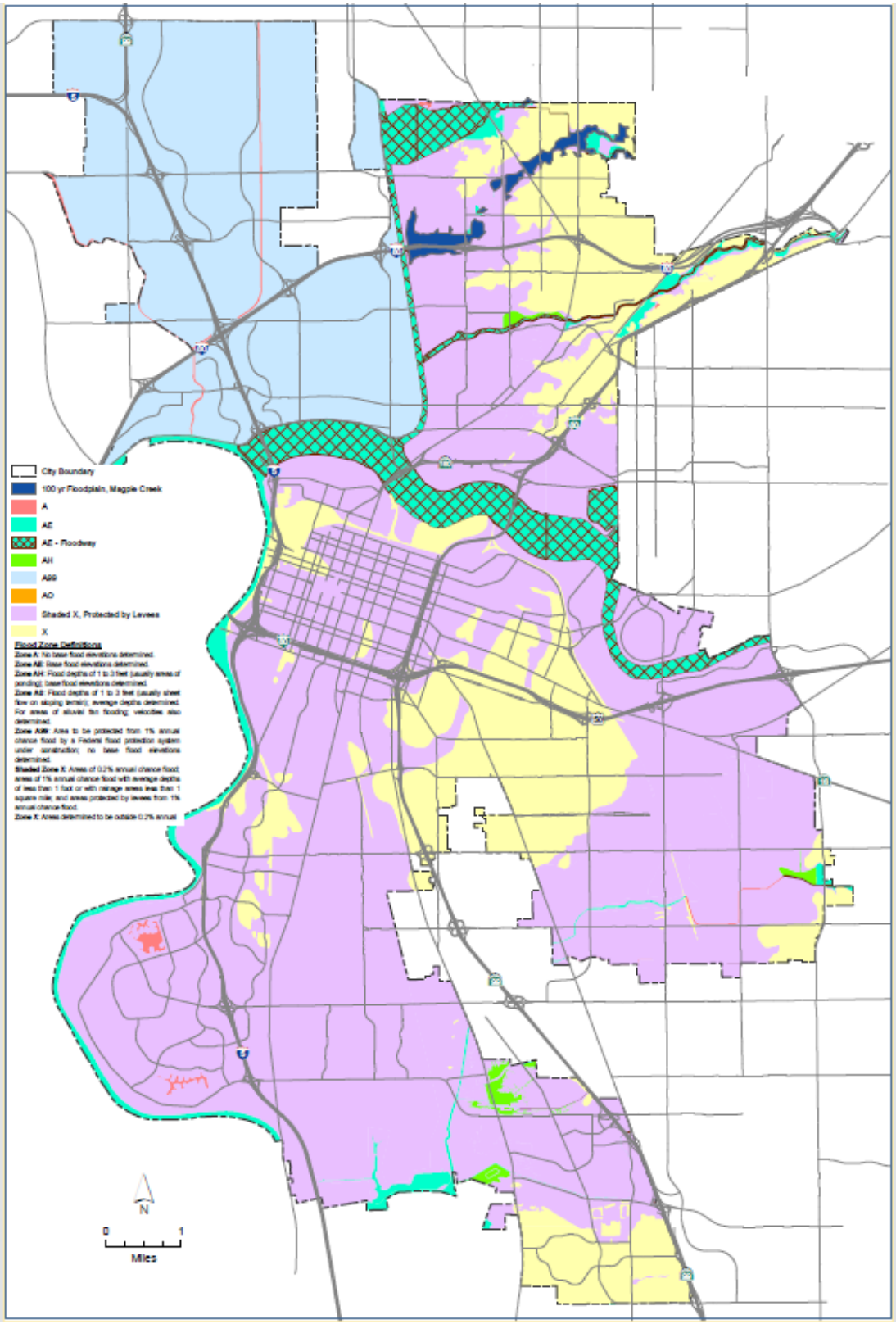
In addition to FEMA floodplains, the City also regulates a local floodplain. FEMA floodplains and local floodplains are shown on Figure F-18. For purposes on analysis in this plan, only FEMA floodplains are analyzed.

Figure F-17 City of Sacramento – FEMA DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Figure F-18 City of Sacramento – FEMA and Local Floodplains



Source: City of Sacramento Department of Utilities GIS

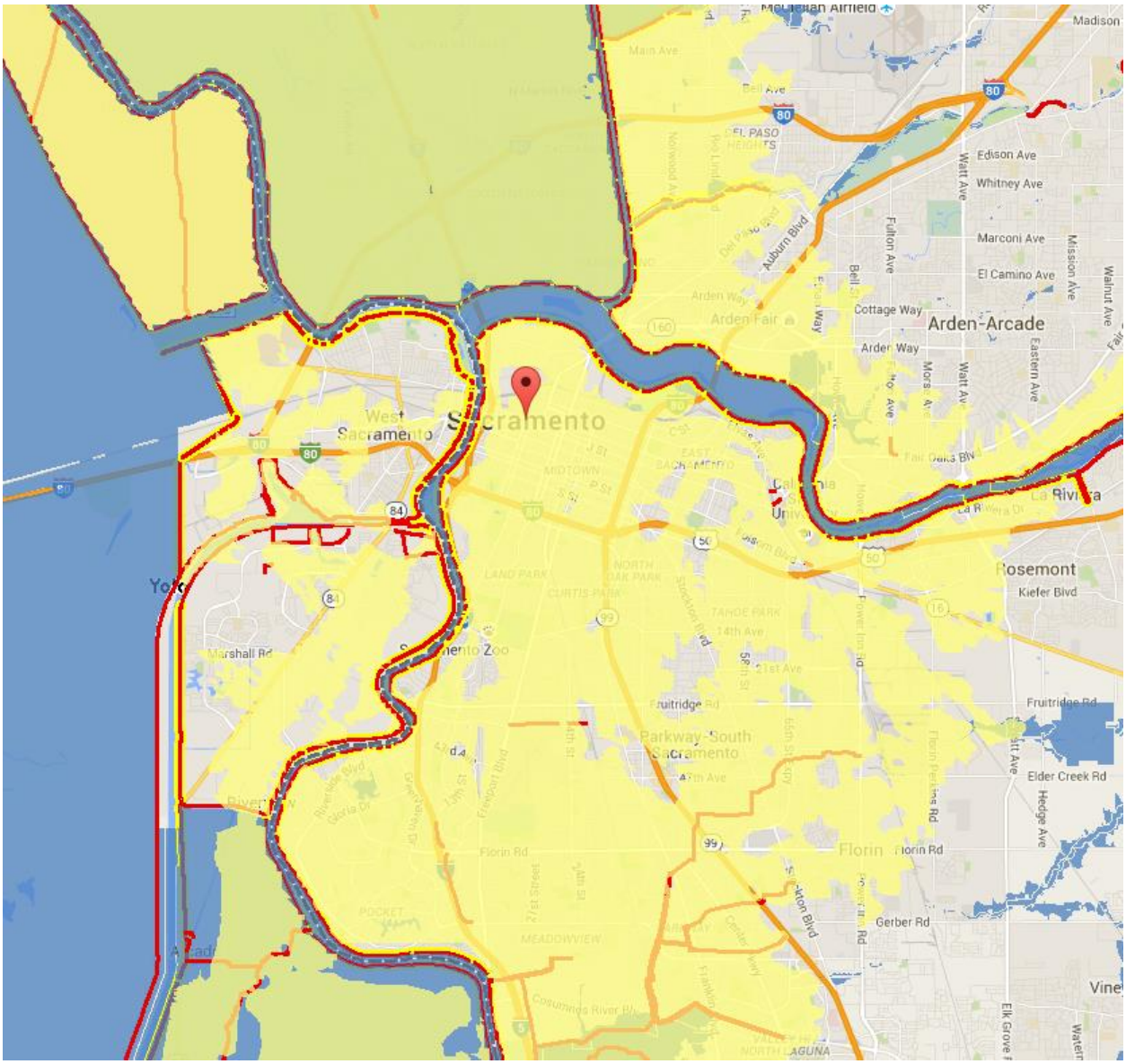
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Sacramento County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency, however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. The BAM map for Sacramento is shown in Figure F-19.

Figure F-19 City of Sacramento Best Available Map



Floodplains are displayed using semi transparent colors. When viewing overlapping floodplains, the combination of multiple semi transparent colors will not match the legend colors. For accurate color representation, view floodplains individually.

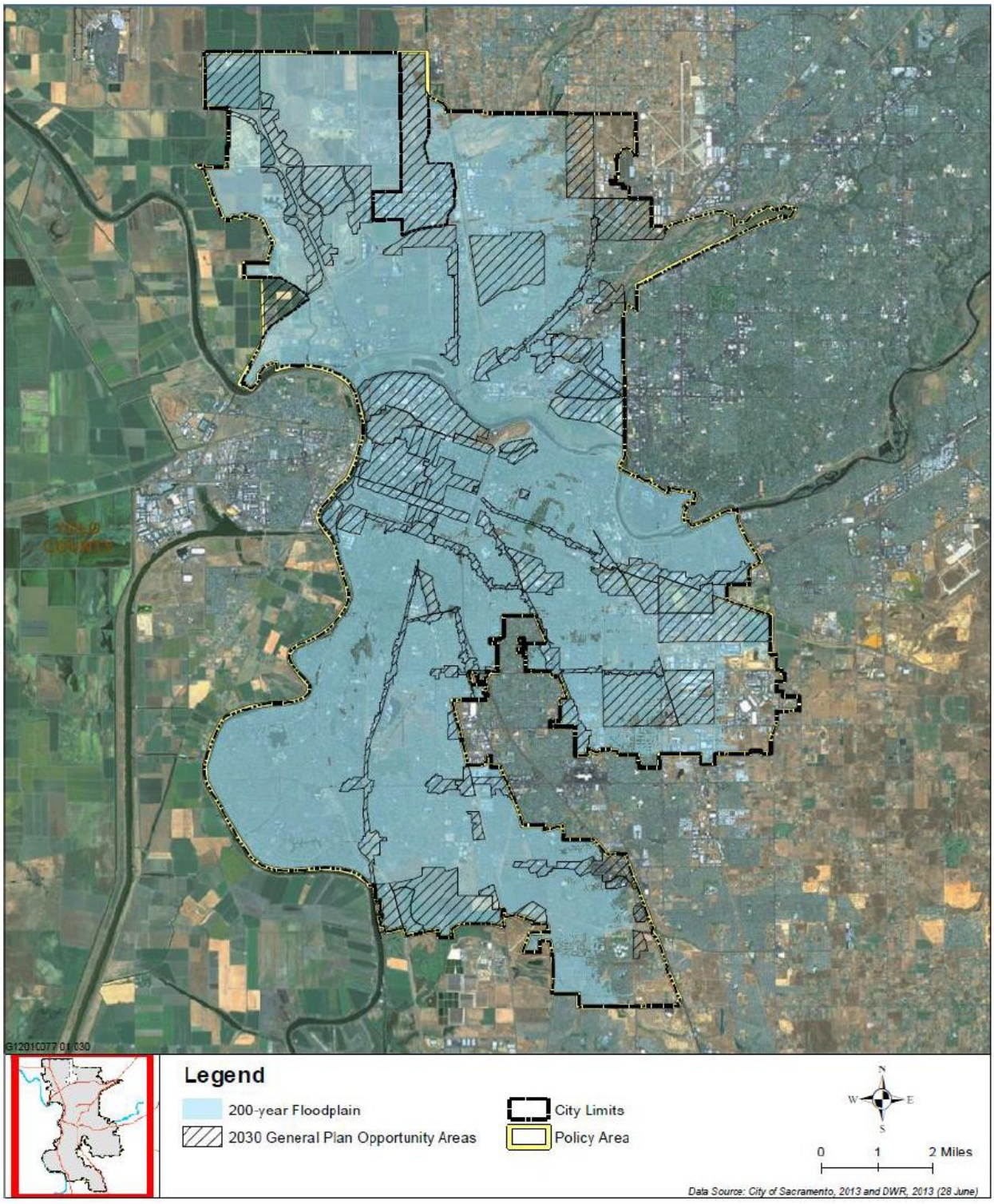
County Boundary	Federal Levee Centerline	Non-Federal Levee Centerline
FEMA Effective	DWR Awareness	Regional/Special Study
USACE Comprehensive Study	USACE Comprehensive Study	

Source: California Department of Water Resources Best Available Maps, 2016

Legend explanation: Blue - FEMA 100-Year, Orange – Local 100-Year (developed from local agencies), Red – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), Pink – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), Purple – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

An estimation of the City's 200-year floodplain can be seen in Figure F-20. While no analysis was performed using 200-year flood layer, it is presented here for informational purposes.

Figure F-20 City of Sacramento 200-year Floodplain



Source: City of Sacramento 2035 General Plan

Vulnerability to Flood

The City of Sacramento has extensive vulnerability to flooding. This is shown in the analysis below.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Sacramento. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table F-27 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a floodplain in the City.

Table F-27 City of Sacramento – Count and Improved Value by Property Use and Detailed Flood Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Zone A						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	5	0	$848	$0	$848	$1,696
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	21	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	11	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	1	0	$11	$0	$0	$11
Total	**38**	**0**	**$859**	**$0**	**$848**	**$1,707**
Zone AE						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	1	1	$2,803,592	$15,895,092	$2,803,592	$21,502,276
Church / Welfare	3	1	$23,045	$59,826	$23,045	$105,916
Industrial	6	4	$2,465,577	$3,572,738	$3,698,366	$9,736,681
Miscellaneous	62	0	$623,419	$0	$623,419	$1,246,838
NO DATA	0	0	$0	$0	$0	$0
Office	4	4	$4,132,181	$12,148,351	$4,132,181	$20,412,713

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Public / Utilities	318	0	$0	$0	$0	$0
Recreational	5	3	$944,779	$5,396,298	$944,779	$7,285,856
Residential	68	61	$7,042,417	$14,386,176	$3,521,209	$24,949,802
Retail / Commercial	10	9	$4,908,587	$6,442,818	$4,908,587	$16,259,992
Vacant	74	0	$3,559,611	$0	$0	$3,559,611
Total	**551**	**83**	**$26,503,208**	**$57,901,299**	**$20,655,177**	**$105,059,684**
Zone AH						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	1	1	$30,575	$101,984	$30,575	$163,134
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	8	8	$4,605,452	$14,583,475	$6,908,178	$26,097,105
Miscellaneous	2	0	$783	$0	$783	$1,566
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	28	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	522	515	$16,451,152	$47,949,506	$8,225,576	$72,626,234
Retail / Commercial	6	6	$2,715,649	$2,698,936	$2,715,649	$8,130,234
Vacant	16	0	$935,185	$0	$0	$935,185
Total	**583**	**530**	**$24,738,796**	**$65,333,901**	**$17,880,761**	**$107,953,458**
Zone AO						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone A99						
Agricultural	7	1	$3,102,866	$150,617	$3,102,866	$6,356,349
Care / Health	12	11	$4,400,485	$17,355,634	$4,400,485	$26,156,604
Church / Welfare	17	15	$11,100,265	$42,900,938	$11,100,265	$65,101,468
Industrial	34	31	$24,149,478	$90,292,605	$36,224,217	$150,666,300
Miscellaneous	524	0	$75,324	$0	$75,324	$150,648
NO DATA	0	0	$0	$0	$0	$0
Office	127	117	$122,255,329	$574,353,312	$122,255,329	$818,863,970
Public / Utilities	317	0	$0	$0	$0	$0
Recreational	10	8	$21,227,054	$41,417,988	$21,227,054	$83,872,096
Residential	24,205	23,840	$1,795,781,905	$5,403,747,483	$897,890,953	$8,097,420,341
Retail / Commercial	208	199	$178,061,207	$379,207,814	$178,061,207	$735,330,228
Vacant	3,060	26	$201,424,820	$2,679,016	$0	$204,103,836
Total	**28,521**	**24,248**	**$2,361,578,733**	**$6,552,105,407**	**$1,274,337,700**	**$10,188,021,840**
Total 1%	**29,693**	**24,861**	**$2,412,821,596**	**$6,675,340,607**	**$1,312,874,486**	**$10,401,036,689**
0.2% Annual Chance Flood Zone*						
Agricultural	1	1	$36,181	$213,247	$36,181	$285,609
Care / Health	17	15	$11,392,520	$379,674,718	$11,392,520	$402,459,758
Church / Welfare	70	55	$9,103,996	$39,671,007	$9,103,996	$57,878,999
Industrial	595	563	$188,334,822	$574,717,575	$282,502,233	$1,045,554,630
Miscellaneous	128	0	$78,031	$0	$78,031	$156,062
NO DATA	0	0	$0	$0	$0	$0
Office	41	36	$16,661,535	$60,491,852	$16,661,535	$93,814,922
Public / Utilities	287	0	$53,533	$0	$53,533	$107,066
Recreational	4	4	$2,138,092	$2,400,240	$2,138,092	$6,676,424
Residential	13,878	13,622	$517,512,406	$1,578,414,652	$258,756,203	$2,354,683,261
Retail / Commercial	193	169	$83,714,497	$182,091,851	$83,714,497	$349,520,845
Vacant	951	30	$62,303,335	$5,038,017	$0	$67,341,352
Total	**16,165**	**14,495**	**$891,328,948**	**$2,822,713,159**	**$664,436,821**	**$4,378,478,928**

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
X Protected by Levee Zone						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	120	94	$57,548,864	$419,739,056	$57,548,864	$534,836,784
Church / Welfare	241	216	$43,415,824	$172,789,435	$43,415,824	$259,621,083
Industrial	965	801	$244,227,533	$496,705,067	$366,341,300	$1,107,273,900
Miscellaneous	345	5	$1,526,611	$95,585	$1,526,611	$3,148,807
NO DATA	8	5	$542,436	$1,460,705	$542,436	$2,545,577
Office	1,050	935	$667,325,318	$2,450,427,712	$667,325,318	$3,785,078,348
Public / Utilities	1,678	3	$3,888,349	$886,814	$3,888,349	$8,663,512
Recreational	73	42	$16,934,177	$43,254,208	$16,934,177	$77,122,562
Residential	62,289	61,708	$4,469,620,158	$10,365,775,983	$2,234,810,079	$17,070,206,220
Retail / Commercial	1,590	1,309	$583,121,232	$1,002,143,459	$583,121,232	$2,168,385,923
Vacant	1,602	65	$233,335,191	$2,457,283	$0	$235,792,474
Total	**69,961**	**65,183**	**$6,321,485,693**	**$14,955,735,307**	**$3,975,454,190**	**$25,252,675,190**
Zone X						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	42	33	$18,219,914	$178,905,629	$18,219,914	$215,345,457
Church/Welfare	184	151	$25,103,465	$195,405,505	$25,103,465	$245,612,435
Industrial	383	346	$97,590,976	$276,067,803	$146,386,464	$520,045,243
Miscellaneous	173	3	$194,921	$168,858	$194,921	$558,700
NO DATA	0	0	$0	$0	$0	$0
Office	203	169	$120,605,677	$451,670,188	$120,605,677	$692,881,542
Public / Utilities	699	1	$958,002	$137,675	$958,002	$2,053,679
Recreational	25	20	$4,420,041	$7,015,135	$4,420,041	$15,855,217
Residential	25,492	25,194	$1,377,132,972	$3,287,846,034	$688,566,486	$5,353,545,492
Retail / Commercial	665	579	$199,173,751	$274,806,194	$199,173,751	$673,153,696
Vacant	1,417	50	$126,879,194	$2,820,311	$0	$129,699,505
Total	**29,283**	**26,546**	**$1,970,278,913**	**$4,674,843,332**	**$1,203,628,721**	**$7,848,750,966**

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Table F-28 summarizes Table F-27 above and shows City of Sacramento loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table F-28 City of Sacramento – Flood Loss Summary

Flood Zone	Improved Parcel Count	Total Improved Value	Estimated Contents Value	Total Improved/ Contents Value	Loss Estimate	Loss Ratio
1% Annual Chance	24,861	$6,675,340,607	$3,993,844,418	$10,669,185,025	$2,133,837,005	3.54%
0.2% Annual Chance*	14,495	$2,822,713,159	$2,315,826,604	$5,138,539,763	$1,027,707,952.60	1.71%

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data
*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

According to Table F-27 and Table F-28, the City of Sacramento has 24,861 improved parcels and roughly $10.7 billion of structure and contents value in the 1% annual chance floodplain. The City of Sacramento has an additional 14,495 improved parcels and roughly $5.1 billion of structure and contents value in the 0.2% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a 1% chance in any given year of a flood event causing roughly $2.13 billion in damage, and a 0.2% chance in a given year of a flood event causing roughly $1.0 billion in damages in the City of Sacramento. A loss ratio (loss estimate divided by the total assets of the City) of 3.54% and 1.71% indicates that losses in Sacramento to flood would be relatively minor compared to the total value of properties in the City.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.10 of the Base Plan that was used for the County as a whole, was used for the City of Sacramento. Table F-29 represents a summary analysis of total acres in the 1% and 0.2% annual chance flood zones in the City.

Table F-29 City of Sacramento – Flooded Acres

Flood Zone	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
1% Annual Chance	12,958.27	5,468.67	5.89%
0.2% Annual Chance*	6,385.63	4,477.68	36.96%

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data
*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Insurance Coverage, Claims Paid, and Repetitive Losses

Two separate analysis are included below. One from the NFIP, which contained slightly newer data. The second is from the City's CFMP. While the data is slightly older, it contains a much more detailed analysis. As such, both are included here.

2016 NFIP Flood Insurance Analysis

The City of Sacramento joined the National Flood Insurance Program (NFIP) on September 15, 1978. The City joined in CRS program on October 1, 1992 and maintains a CRS rating of Class 5. This rating gives flood insurance policyholders in the City a 25% discount for properties located in a special flood hazard zone, and a 10% discount for those properties located outside the special flood hazard zone. A more detailed description and summary of the flood zones is provided in Section 4.3.10 of the Base Plan.

NFIP data indicates that as of February 19, 2016, there were 43,937 flood insurance policies in force in the City with $14,355,078,500 of coverage. Of the 43,937 policies, 42,827 were residential (single-family homes) and 1,110 were nonresidential; 2,153 of the policies were in A zones (the remaining 41,784 were in B, C, and X zones). The GIS parcel analysis detailed above identified 24,861 parcels in the 100-year flood zone. 2,153 policies for 24,861 parcels in the 100-year floodplain equates to insurance coverage of 28.8 percent. It should be noted, however, that many of the 24,861 parcels in the 100-yr floodplain are located in the Natomas Basin, which is an A99 zone.

There have been 967 historical claims for flood losses totaling $9,906,307.99. 682 of these were for pre-FIRM structures; 280 were for post-FIRM structures, and 5 were unknown.

2016 CFMP Flood Insurance Analysis

Most every primary building or substantial improvement within the City of Sacramento's SFHA must have a flood insurance policy if there is a federally-backed mortgage. The majority of mortgage loans are backed by the federal government through either Fannie Mae or Freddie Mac. Since flood insurance rates are driven by location of the building and the BFE, structures in the SFHA usually pay higher rates than do those buildings located outside the designated higher risk areas. Typically when BFEs increase, flood insurance premiums also increase, unless some type of mitigation is implemented on that building.

While flood insurance can do nothing to prevent actual flood damage or loss of life it can mitigate the economic risk associated with flooding to the insured in many ways. Flood insurance is a property owner's first line of defense against flood damage. A property which is damaged or destroyed can be replaced more quickly without using financial resources devoted to other things such as the mortgage, utilities or maintenance. Additionally, compensation for flood losses (through flood insurance payments) can help families get back on their feet with minimal financial hardship and can also aid businesses in getting back open to avoid potential financial ruin.

Table F-30 shows historically the number of flood insurance policies in the A, AE, AH and AO-Zones, the number of Standard X-Zone policies in AR, A99-Zones, and the number of Preferred Risk Policies in the B, C or X-Zones. The table also shows the average number of flood insurance policies by flood zone from August 2008 through March of 2012.

Table F-30 Flood Insurance Policies in Sacramento by Zone and Year

Year	Zone A, AE, AH, AO	Zone AR, A99*	Zone B, C, X**	Total
Aug 2008	737	12,360	30,050	43,147

Year	Zone A, AE, AH, AO	Zone AR, A99*	Zone B, C, X**	Total
May 2009	1,318	16,984	30,107	48,409
Aug 2009	924	30,974	19,459	51,357
May 2010	1,047	15,091	33,434	49,572
Sept 2010	1,106	15,372	32,722	49,200
Jan 2011	708	4,656	40, 637	46,001
Mar 2012	791	10,676	36,459	47,926
Oct 2013	571	8,020	36,045	44,636
April 2015	372	13,350	28,245	41,967
Jan 2016	360	22,170	21,407	43,937
Average	**793**	**14,965**	**26,793**	**46,615**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan * Standard X-Zone Policies ** Preferred Risk Policies

Table F-31 indicates that as of January 31, 2016, the City of Sacramento had 43,937 active flood insurance policies in force with total premiums of more than $20 million. These active polices represent more than $14 billion of insurance in place covering both structure and contents. Historically, the City has had 967 claims paid against the NFIP totaling $9.9 million in paid losses.

Table F-31 Flood Insurance Policies by Occupancy (Data as of 01/31/2016)

Property Type	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
Single Family	37,691	$16,291,601	$12,278,053,400	799	$7,237,612.26	$332,146.93
2-4 Family	1,474	$606,999	$430,073,500	73	$533,676.99	$29,085.00
All Other Residential	3,662	$1,644,288	$1,053,055,600	32	$385,040.51	$16,950.26
Non Residential	1,110	$2,191,166	$593,896,000	63	$1,749,978.23	$57,185.26
Total	**43,937**	**$20,734,054**	**$14,355,078,500**	**967**	**$9,906,306.00**	**$435,366.00**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan

Table F-32 presents the number of insurance policies in force, as of January 1, 2016, by occupancy type in relation to condominiums.

Table F-32 Flood Insurance Policies by Occupancy (Data as of 01/31/2016)

Property Type	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
Condo	3,391	$1,332,563	$733,995,500	28	$210,664.78	$11,403.89
Non Condo	40,546	$19,401,491	$13,621,083,000	939	$9,695,643.20	$423,963.56
Total	**43,937**	**$20,734,054**	**$14,355,078,500**	**967**	**$9,906,307.00**	**$435,366.00**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan

Table F-33 indicates the number of flood insurance policies by flood zone as of January 31, 2016. The total number of flood insurance policies in the A, AE, AH and AO-zones decreased by 12 from 372 in April 2015 to 360 in January of 2016. The number of flood insurance policies in the A99, AR, and Standard X increased from 13,350 in April of 2015 to 22,170 in January of 2016. The total number of flood insurance policies dropped in the B, C and X-zones from 28,245 to 21,407, a net decrease of 6,838 policies or 24.2%. The total number of flood insurance policies in the City decreased from 2015 to 2016. In April 2015, the City had 41,967 flood insurance policies in force and in January of 2016 the total policies in force increased to 43,937 or 4.69%.

Table F-33 Flood Insurance Policies by Flood Zone (Data as of 01/31/2016)

Property Type	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	209	$300,475	$46,734,900	37	$465,140.87	$18,539.98
A Zones	9	$20,500	$2,736,500	21	$239,984.28	$9,972.87
AO Zones	43	$29,374	$9,776,600	16	$255,574.76	$7,775.00
AH Zones	99	$77,150	$21,666,400	14	$186,562.71	$6,975.00
AR Zones	152	$161,180	$35,614,900	15	$376,173.26	$14,557.02
A99 Zones	1,641	$1,556,635	$350,476,700	715	$6,265,285.28	$300,944.93
B, C & X Zones						
Standard	20,377	$9,610,229	$6,700,808,500	115	$1,764,167.91	$55,762.65
Preferred	21,407	$8,978,511	$12,122,796,000	27	$324,467.81	$17,800.00
Total	**43,937**	**$20,734,054**	**$14,355,078,500**	**960**	**$9,854,918.00**	**$432,324.00**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan

As of January 31, 2016, the City of Sacramento had 14,768 pre-FIRM flood insurance policies in force as shown in Table F-34 These pre-FIRM policies in the AE, A, and AH zones have the potential to be affected by rate increases through the Biggert-Waters Flood Insurance Reform Act of 2012 and the Homeowner's Flood Insurance Affordability Act of 2014. The City does not have any AO or AR zone currently.

Table F-34 Pre-FIRM Flood Insurance Policies by Zone (Data as of 01/31/2016)

Property Use	Policies in Force	Premium	Insurance in Force	# of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	147	$249,203	$26,677,500	30	$413,959.08	$15,789.98
A Zones	7	$19,313	$1,986,500	20	$235,967.81	$9,622.87
AO Zones	31	$21,214	$7,075,900	7	$24,882.14	$2,300.00
AH Zones	58	$47,395	$11,846,600	3	$19,019.64	$1,275.00
AR Zones	66	$73,591	$14,424,200	11	$369,349.34	$13,802.02

Property Use	Policies in Force	Premium	Insurance in Force	# of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A99 Zones	658	$670,171	$139,093,600	500	$3,298,247.38	$193,500.69
B, C & X Zones	13,801	$5,714,882	$4,561,985,200	111	$1,691,090.71	$58,807.65
Standard	1,582	$831,287	$494,537,200	91	$1,492,497.04	$45,252.65
Preferred	12,219	$4,883,595	$4,766,089,500	20	$198,116.67	$13,555.00
Total	**14,768**	**$6,795,769**	**$4,766,089,500**	**681**	**$6,052,243.00**	**$294,375.00**

Source: 2016 City of Sacramento Comprehensive Flood Management Plan

Table F-35 shows there were 29,169 post-FIRM flood insurance policies as of January 31, 2016; 18,795 were Standard Flood Insurance Policies and just over 9,188 were PRP.

Table F-35 Post-FIRM Flood Insurance Policies by Zone (Data as of 01/31/2016)

	Policies in Force	Premium	Insurance in Force	# of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	62	$51,272	$17,057,400	7	$51,181.79	$2,750.00
A Zones	2	$1,187	$750,000	1	$4,286.47	$350.00
AO Zones	12	$8,160	$2,700,700	9	$230,692.62	$5,475.00
AH Zones	41	$29,755	$9,819,800	11	$167,543.07	$5,700.00
AR Zones	86	$87,589	$21,190,700	4	$6,823.92	$1,475.00
A99 Zones	983	$886,464	$211,383,100	215	$2,967,037.90	$107,444.24
B, C & X Zones	27,983	$12,873,858	$9,326,087,300	33	$415,563.65	$16,705.00
Standard	18,795	$8,778,942	$6,206,271,300	24	$271,193.87	$10,510.00
Preferred	9,188	$4,094,916	$3,119,816,000	9	$144,369.78	$6,195.00
Total	**29,169**	**$13,938,285**	**$9,588,989,000**	**280**	**$3,843,125.00**	**$139,899.00**

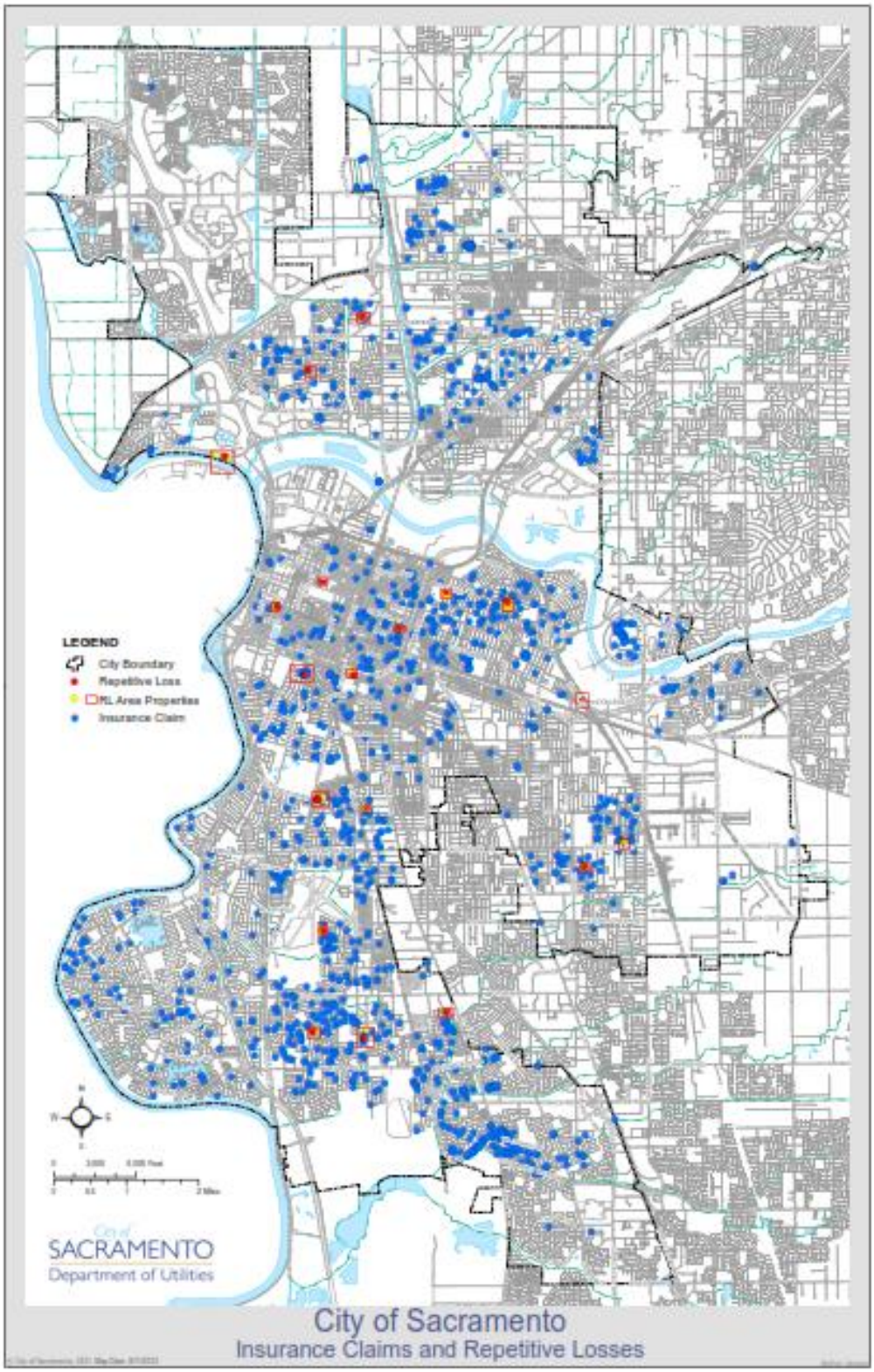
Source: 2016 City of Sacramento Comprehensive Flood Management Plan

Many factors change the number of flood insurance policies in the City. In 2015, the City saw a drop in the number of A99 policies in Pre-FIRM and Post-FIRM policies because over 3,000 residents were removed from the A99 Zone on May 12, 2014 in South Sacramento. Hopefully, the City will see an increase in PRP policies as residents convert in this area over the next few years. On another note, Natomas was remapped from an AE to A99 zone in June 2015, so the City expects to see an increase in A99 policies in the first part of 2016. Also, the numbers may conflict in the table above because Natomas residents have been in multiple subsidized programs since 2008 – Preferred Risk Policy Eligibility Extension and Properties Newly Mapped. Also, the numbers may conflict in the table above because the Natomas Basin was remapped from X to AE zone in 2008 and from AE to A99 zone in 2015 and has been in multiple subsidized programs since 2008 - Preferred Risk Policy Eligibility Extension, Properties Newly Mapped, and now PRP.

Repetitive Loss Analysis

NFIP data further indicates that there are 21 repetitive loss (RL) buildings, with 5 RL buildings being insured. There have been a total of 49 RL losses, with 10 insured RL losses. None of the insured RL buildings has incurred 4 or more losses. 18 of the properties are located in the A zone, and 3 RL buildings are located outside of the 100- and 500-year floodplain in the B, C, or X zones. The RL properties are located throughout the city. Repetitive flooding is generally a result of a combination of poor drainage and homes below the street elevation. Drainage improvements in the area have alleviated some of the flooding issues to these RL structures over the years. Citizens are required to have flood insurance in an A zone if they have a federally backed mortgage. Repetitive loss properties are shown in Figure F-21 and detailed in Table F-36. A detailed repetitive loss area analyses of the City's repetitive loss properties is located in the City's Comprehensive Flood Management Plan.

Figure F-21 Unmitigated Repetitive Loss Areas



Source: City of Sacramento, 2016 Comprehensive Flood Management Plan

Table F-36 Repetitive Loss Property Information (as of 2009)

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
14th St	01/10/1995 09/19/2004	$4,402.03 $1,582.67	$0.00 $0.00	X(s)	Investigated in 2008. Flooding from backed up combined system. Water came up to top step and flooded the resident's garage and basement.	Combined system	–
20th Av	01/10/1995 02/07/1996 01/22/1997	$10,792.02 $1,530.54 $21,271.07	$0.00 $0.00 $0.00	X(s)	These three addresses are individual structures within the same apartment complex, but on 3 separate flood policies. Property in low lying area with an undersized drainage conveyance system. Combined mailing	Leonardo Divinci basin was constucted in 2008 in Basin 26, but it is too far away from these properties to have a significant impact. Future projects with Land Park have been verbally discussed.	–
20th Av	01/10/1995 01/22/1997	$11,657.56 $20,903.32	$0.00 $0.00	–	–	–	–
20th Av	01/10/1995 01/22/1997	$5,169.30 $16,734.55	$0.00 $0.00	–	–	–	–
20th Av	03/25/1989 01/12/1990 01/13/1993 01/09/1995 02/20/1996 01/22/1997	$423(B/C?) $1,228(B/C?) $5,052.24 $7,566.43 $2,575.04 $7,838.39	$0.00 $0.00 $0.00 $0.00 $0.00 $0.00	X(s)	Property in low lying area with an undersized drainage conveyance system.	Drainage study is being conducted to determine a location for a drainage basin to reduce the flooding in the area.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
21st St	01/10/95 01/26/97 9/19/2004	$24,938.03 $9,441.28 $26,963.58	$0.00 $0.00 $0.00	X(s)	Property located in the Combined Sewer System with an undersized drainage conveyance system.	Combined sewer main in the area was increased from a 12" to a 24" main in late 1997.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
21st Av	01/10/1995 03/11/1995	$2,878.36 $5,161.85	$0.00 $0.00	X(s)	According to owner structure has never flooded. Owner has installed a sump pump in a low area in the backyard to drain storm water away from residence in the rear.	Need pictures of sump pump	Flood Protection Provided - Reported 2007
24th St	02/23/2000 12/31/2005	$7,707.72 $80,632.86	$0.00 $0.00	X(s)	Property has been assessed using Lidar data and flooding source has been found.	In process.	In process.
36th St	01/09/95 01/22/97	$1,157.89 $1,926.32	$0.00 $0.00	X	Property located in the Combined Sewer System. Flooding caused by clogged storm drains and street flooding in the area.	Older street drain inlet in front of property replaced with current larger standard drain inlet as part of the McKinley sewer construction project in 2006 .	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
37th Av	01/10/1995 01/22/1997 12/31/2005	$2,167.18 $1,670.55 $5,291.95	$1,850.00 $0.00 $0.00	X(s)	Flooding from adjacent vacant lot behind property.	Basin 96 Master Plan and pipe upsizing completed. A detention basin is still needed.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
45th St	04/08/95 02/04/98	$4,411.79 $4,159.33	$0.00 $0.00	X	Property in low lying area of Basin 10 with an undersized drainage conveyance system	Basin 10 Drainage Master Plan completed. Currently determining projects to reduce flooding in the area.	–
48th Av	01/25/1997 12/23/2004	$15,391.57 $10,672.22	$0.00 $0.00	X(s)	Property has a drain in front, but is elevated way above the street. Looks like a partial new roof.	Flood source has been determined. Drainage improvements are being assessed.	–
68th Av	01/10/95 02/26/00	$4,164.52 $2,814.97	$0.00 $0.00	X(s)	Flood sources has been recently identified.	Drainage basin is currently being studied to develop a plan to reduce flooding in the area.	–
Alcedo Cr	01/10/95 01/27/95	$1,911.80 $5,661.33	$0.00 $0.00	X	Source of flooding is unknown. Lowest floor of the structure appears to be higher than adjacent structures that have not flooded.	Need to investigate further.	–
Arabella Wy	03/23/1995 01/04/1997	$3,556.23 $3,634.90	$0.00 $0.00	X(s)	Property adjacent to the Sac. River levee. Flooding of house from levee seepage.	USACE & SAFCA did levee work in this area. The work was completed at the end of 2006.	Flood Protection Provided - Reported 2007. Documentation provided in 2009.

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Berthoud St	01/13/93 01/10/95	$1,465.21 $7,777.06	$0.00 $480.55	X(s)	Higher adjacent lot was draining onto subject property.	Drainage ditch was constructed on adjacent lot to divert drainage to Norwood Avenue. Older street drain inlets replaced with current larger standard drain inlets. SEE 1996 MEMO. School was built across the street.	Flood Protection Provided - Reported 2007 - Report in 2011 that ditch was built for this house and 329.
Berthoud St	1/13/93 1/9/95	$2,583.22 $5,278.40	$0.00 $0.00	X(s)	Higher adjacent lot was draining onto subject property.	Berthoud Street Drainage Extension was completed in 2005. Stormwater diversion pipeline basin was installed.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Binghamton Dr	1/10/1995 1/24/2010	$3,177.02 $2,590.42	$0.00 $0.00	X(s)	Water seeps through landscaping into sunken living room and gets the carpet wet.	Need to elevate living room.	–
E Curtis Dr	01/10/1995 01/26/1997	$17,370.04 $2,663.91	$0.00 $595.40	X(s)	Basement flooding. Flooding caused by clogged storm drains and street flooding in the area.	Older street drain inlet in front of property replaced with current larger standard drain inlet. Very low spot - Sump 4 pumps this ara in a circle. Once the Curtis Park Regional Storage Project is constructed, this property can be taken out.	Flood Protection Provided - Reported 2007, but documentation not submitted in 2009.

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Custis Av	01/10/1995 01/22/1997	$1,261.74 $8,058.51	01/10/1995 01/22/1997	X(s)	Lot lower than adjacent lots. Drainage from adjacent lots was going into garage which was converted to living quarters.	Garage portion of structure will be raised with HUD Grant funds. Elevation of structure expected to completed in November 2001.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Elvas Av	02/18/1986 06/04/1993 01/22/1997	$13,179.30 $12,556.61 $38,718.83	02/18/1986 06/04/1993 01/22/1997	X(s)	These three addresses are individual structures within the same apartment complex, but on 3 separate flood policies. Property in low lying area with an undersized drainage conveyance system. Combined mailing	Leonardo Divinci basin was constucted in 2008 in Basin 26, but it is too far away from these properties to have a significant impact. Future projects with Land Park have been verbally discussed.	–
Folsom Blvd	01/04/1998 01/15/1990	–	01/04/1998 01/15/1990		–	–	–
Folsom Blvd Unit 9c	02/12/2000 09/19/2004	–	02/12/2000 09/19/2004		–	–	–
Frienza Av	01/04/82 01/13/83	$1,002.46 $3,594.28	01/04/82 01/13/83	X(s)	Property in low lying area with an undersized drainage conveyance system.	Drainage study is being conducted to determine a location for a drainage basin to reduce the flooding in the area.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Garden Hwy	01/09/95 01/01/97	$6,100.00 $7,594.96	01/09/95 01/01/97	X(s)	Property located in the Combined Sewer System with an undersized drainage conveyance system.	Combined sewer main in the area was increased from a 12" to a 24" main in late 1997.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Henrietta Dr	01/12/1993 01/10/1995 01/25/1997	$8,660.85 $6,272.51 $3,292.51	$0.00 $0.00 $0.00	X(s)	According to owner structure has never flooded. Owner has installed a sump pump in a low area in the backyard to drain storm water away from residence in the rear.	Need pictures of sump pump	Flood Protection Provided - Reported 2007
Henrietta Dr	01/10/1995 01/22/1997	$19,725.94 $13,741.60	$0.00 $0.00	X(s)	Need to investigate!	–	–
K St, Suite 1517	01/09/1995 01/01/1997	$5,195.74 $9,535.42	$0.00 $0.00	X	Property located in the Combined Sewer System. Flooding caused by clogged storm drains and street flooding in the area.	Older street drain inlet in front of property replaced with current larger standard drain inlet as part of the McKinley sewer construction project in 2006 .	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Johns Dr	01/13/1993 01/11/1995 01/03/1997	$2,489.90 $1,977.43 $2,427.86	$0.00 $0.00 $0.00	X(s)	Flooding from adjacent vacant lot behind property.	Basin 96 Master Plan and pipe upsizing completed. A detention basin is still needed.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
La Almendra Wy (Srl)	01/10/1995 01/27/1997	$29,693.68 $48,733.49	$0.00 $0.00	X	Property in low lying area of Basin 10 with an undersized drainage conveyance system	Basin 10 Drainage Master Plan completed. Currently determining projects to reduce flooding in the area.	–
La Almendra Wy	01/10/1995 01/22/1997	$29,662.06 $26,811.07	$0.00 $22,679.58	X(s)	Property has a drain in front, but is elevated way above the street. Looks like a partial new roof.	Need to investigated flood source further	–
Las Palmas Av (Srl)	01/13/93 01/20/93 01/09/95 01/22/97 02/06/98 01/24/00	$1,336.55 $8,891.96 $28,803.57 $19,291.63 $10,068.13 $4,898.80	$0 $1,776.88 $5,637.45 $11,972.96 $2,750.00 $0	X(s)	Source of flooding is unknown. Property is on the highest portion of the street. No reported flooding of adjacent properties which are lower.	Drainage basin is currently being studied to develop a plan to reduce flooding in the area.	–
Las Palmas Av	01/09/95 01/26/97	$11,395.87 $7,497.82	$0.00 $0.00	A99	Source of flooding is unknown. Lowest floor of the structure appears to be higher than adjacent structures that have not flooded.	Need to investigate further.	–
Manacor Dr	12/28/1996 01/28/1997 12/30/2005	$2,198.26 $2,581.42 $2,606.40	$0.00 $0.00 $1,985.00	X(s)	Property adjacent to the Sac. River levee. Flooding of house from levee seepage.	USACE & SAFCA did levee work in this area. The work was completed at the end of 2006.	Flood Protection Provided - Reported 2007. Documentation provided in 2009.

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
N St	01/10/1995 01/25/1997 09/19/2004	$5,588.09 $1,344.59 $8,884.87	$0.00 $0.00 $0.00	X(s)	Higher adjacent lot was draining onto subject property.	Drainage ditch was constructed on adjacent lot to divert drainage to Norwood Avenue. Older street drain inlets replaced with current larger standard drain inlets. SEE 1996 MEMO. School was built across the street.	Flood Protection Provided - Reported 2007 - Report in 2011 that ditch was built for this house and 329.
N St	01/09/1995 09/19/2004	$3,302.60 $8,948.96	$0.00 $0.00	X(s)	Higher adjacent lot was draining onto subject property.	Berthoud Street Drainage Extension was completed in 2005. Stormwater diversion pipeline basin was installed.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Norwood Av	1/10/1995 1/22/1997 2/2/1998	$10,000.76 $4,440.26 $2,951.82	$0.00 $1,528.55 $246.50	X(s)	Water seeps through landscaping into sunken living room and gets the carpet wet.	Need to elevate living room.	–
Oak Nob Wy	01/05/97 02/04/98	$8,005.41 $3,797.03	$0.00 $2,030.00	X(s)	Basement flooding. Flooding caused by clogged storm drains and street flooding in the area.	Older street drain inlet in front of property replaced with current larger standard drain inlet. Very low spot - Sump 4 pumps this ara in a circle. Once the Curtis Park Regional Storage Project is constructed, this property can be taken out.	Flood Protection Provided - Reported 2007, but documentation not submitted in 2009.

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Ortega St	01/14/1995 01/25/1997	$1,321.05 $1,692.08	$0.00 $0.00	X(s)	Lot lower than adjacent lots. Drainage from adjacent lots was going into garage which was converted to living quarters.	Garage portion of structure will be raised with HUD Grant funds. Elevation of structure expected to completed in November 2001.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Ortega St	01/09/95 01/25/97	$3,485.33 $5,333.80	$0.00 $0.00	X(s)	These three addresses are individual structures within the same apartment complex, but on 3 separate flood policies. Property in low lying area with an undersized drainage conveyance system. Combined mailing	Leonardo Divinci basin was constucted in 2008 in Basin 26, but it is too far away from these properties to have a significant impact. Future projects with Land Park have been verbally discussed.	–
Park Wy	01/10/1995 12/21/1996 01/22/1997	$2,186.10 $2,195.02 $13,779.28	$0.00 $0.00 $0.00		–	–	–
Priscilla Ln	03/02/95 01/25/97 09/19/2004	$0.00 $903.00 $5,716.00	40,161.00 9,474.00 26,909.64		–	–	–
Q St	1/10/1995 1/22/97			X(s)	Property in low lying area with an undersized drainage conveyance system.	Drainage study is being conducted to determine a location for a drainage basin to reduce the flooding in the area.	–

Street	Dates of Losses	Building Payment	Contents Payment	Flood Zone (2009)	Investigation of Flooding	Status of Drainage Improvements Provided to Reduce Flooding	Submitted to FEMA/ Changes Requested
Rio Linda Blvd	01/10/1995 01/22/1997	$2,186.10 $13,779.28	$0.00 $0.00	X(s)	Property located in the Combined Sewer System with an undersized drainage conveyance system.	Combined sewer main in the area was increased from a 12" to a 24" main in late 1997.	Flood Protection Provided - Reported 2007. Documentation provided to FEMA in August 2009.
Ventura St	01/14/1995 01/25/1997	$1,321.05 $1,692.08	$0.00 $0.00	X(s)	According to owner structure has never flooded. Owner has installed a sump pump in a low area in the backyard to drain storm water away from residence in the rear.	Need pictures of sump pump	Flood Protection Provided - Reported 2007

Source: City of Sacramento

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for Sacramento. According to this analysis, there is a total population of 63,970 and 35,794 residents of the City at risk to flooding in the 1% and 0.2% annual chance floodplains, respectively. This is shown in Table F-37.

Table F-37 City of Sacramento – Count of Improved Residential Parcels and Population by Flood Zone

Flood Zone	Improved Residential Parcels	Population*
1% Annual Chance	24,416	63,970
Shaded X (0.2% Annual Chance)*	13,622	35,794

Source: FEMA DFIRM June 16, 2015, Sacramento County 2016 Parcel/2015 Assessor's Data, US Census Bureau

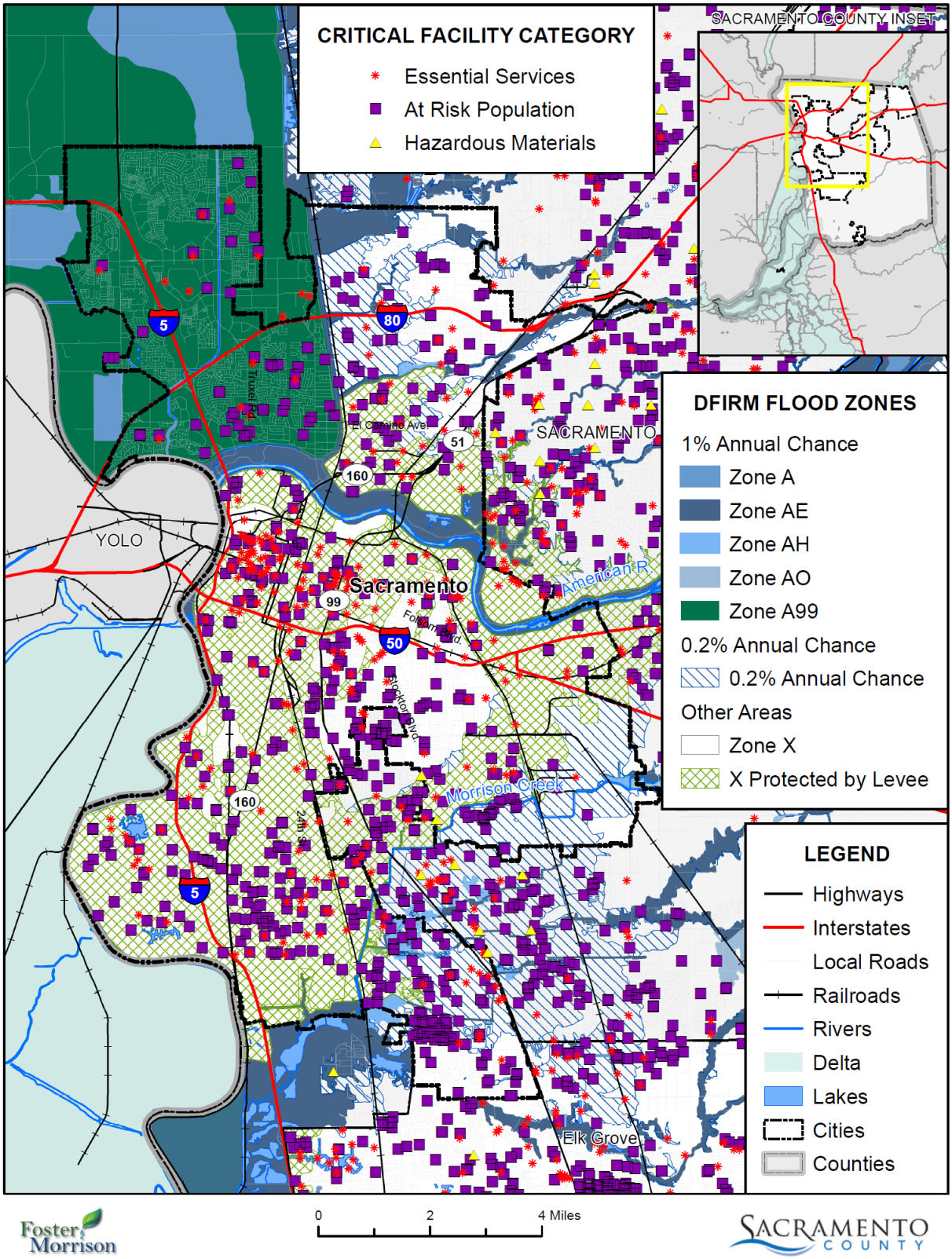
* Average household populations from the 2010 US Census were used: Sacramento– 2.62.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Sacramento in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersects a DFIRM flood hazard areas, and if so, which zone it intersects. Details of critical facilities in the floodplain in the City of Sacramento are shown in Figure F-22 and Table F-38. As shown on the table and figure, Sacramento has 84 critical facilities located in 1% annual chance and 128 critical facilities in the 0.2% annual chance DFIRM flood zones. None of these critical facilities are located in an A Zone. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure F-22 City of Sacramento – Critical Facilities and Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table F-38 City of Sacramento– Critical Facilities and Flood Zones

Critical Facility Category	Facility Type	Facility Count
1% Annual Chance		
A99		
Essential Services Facilities	Arena	1
	Emergency Evacuation Shelter	10
	Fire Station	2
	Total	**13**
At Risk Population Facilities	Adult Residential	7
	Alternative Education School	1
	Charter School	3
	Day Care Center	19
	Group Home	1
	Hotel	2
	Private Elementary School	2
	Public Continuation High School	1
	Public Elementary School	10
	Public High School	2
	Public Middle School	3
	Residential Care/Elderly	6
	School-Age Day Care Center	8
	Total	**65**
	A99 Total	**78**
AE		
Essential Services Facilities	Medical Health Facility	1
	Total	**1**
	AE Total	**1**
AH		
Essential Services Facilities	Emergency Evacuation Shelter	1
	Total	**1**
At Risk Population Facilities	Adult Residential	2
	Residential Care/Elderly	1
	School-Age Day Care Center	1
	Total	**4**
	Zone AH Total	**5**
1% Annual Chance Total		**84**

Critical Facility Category	Facility Type	Facility Count
0.2% ANNUAL CHANCE		
Essential Services Facilities	Bus Terminal	1
	Emergency Evacuation Shelter	5
	Fire Station	2
	General Acute Care Hospital	2
	Government Facilities	2
	Medical Health Facility	9
	Police	1
	Total	**22**
At Risk Population Facilities	Adult Day Care	1
	Adult Residential	35
	Alternative Education School	1
	Charter School	2
	College/University	1
	Day Care Center	22
	Group Home	2
	Infant Center	1
	Private Elementary School	3
	Private K-12 School	1
	Public Continuation High School	1
	Public Elementary School	12
	Public High School	1
	Public Middle School	2
	Residential Care/Elderly	16
	School-Age Day Care Center	4
	Total	**105**
Hazardous Materials Facilities	Oil Collection Center	1
	Total	**1**
0.2% Annual Chance Total*		**128**
Zone X		
Essential Services Facilities	Bus Terminal	1
	Emergency Evacuation Shelter	12
	Fire Station	1
	General Acute Care Hospital	2
	Government Facilities	9
	Light Rail Stop	13
	Medical Health Facility	17

Critical Facility Category	Facility Type	Facility Count
	Police	1
	Train Station	1
	Water Treatment Plant	1
	Total	**58**
At Risk Population Facilities	Adult Day Care	2
	Adult Residential	27
	Assisted Living Centers	1
	Charter School	5
	Children's Home	2
	College/University	1
	Community Day School	2
	Day Care Center	29
	Group Home	4
	Hotel	3
	Infant Center	4
	JAIL	1
	Private Elementary School	4
	Private High School	3
	Private K-12 School	5
	Public Continuation High School	2
	Public Elementary School	17
	Public High School	4
	Residential Care/Elderly	9
	School-Age Day Care Center	11
	Social Rehabilitation Facility	1
	Total	**137**
Hazardous Materials Facilities	Oil Collection Center	1
	Total	**1**
X Total		**196**
X Protected by Levee		
Essential Services Facilities	Airport	1
	Bus Terminal	4
	Convention Center	1
	Emergency Evacuation Shelter	48
	Fire Station	16
	General Acute Care Hospital	2
	Government Facilities	18

Critical Facility Category	Facility Type	Facility Count
	Light Rail Stop	23
	Medical Health Facility	70
	Police	1
	Stadium	2
	Water Treatment Plant	1
	Total	**187**
At Risk Population Facilities	Adult Day Care	8
	Adult Education School	4
	Adult Residential	48
	Charter School	4
	College/University	2
	Community Day School	2
	Day Care Center	88
	Group Home	12
	Hotel	12
	Independent Study School	1
	Infant Center	9
	Private Elementary School	9
	Private High School	4
	Private K-12 School	3
	Public Elementary School	44
	Public High School	4
	Public Middle School	8
	Residential Care/Elderly	38
	School-Age Day Care Center	17
	Total	**317**
Hazardous Materials Facilities	Oil Collection Center	1
	Total	**1**
X Protected by Levee Total		**505**
Grand Total		**913**

Source: FEMA DFIRM June 16, 2015, Sacramento County GIS

*This count only includes those critical facilities in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all critical facilities in the 1% annual chance floodplain.

Natural Resources at Risk

The City Planning Team noted that many of the City's natural resources are protected by levees, however if there was a greater than 1%-annual-chance storm event (100-year storm), or other event that results in a breach of City levees, the City's natural resources will be at risk.

Historic and Cultural Resources at Risk

The City Planning Team noted that the historical and cultural resources are protected by levees, however if there was a greater than 1%-annual-chance storm event (100-year storm) or other event that results in a breach of City levees, the City's historic and cultural resources will be at risk.

Overall Community Impact

Floods and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the City during specific times. Based on the risk assessment, it is evident that floods will continue to have potentially devastating economic impacts to certain areas of the City. However, many of the floods in the City are minor, localized flood events that are more of a nuisance than a disaster. Impacts that are not quantified, but can be anticipated in large future events, include:

- Commercial and residential structural and property damage;
- Costs incurred due to post-flood clean up and repair of buildings and infrastructure;
- Damage to roads/bridges resulting in loss of mobility;
- Decreased revenue due to loss of income, sales, tourism, and property taxes;
- Deterioration of homes and neighborhoods as floods recur;
- Disruption of and damage to public infrastructure and services;
- Health hazards associated with mold and mildew, contamination of drinking water, etc.;
- Impact on the overall mental health of the community;
- Injury and loss of life, including first responders rescuing those who did not evacuate or are stranded;
- Loss of historical or unique artifacts;
- Loss of jobs due to businesses closing or cutting back on operating hours;
- Loss of programs or services that are cut to pay for flood recovery;
- Mental health and family impacts, including increased occurrence of suicides and divorce
- Negative impact on commercial and residential property values;
- Significant disruption to students and teachers as temporary facilities and relocations would likely be needed; and
- Significant economic impact (jobs, sales, tax revenue) to the community.

Future Development and Future Flood Conditions

This section provides an analysis of the flood hazard and proposed future development within the City based on FEMA DFIRMs and also discusses considerations in evaluating future flooding conditions.

Future Development: General Considerations

Communities that participate in the NFIP adopt regulations and codes that govern development in special flood hazard areas, and enforce those requirements through their local floodplain management ordinances

through the issuance of permits. The City of Sacramento's floodplain management ordinance provides standards for development, subdivision of land, construction of buildings, and improvements and repairs to buildings that meet or exceed the minimum requirements of the NFIP.

The International Residential Code (IRC) and International Building Code (IBC), by reference to ASCE 24, include requirements that govern the design and construction of buildings and structures in flood hazard areas. FEMA has determined that the flood provisions of the I-Codes are consistent with the requirements of the NFIP (the I-Code requirements shown either meet or exceed NFIP requirements). ASCE 24, a design standard developed by the American Society of Civil Engineers, expands on the minimum NFIP requirements with more specificity, additional requirements, and some limitations.

With the adoption of the 2015 International Code, communities will be moving towards a more stringent approach to regulatory floodplain management. The adoption and enforcement of disaster-resistant building codes is a core community action to promote effective mitigation. When communities ensure that new buildings and infrastructure are designed and constructed in accordance with national building codes and construction standards, they significantly increase local resilience now and in the future. With continued advancements in building codes, local ordinances should be reviewed and updated to meet and exceed standards as practicable to protect new development from future flood events and to further promote disaster resiliency.

Master planning will also be necessary to assure that open channel flood flow conveyances serving the smaller internal streams and drainage areas are adequately prepared to accommodate the flows. Preservation and maintenance of natural and riparian areas should also be an ongoing priority to realize the flood control benefits of the natural and beneficial functions of these areas. Also to be considered in reducing flooding in areas of existing and future development is to promote implementation of stormwater program elements and erosion and sediment controls, including the clearing of vegetation from natural and man-made drains that are critical to flood protection. Both native and invasive species can clog drains, and reduce flows of floodwaters, which slow that natural drainage process and can exacerbate flooding.

One of the most effective ways to reduce vulnerability to potential flood damage is through careful land use planning that fully considers applicable flood management information and practices. California's 2007 flood legislation (Senate Bill 5) directly linked system-wide flood management planning to local land use planning, requiring local jurisdictions to demonstrate an urban level of flood protection before approving new development in urban and urbanizing areas. "Urban level of flood protection" means the level of protection necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year (California Government Code Section 65007). DWR has been developing criteria to guide local jurisdiction compliance with the new requirements. In addition to developing criteria to help local jurisdictions in their land use planning, DWR is preparing criteria for use in the design of levees protecting urban and urbanizing areas. DWR is also working with local partners to develop guidance related to nonurban flood protection levels.

As of July 2, 2016 these standards became effective, and cities and counties within the Sacramento-San Joaquin Valley cannot enter into development agreements or issue a permit to construct a new structure in areas located within a flood hazard zone unless the following is established:

- Find that existing facilities protect urban and urbanizing areas to a 1-in 200 chance of flooding in any given year or the FEMA standard of flood protection in non-urbanized areas, or
- Find that the local flood management agency has made adequate progress on the construction of the flood protection system to provide the required level of protection, or
- Impose conditions on the development agreement that will provide the required level of protection.

City of Sacramento SB 5 Compliance

Senate Bills (SB) 5 and 17 and Assembly Bills (AB) 5, 70, 156, and 162 (Legislation) were signed into law in 2007 to address flood problems. As part of this Legislation, DWR was required to develop a Central Valley Flood Protection Plan (CVFPP). The CVFPP was adopted in 2012 and will be updated every 5 years. In 2012, SB1278 and AB1965 were enacted, revising provisions related to planning and zoning for flood protection.

The City will be required to make findings related to an urban level of flood protection (200-year) as stipulated in California Government Code Sections 65865.5, 65962, and 66474.5, using criteria consistent with, or developed by DWR. DWR has developed draft criteria, *Urban Level of Flood Protection* (ULOP) (November 2013).

The ULOP requires a minimum urban level of 200-year flood protection before a community can issue a building permit or approve a parcel map. This requirement affects areas in the Sacramento-San Joaquin Valley where flood depths are anticipated to exceed three feet and are in a watershed greater than 10 square miles for the 200-year flood event. If a ULOP plan is in place to reach 200-year flood protection and adequate progress is shown annually, then these requirements can be delayed until 2025. SAFCA will have a ULOP plan by the July deadline.

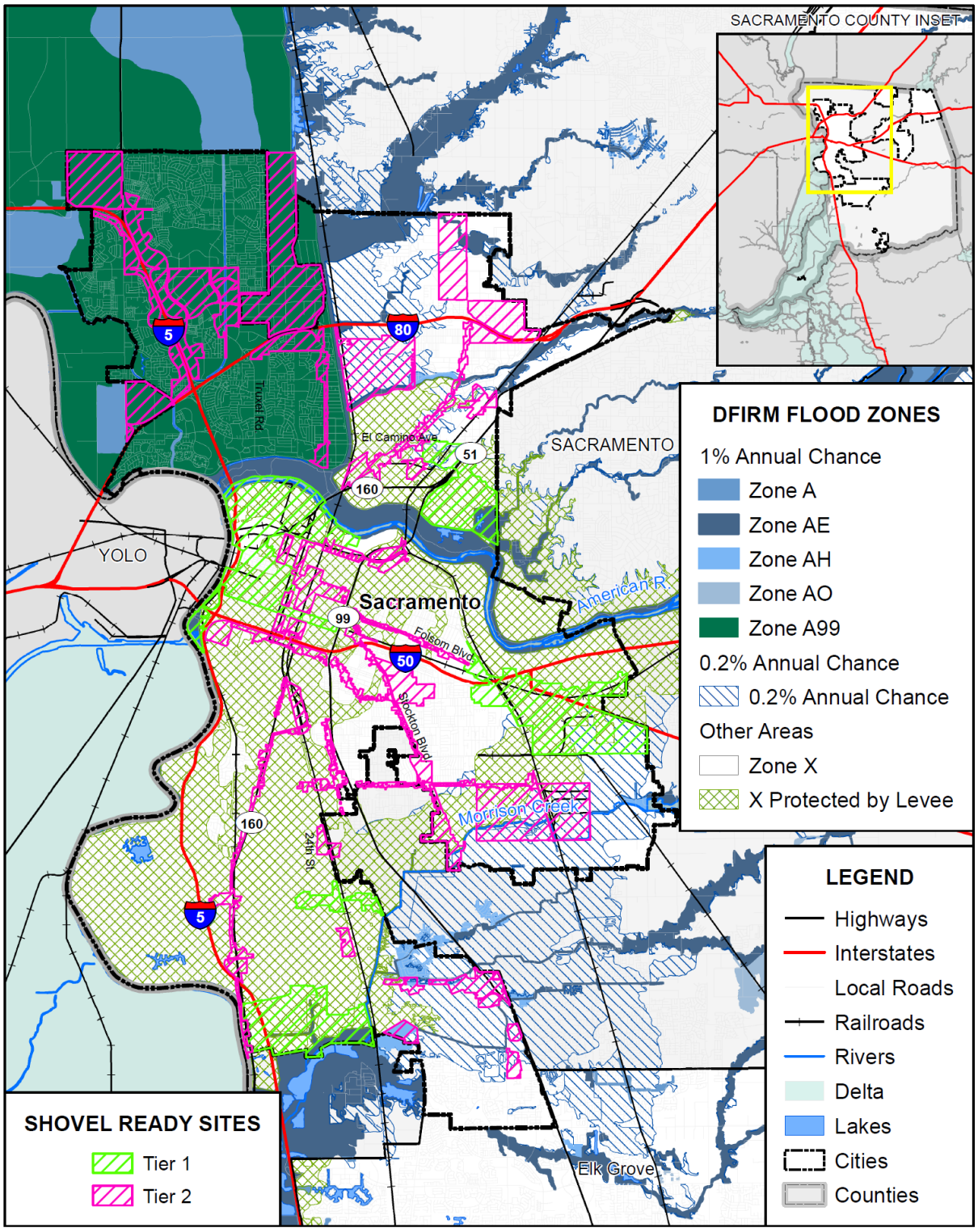
Many areas of the City that are in watersheds greater than 10 square miles and exceed three feet in depth will not be covered by the ULOP plan. The 200-year floodplain in these areas were mapped and will be utilized for development purposes.

The City enforces the floodplain ordinance. If any development is to occur in the FEMA 100-year flood hazard area or the 200-year flood hazard area not covered by the ULOP plan, it will have to conform to the elevation or floodproofing standards of the floodplain ordinance.

Future Development: DFIRM Analysis

Hazard analysis was performed to determine the number of parcels in the FEMA DFIRM flood zones within the Opportunity Areas. Results can serve as a vulnerability analysis guide for future development. Figure F-23 shows the Opportunity Areas overlaid on the DFIRM flood zones. Table F-39 shows results of the parcel hazard analysis, sorted by Opportunity Area tier and type. There are 1,868 and 3,464 parcels in the 1% and 0.2% annual chance DFIRM flood zones, respectively.

Figure F-23 City of Sacramento – Future Development in DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table F-39 City of Sacramento – Future Development in DFIRM Flood Zones

Type	1% Annual Chance		0.2% Annual Chance	
	Parcel Count	Acres	Parcel Count	Acres
Tier 1				
Centers	55	263	59	31
Corridors	0	0	0	0
Neighborhoods	0	0	0	0
New Growth Areas	13	222	0	0
Transit Center	0	0	45	346
Tier 1 Total	**68**	**485**	**104**	**377**
Tier 2				
Centers	1,179	1,353	25	391
Corridors	226	360	440	318
Neighborhoods	72	108	2,815	903
New Growth Areas	320	2,250	0	0
Transit Center	3	53	80	74
2 Total	**1,800**	**4,124**	**3,360**	**1,686**
Grand Total	**1,868**	**4,609**	3,464	2,063

Source: FEMA June 16, 2015 DFIRM, City of Sacramento GIS

Future Flooding Conditions

The flood risk assessment included a detailed analysis of historic and existing conditions through documentation of past occurrences and various mapping efforts conducted by multiple agencies, as well as an evaluation of areas likely to flood in the future/future flooding conditions. Future flooding conditions were considered by the City for this assessment using a variety of tools:

- The new FEMA DFIRMs (6/16/2015) and updated FIS provide information on the updated 1% and 0.2% annual chance floods and X-protected by levee areas based on the latest studies and considering recent growth and development in the City as well as recent and ongoing improvements to the area's flood control system. This new mapping is a representation of areas subject to major floods in the future and is used for regulatory and future planning and development purposes.
- Local Flood Mapping prepared by the City of Sacramento Department of Utilities. These maps have local floodplains identified throughout the City that are based on high water data, local hydrologic and hydraulic studies, and other reports of flooding.
- The City also maintains a separate database and mapping effort of all RL and historical loss properties in the City. This RL/historical loss analysis is also used to identify areas likely to flood in the future and to assist with the development of mitigation measures to mitigate future flood damage to these areas. This information and analysis is included in the City of Sacramento's updated 2015 RLAA Reports, attached as an Appendix to this plan.

- Also to be considered when evaluating future flood conditions in the City of Sacramento, the California DWR developed Best Available Maps (BAM)/Flood Awareness Maps.

Regulatory Considerations for Future Flood Conditions

As previously described, the City of Sacramento has been evaluating and determining the impact of both existing and future flood conditions, including development of a local program to address the 200-year state requirement for the ULOP. The City recently finalized updates to the General Plan and Floodplain Management Ordinance addressing new flood protection requirements that establish a 200-year flood standard of protection in urban areas (e.g., ULOP). This is the primary policy change that will affect construction in urban or urbanizing areas that are in an identified flood hazard zone. Areas not considered to be urbanizing will remain subject to the FEMA 0.1% standard of flood protection. Figure F-20 shows the 200-year ULOP areas within the City of Sacramento.

Future Flood Conditions: The Effects of Climate Change

The effects of climate change on future flood conditions should also be considered. While the risk and associated short and long term impacts of climate change are uncertain, experts in this field tend to agree that among the most significant impacts include those resulting from increased heat and precipitation events that cause increased frequency and magnitude of flooding. Changes associated with climate change and flooding could be significant given the effects of snowmelt runoff combined with significant rain events. Increases in damaging flood events may cause greater property damage, public health and safety concerns displacement, and loss of life. In addition, an increase in the magnitude and severity of flood events can lead to potential contamination of potable water and contamination of food crops. Displacement of residents can include both temporary and long-term displacement.

The City of Sacramento will continue to study the risk and vulnerability associated with future flood conditions, both in terms of future growth areas and other considerations such as climate change, as they evaluate and implement their flood mitigation and adaptation strategy for the City.

Future Flood Conditions: ARkStorm Scenario

Also to be considered in evaluating potential "worst case" future flood conditions for the City of Sacramento, is the ARkStorm Scenario. The USGS Multi Hazards Demonstration Project's (MHDP) developed a product called ARkStorm, which addressed massive U.S. West Coast storms analogous to those that devastated California in 1861-1862. Over the last decade, scientists have determined that the largest storms in California are the product of phenomena called Atmospheric Rivers (discussed above in the flood assessment in the discussion of Pineapple Express), and so the MHDP storm scenario is called the ARkStorm, for Atmospheric River 1000 (a measure of the storm's size).

Scientific studies of offshore deposits in northern and southern California indicate that storms of this magnitude and larger have occurred about as often as large earthquakes on the southern San Andreas Fault. Such storms are projected to become more frequent and intense as a result of climate change. This scientific effort resulted in a plausible flood hazard scenario to be used as a planning and preparation tool by hazard mitigation and emergency response agencies. A more complete discussion of the ARkStorm and potential impacts to Central Valley communities is included in Chapter 4 of the Base plan.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Historically, the City has been at risk to flooding primarily during the spring months when river systems in the County swell with heavy rainfall. Localized flooding also occurs at various times throughout the year with several areas of primary concern unique to the City. Due to data limitations, these areas could not be mapped.

The risk of stormwater/localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater or choosing not to develop in areas that often are subject to localized flooding will reduce future risks of losses due to stormwater/localized flooding.

The City local drainage system services approximately 100 square miles and is handled by a combination of gravity and lift stations which a total of approximately some 140 storm drainage basins. Since the City is typically lower than the elevated rivers by as much as 5-25 feet, the majority of the local drainage must be pumped into the rivers. The City operates 94 sumps and pumps to keep the drainage pumped down. A major power outage within any of these basins can cause significant local flooding.

The situation brought about by extremely heavy local rain storms could conceivably result in badly flooded streets and flooding of homes in some areas. It is probable that such situations would be brought about by a slow-moving high-intensity rainstorm over several hours reaching a peak intensity of ½" per hour later in the storm event. Any higher intensity storm event will cause localized flooding problems. An example is shown in Figure F-24.

Figure F-24 City of Sacramento – Localized Flooding at Anita Avenue and 23rd Street

Source: City of Sacramento Department of Utilities

Past Occurrences

December 2012: Severe rain for several days. The Department Operation Center (DOC) was activated for approximately a week due extreme weather forecasts.

2013: Sewer system overflow incident. DOC activation was not required.

December 2014 – Media and reports claimed severe rain predicted for multiple days. DOC activated for several days.

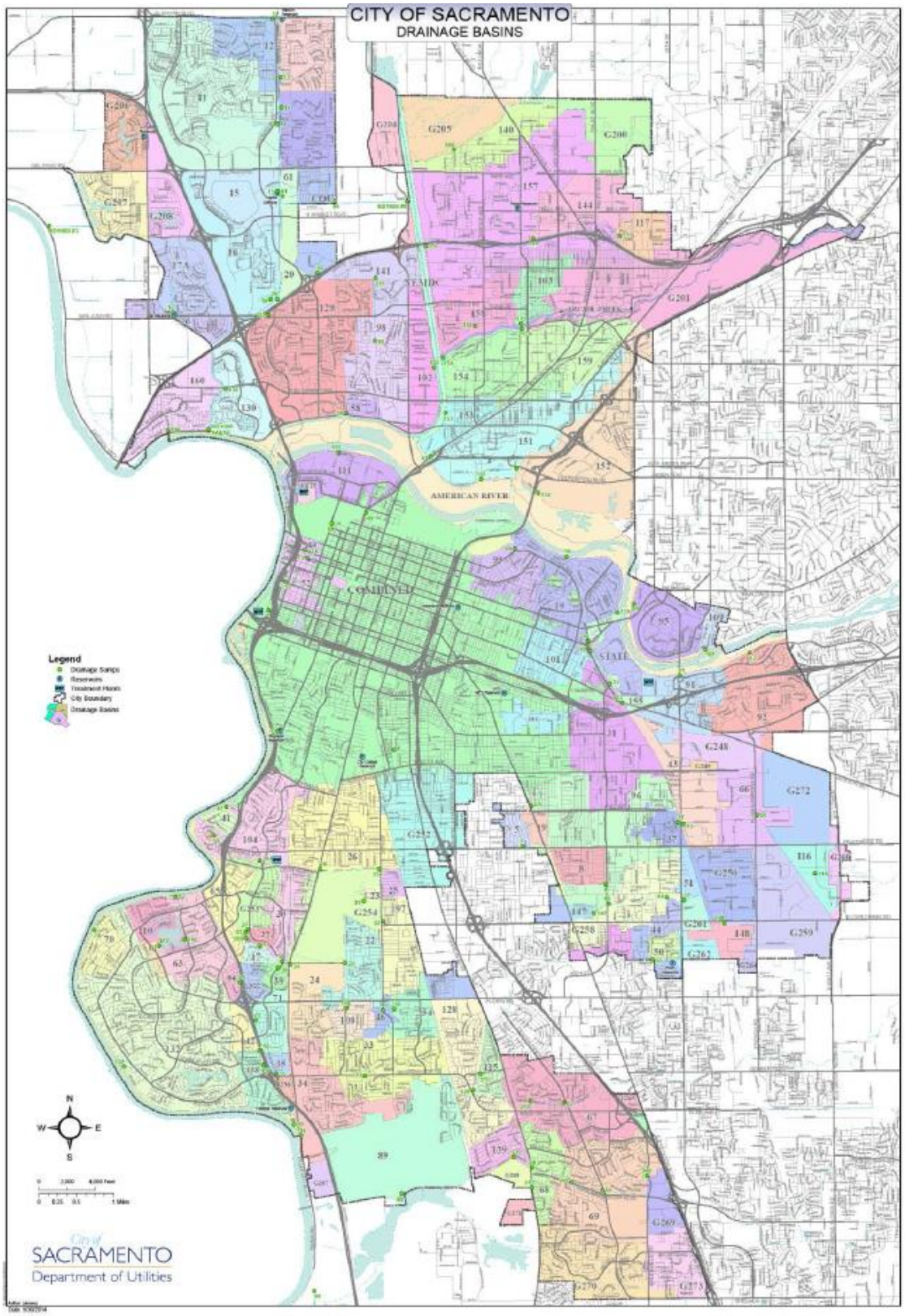
March 2016 – DOC was on alert due to heavy rain projections. DOC activation was ultimately not required.

Vulnerability to Localized Flooding

Although levee failure may result in much more catastrophic damage than flooding from internal drainage, most of the City's flood damage since 1955 has resulted from drainage deficiencies. In 1995, for instance, approximately 100 homes in 4 south area drainage basins incurred flood damage due to

internal drainage system failure during a particularly intense storm. The City has a total of 1,354 miles of storm drain pipes, 49,914 DIs, and 105 pump stations. The City's drainage basins are shown in Figure F-25. Much of this infrastructure was constructed before current storm drainage design guidelines were in place. In many areas, the system is sized based on outdated hydrology and does not have capacity to drain a 100-year storm event.

Figure F-25 City of Sacramento – Drainage Basins



Source: 2016 Comprehensive Flood Management Plan

Assets at Risk

Sewer and Drainage System Damage

In case of a major disaster, such as an earthquake or flood, the City of Sacramento's sewer collection system may be subject to many severe pipe failures. In the City's combined system, there may be complete pipe collapses, especially where the City's brick mains are located. Sewage pumping stations could and probably would be damaged at these locations. The Operations & Maintenance Division's sewer maintenance would close down and isolate areas where severely damaged pipes were located and bypass pumping would be implemented. Furthermore, this Division would have the responsibility of inspecting and evaluating the restoration of all sewers, sewer collections mains, and service laterals.

Energy Shortage

Should the City experience a shortage or shut-down of the fuel supply or electrical distribution system due to a flood, the Public Works Energy Emergency Coordinator will provide critical information and coordination. The Energy Coordinator will report to the Emergency Operations Center and provide information regarding critical City facilities in relation to function and auxiliary power.

Back-up generators at the pump stations are also available in case of a loss of power.

Problem Areas

The list below and Table F-40 identify known and past occurrences of such areas and the associated problems encountered. This list is an initial inventory of key problem areas and is not intended to be a complete inventory of all problems and locations associated with severe weather events and localized flooding in the City of Sacramento.

1. Sump (pump station) 157 screen. During rain events the north channel which empties into sump 157 conveys debris onto the screen which can reduce the pumping capacity of the station. The screen is monitored during rain events and cleaned as necessary.
2. Riza ditch near Stockton Boulevard and Riza Avenue. During rain events the screen on the culvert on the east side of Stockton Boulevard can become clogged with debris. The screen is monitored during rain events and cleaned as necessary.
3. Culvert at John Stiles ditch at Interstate 5 upstream of Sump 134. This culvert tends to clog during rain events. The culvert is monitored and cleaned as necessary.
4. Bypass pipe between Sumps 37 and 43 under Power Inn Road. Pipe tends to clog. Maintenance crews keep the pipe free and clear prior to rain events.
5. Inverted siphon under Fruitridge Road – Proctor and Gamble Ditch. Headwalls have been installed upstream and downstream of the inverted siphon, which allows crews to better service the siphon. During rain events the siphon is monitored and cleaned as necessary.
6. Sears ditch near Arden Way onramp to Business 80 freeway. This ditch terminates at a box culvert. The box culvert has a screen at the entrance to the culvert which tends to clog during first flush rain events. The screen is monitored and cleaned as necessary.
7. San Juan Road bridge. Screen on the south side of the bridge tends to clog during rain events. The screen is monitored during rain events and cleaned as necessary.

8. Sump 95 and 98. If these stations lose electrical power during rain events, the watershed tends to flood rapidly. Power to these stations is monitored during rain events and trailer mounted generators are available to provide backup power to these pump stations.
9. Sutterville Road at 24th Street. An 8-inch pipe in this area routinely plugs. Field crews check this pipe during storm events and provide the necessary maintenance to keep the pipe cleared.
10. Hagginwood ditch downstream of Arcade Boulevard near Acacia Avenue. This ditch has an ongoing trash problem and is difficult to clean. This ditch is monitored during rain events and cleaned as necessary.
11. Low lying area of the Valley Hi neighborhood
12. River Park neighborhood
13. Downtown Area – during rain events, the combined storm/sewer system can't handle all of the water causing a lot of street flooding
14. Florin Road and Meadowview Intersection
15. Sump 96 at Beach Lake Stables
16. Magpie Creek at Raley Blvd. A low lying area of Raley Blvd always fills up with water during rain events making it almost impossible to drive through.
17. Elvas Avenue & 65th Street near walking path to Sacramento State University
18. Sump 99 at McKinley Park in East Sacramento

Table F-40 City of Sacramento's Road List of Localized Flooding Problem Areas

Road Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Stockton Boulevard at Riza Avenue	X						
Interstate 5 upstream of Sump 134	X						
Arden Way onramp to Business 80 freeway	X						
Sutterville Road at 24th Street	X						
Arcade Boulevard near Acacia Avenue	X						
Florin Road at Meadowview Blvd.	X						
Raley Blvd	X						
Power Inn Road at Fruitridge Blvd.	X						
Mack Road at Franklin Blvd.	X						

Source: City of Sacramento

Future Development

Future development in the City will add more impervious surfaces and need to drain those waters. The City will be proactive to ensure that increased development has proper siting and drainage for

stormwaters. New development and redevelopment requirements have been approved to mitigate flooding, hydromodification and water quality issues.

The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the City of Sacramento from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Levee Overtopping

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters. For example, on the American River, stages should be predictable for up to eight hours. On the Sacramento River system, depending on which dams are releasing the flows, advance warning of river stages may be as much as 24 hours.

When a flood control system provides 100-year flood protection, it means that in any given year there is a one-in-100 chance that a storm might occur that is beyond the containment capacity of levees and reservoirs. Similarly, 200-year flood protection means there is a one-in-200 chance that a storm might occur that the system could not handle, and 500-year protection means there is a one-in-500 chance that a storm will overwhelm the system.

Levee Status

USACE expired the City's levee certifications in 2012 and 2013 because the certifications no longer met USACE's risk & uncertainty criteria and/or were older than 10 years. This is shown in Table F-41. Figure F-26 shows the City of Sacramento's current levee status.

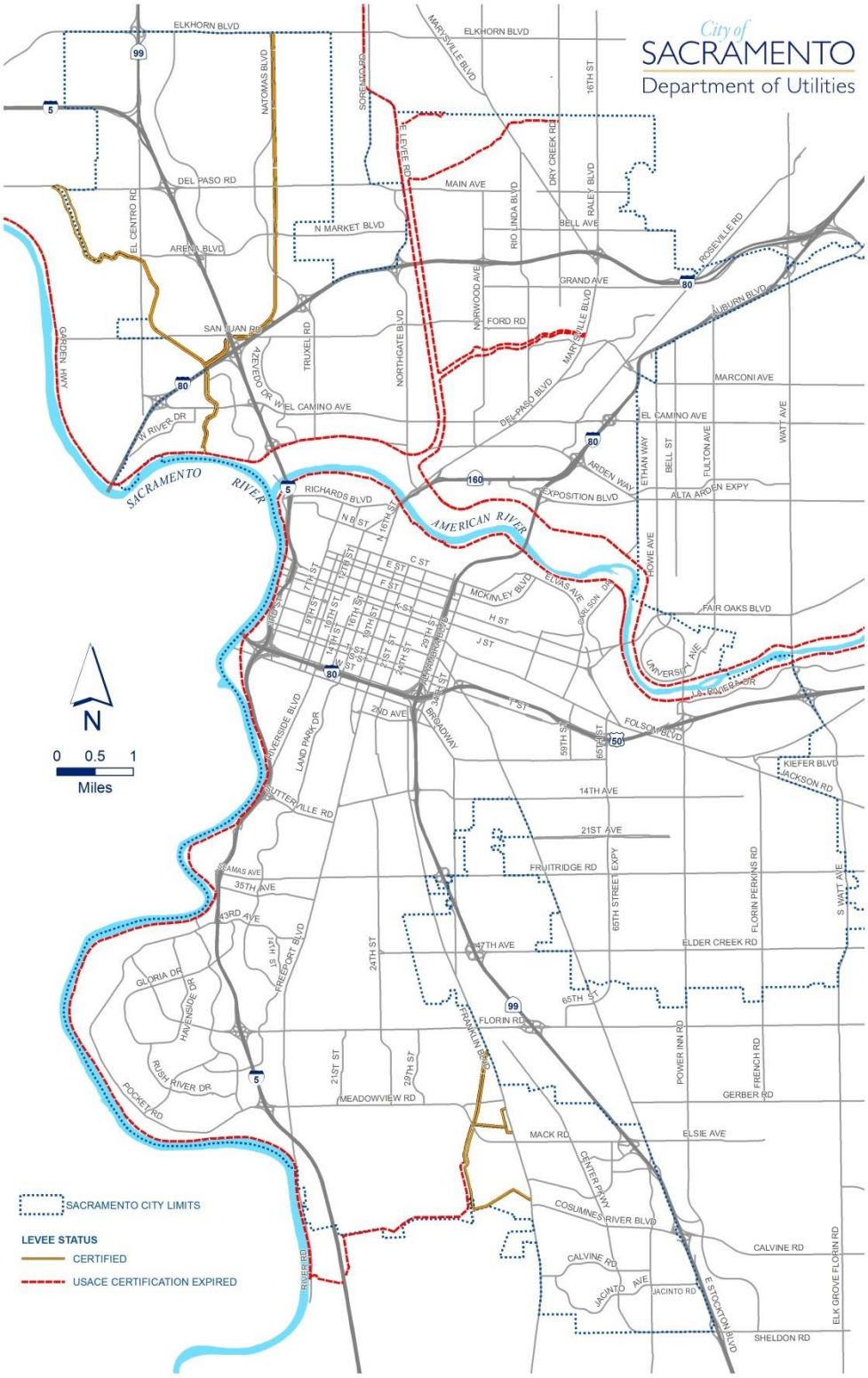
Table F-41 USACE Levee Certification Expiration Dates Stream Reach Expiration Date

Stream	Reach	Expiration Date
Dry Creek	North levee	March 19, 2012

Stream	Reach	Expiration Date
Robla Creek	South levee from approximately Sully Street to City border on the east	August 31, 2013
Robla Creek	South levee from junction with Natomas East Main Drainage Canal to approximately Sully Street	March 19, 2012
Arcade Creek	North and south levees	March 19, 2012
Natomas East Main Drainage Canal	East levee from junction with American River north levee to the pump station north of Dry Creek	March 19, 2012
American River	North and south levee (not including Natomas)	August 31, 2013
Sacramento River	Left bank levee from the junction with the American River to the southern City limits	August 31, 2013
Morrison Creek	Junction with Sacramento River to Unionhouse Creek Right bank from Unionhouse Creek to Brookfield Drive	August 31, 2013

Source: 2016 Comprehensive Flood Management Plan

Figure F-26 City of Sacramento Levee Status



Source: City of Sacramento Department of Utilities

In 2012, SAFCA along with the local communities and maintaining agencies, began developing a levee accreditation program to determine whether the levees protecting Sacramento along the lower American and Sacramento rivers and their tributaries (outside the Natomas Basin) adequately met the minimum requirements of the NFIP. The following projects need to be completed to accredit the levees:

Federal projects:

- Folsom Dam JFP
- Folsom Dam Raise
- American River Common Features WRDA 96/99
- South Sacramento Streams

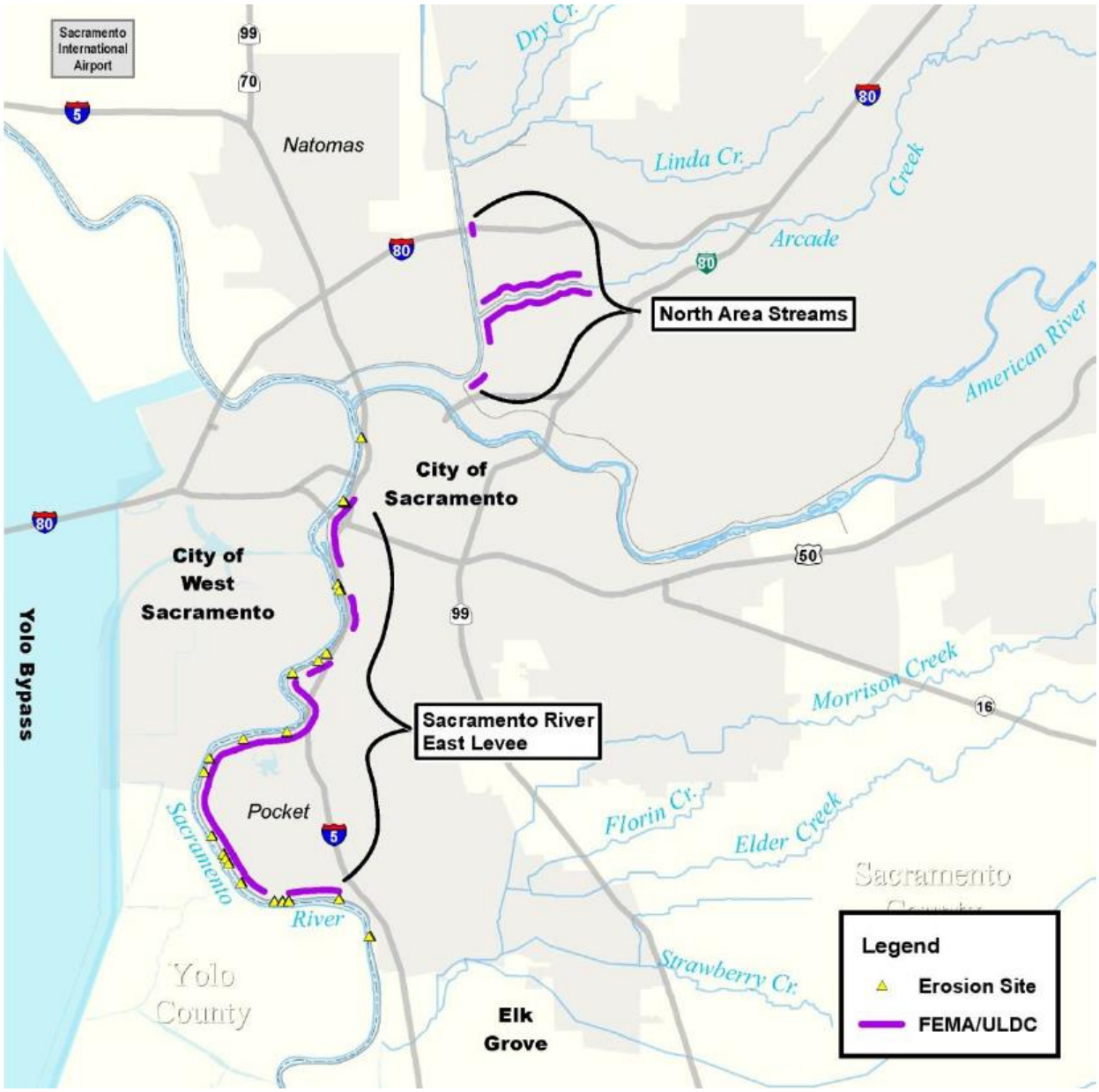
State and local projects:

- North Area Streams
- Sacramento River East Levee downstream of the American River
- Various high hazard encroachments/vegetation

The levees must also meet the State of California's Urban Levee Design Criteria (ULDC). The ULDC requires the city to address additional criteria including encroachments, vegetation, and access to the levees. It was decided that the levee deficiencies would be addressed in two phases – accreditation and modernization.

Figure F-27 shows areas that need to be addressed in the short term (5 to 7 years) to meet the NFIP accreditation and immediate ULDC requirements.

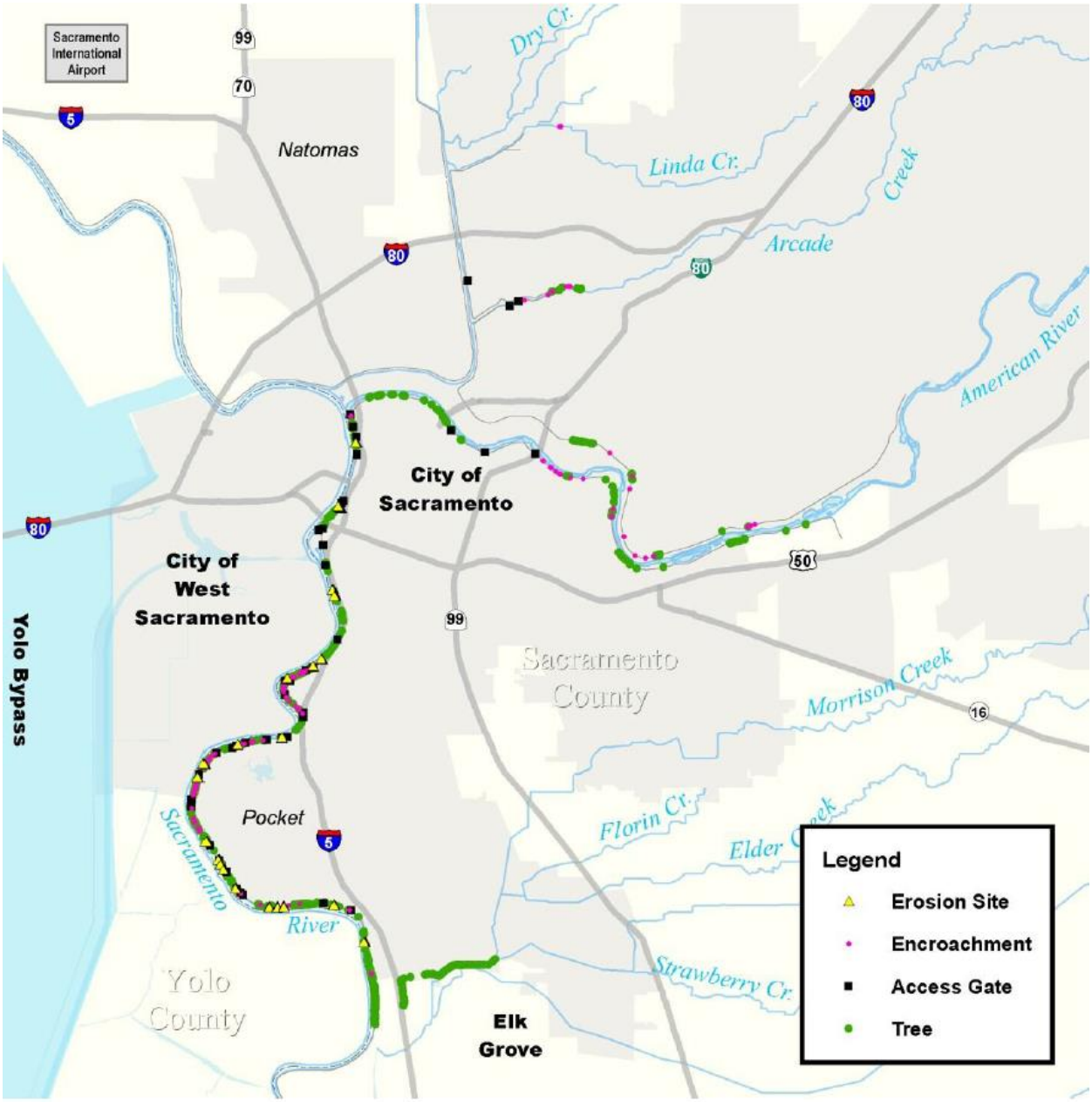
Figure F-27 City of Sacramento – Areas to be Addressed to Meet NFIP Accreditation and Immediate ULDC Requirements



Source: 2016 Comprehensive Flood Management Plan

The second phase is the modernization phase, which will be accomplished over 10-30 years. This will address encroachments, access, and vegetation that are categorized as low risk at the sites shown in Figure F-28.

Figure F-28 City of Sacramento – Sites in Long Term Modernization Process



Source: 2016 Comprehensive Flood Management Plan

Past Occurrences

December 9, 1861 - American River Levee failed east of 30th street, flooding what is now known as River Park. The water then overran the City's levee built to protect it. To relieve the building water levels, the levee at R & 5th Streets was cut to drain the "lake" but houses were swept away in the current in the cut in the levee.

Figure F-29 January 1862 K Street Flooding

Source: Drainage and Flood Control, 152 Year.

Vulnerability to Levee Failure

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee that causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

Values at Risk

GIS was used to determine the possible impacts of levee failure flooding within the City of Sacramento. The methodology described in Section 4.3.12 of the Base Plan was followed in determining structures and values at risk to a levee failure. However, this analysis was performed based on the most current 2015 DFIRMs which still reflect some levees as providing 100-year level of protection. According to the County, all levees have since been decertified as not providing a 100-year level of protection, so this analysis is based solely on the information presented in the DFIRMs. Further it is important to note that many levee improvement projects are ongoing throughout the Planning Area, some of which will be providing certification of area levees to both a 100-year and 200-year levels depending on applicable requirements. Thus, this analysis reflects a moment in time and while it does provide information on areas developed behind levees, the X Protected by Levee flood zone will continue to change as these projects are completed and new certifications obtained.

Table F-42 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a X Protected by Levee floodzone in the City.

Table F-42 City of Sacramento – Count and Improved Value by Property Use in X Protected by Levee Flood Zones

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
X Protected by Levee Zone					
Agricultural	0	0	$0	$0	$0
Care / Health	120	94	$57,548,864	$419,739,056	$477,287,920
Church / Welfare	241	216	$43,415,824	$172,789,435	$216,205,259
Industrial	965	801	$244,227,533	$496,705,067	$740,932,600
Miscellaneous	345	5	$1,526,611	$95,585	$1,622,196
NO DATA	8	5	$542,436	$1,460,705	$2,003,141
Office	1,050	935	$667,325,318	$2,450,427,712	$3,117,753,030
Public / Utilities	1,678	3	$3,888,349	$886,814	$4,775,163
Recreational	73	42	$16,934,177	$43,254,208	$60,188,385
Residential	62,289	61,708	$4,469,620,158	$10,365,775,983	$14,835,396,141
Retail / Commercial	1,590	1,309	$583,121,232	$1,002,143,459	$1,585,264,691
Vacant	1,602	65	$233,335,191	$2,457,283	$235,792,474
Total Levee	**69,961**	**65,183**	**$6,321,485,693**	**$14,955,735,307**	**$21,277,221,000**

Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

Table F-43 shows potential losses from levee failure with loss estimates and loss ratios for the City. The loss ratio is the loss estimate (i.e., total of improved and contents value for all parcels located in levee protected zones in the City) divided by the total potential exposure and displayed as a percentage of loss. Due to the varying flood depths that may occur during flooding, the loss estimate uses 3 scenarios: 3 foot flood depth (30% damage), 6 foot flood depth (60% damage to structure and contents), and total loss (all structure and contents are lost). Land values are not included in the loss estimates, as the land itself is usually not a loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a dam failure.

Table F-43 City of Sacramento – X Protected by Levee Zone Loss Estimates

Flood Zone	Improved Parcel Count*	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate*	Loss Ratio
X Protected by Levee	65,183	$14,955,735,307	$12,364,491,033	$27,178,507,343	$8,153,552,202.90 16,307,104,405.80 $27,178,507,343.00	17.6% 34.3% 57.2%

Source: Sacramento County 2016 Parcel/2015 Assessor's Data; Sacramento County DFIRM, April 2016

*Three values are shown here due to varying flood depths expected – 3-foot, 6-foot, and total loss.

According to the information in Table F-42 and Table F-43, the City has 65,183 improved parcels and roughly $27.2 billion of structure and contents value in the X Protected by Levee areas. The 3-foot loss

ratio of 17.6%, the 6-foot loss ratio of 34.3%, and the total loss ratio of 57.2% indicates that the City has significant amounts of assets at risk to possible levee failures.

Structures protected by levees that fail are often total losses. The analysis above assumes all levees in the City break at one time, which is unlikely. The extent and depth of actual flooding and associated damage will vary depending on the location, nature, depth, and extent of any levee break.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for Sacramento. According to this analysis, shown in Table F-44, there is a total population of 161,675 residents of the City in an X Protected by Levee zone.

Table F-44 City of Sacramento – Count of Improved Residential Parcels and Population in X Protected by Levee Zones

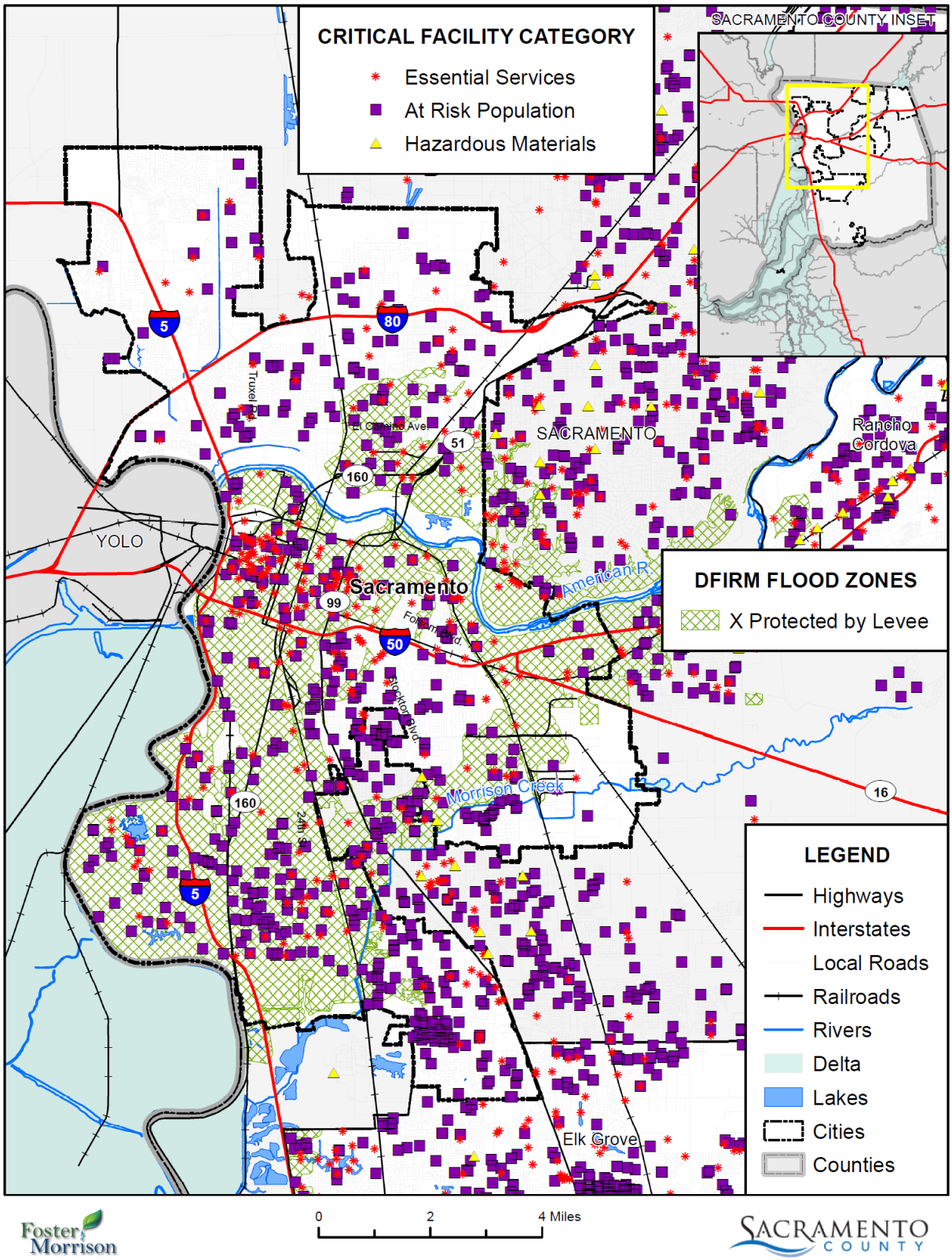
Residential Parcels	Population
61,708	161,675

Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data, US Census Bureau
* Average household populations from the 2010 US Census were used: Sacramento– 2.62.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Sacramento in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersects a DFIRM X Protected by Levee area. Details of critical facilities in the levee protected areas in the City of Sacramento are shown in Figure F-22 and Table F-38. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure F-30 City of Sacramento – Critical Facilities and X Protected by Levee Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table F-45 City of Sacramento– Critical Facilities and X Protected by Levee Zones

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Airport	1
	Bus Terminal	4
	Convention Center	1
	Emergency Evacuation Shelter	48
	Fire Station	16
	General Acute Care Hospital	2
	Government Facilities	18
	Light Rail Stop	23
	Medical Health Facility	70
	Police	1
	Stadium	2
	Water Treatment Plant	1
	Total	**187**
At Risk Population Facilities	Adult Day Care	8
	Adult Education School	4
	Adult Residential	48
	Charter School	4
	College/University	2
	Community Day School	2
	Day Care Center	88
	Group Home	12
	Hotel	12
	Independent Study School	1
	Infant Center	9
	Private Elementary School	9
	Private High School	4
	Private K-12 School	3
	Public Elementary School	44
	Public High School	4
	Public Middle School	8
	Residential Care/Elderly	38
	School-Age Day Care Center	17
	Total	**317**
Hazardous Materials Facilities	Oil Collection Center	1
	Total	**1**
X Protected by Levee Total		**505**

Source: FEMA DFIRM June 16, 2015, Sacramento County GIS

Natural Resources at Risk

The City Planning Team noted that the City's natural resources are at great risk from levee failure. Many habitats and biological resources would be impacted by flood waters.

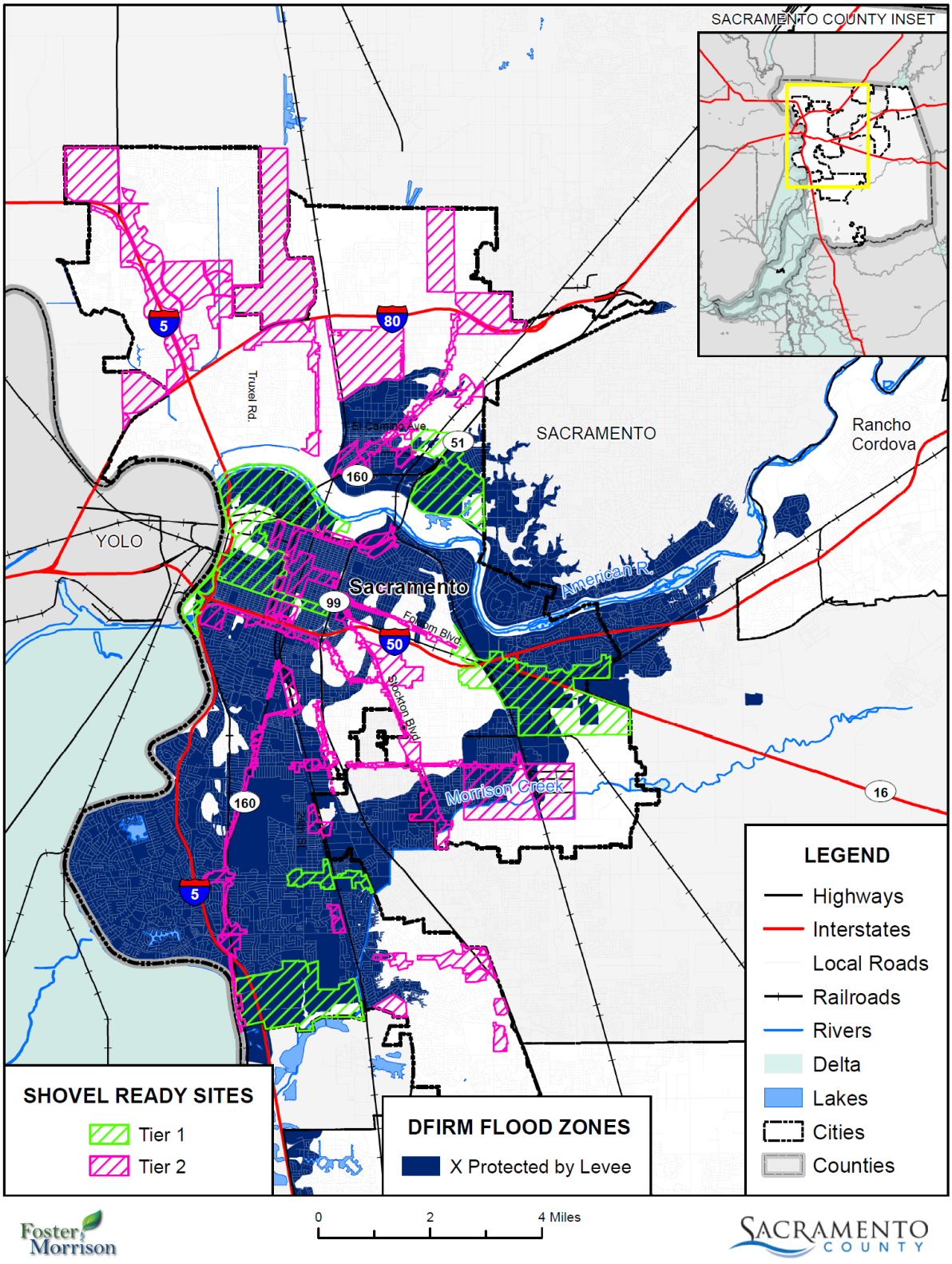
Historic and Cultural Resources at Risk

The City Planning Team noted that the City's historic and cultural resources are at great risk from levee failure. Many of these resources are located near the City's levee system and in low lying areas that would be impacted by flood waters.

Future Development

Hazard analysis was performed to determine the number of parcels in the FEMA DFIRM X Protected by Levee flood zones within the Opportunity Areas. Results can serve as a vulnerability analysis guide for future development. Figure F-31 shows the Opportunity Areas overlaid on the DFIRM flood zones. Table F-46 shows results of the parcel hazard analysis, sorted by Opportunity Area tier and type. There are 8,064 parcels in the X Protected by Levee DFIRM flood zone.

Figure F-31 City of Sacramento – Future Development in DFIRM X Protected by Levee Flood Zone



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table F-46 City of Sacramento – Future Development in DFIRM Levee Protected Flood Zones

Type	Parcel Count	Acres
Tier 1		
Centers	1,916	1,662
Corridors	0	0
Neighborhoods	0	0
New Growth Areas	43	936
Transit Center	500	1,191
Tier 1 Total	**2,459**	**3,789**
Tier 2		
Centers	85	141
Corridors	2,916	999
Neighborhoods	1,557	412
New Growth Areas	0	0
Transit Center	1,047	372
Tier 2 Total	**5,605**	**1,924**
Grand Total	**8,064**	**5,713**

Source: FEMA June 16, 2015 DFIRM, City of Sacramento GIS

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system. Due to the vast system of levees that protect the City (see Figure 4.75 in Section 4.3.10 for areas of the City protected by levees), erosion of levees is of critical importance.

Past Occurrences

2005: Sacramento River, River Mile 78.3 – Left Bank – Bank erosion that required the site to be staked and rock was stockpiled along the top of the bank. Erosion length is approximately 654 feet.

2006: Sacramento River, River Mile 47.0 – Left Bank - Bank erosion which required rock slope protection repair. The length of the repair was approximately 1,156 feet.

Figure F-32 Sacramento River Mile 47.0

Source: US Army Corps of Engineers, Critical Levee Erosion Site Fact Sheet

2006: Sacramento River, River Mile 68.9 – Left Bank - Bank erosion which required rock slope protection repair. The length of the repair was approximately 786 feet.

Vulnerability to Erosion

The 2016 CFMP reported that the USACE receives yearly appropriations to implement the Sac Bank program, which addresses erosion issues. As a result, erosion repair work occurs yearly along the river system. Over the last several years, the Sacramento area has had an average of three to four sites a year repaired, averaging over $2 million per year.

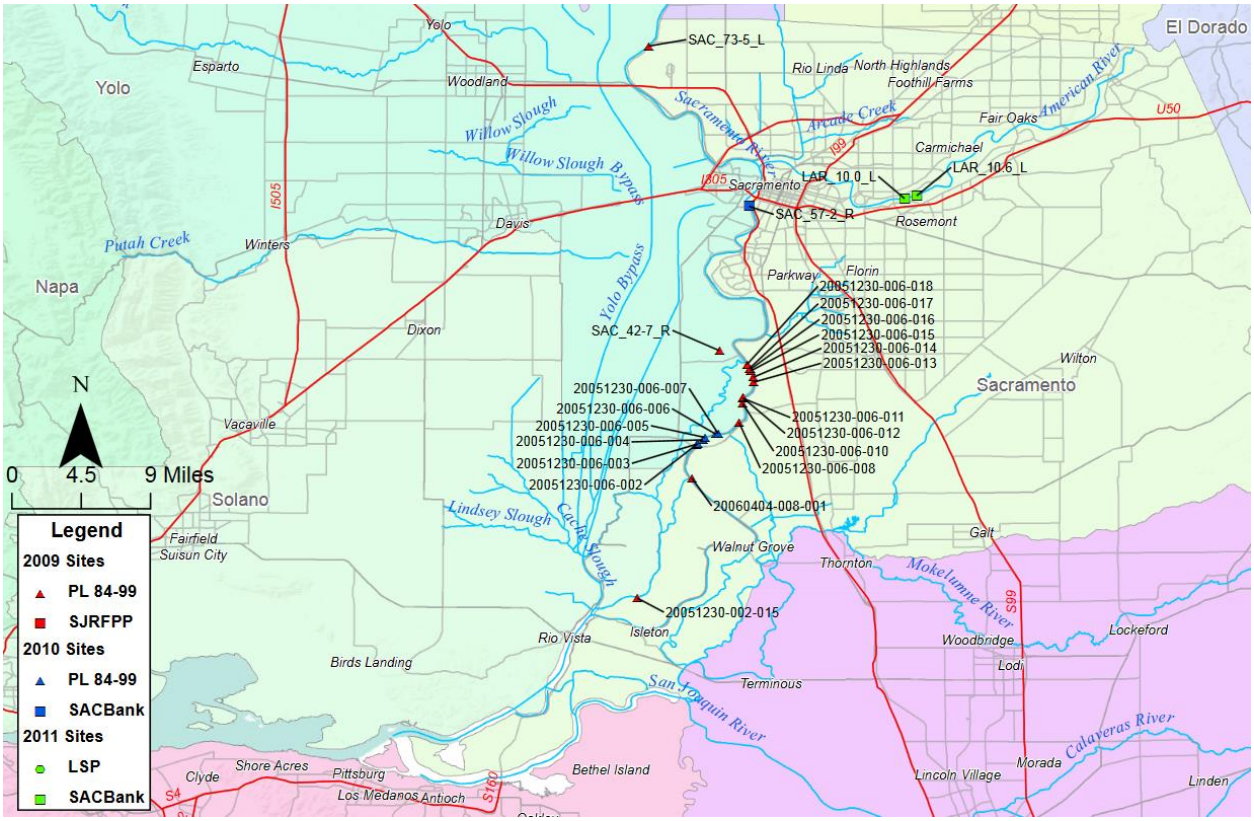
Assets at Risk

On February 24, 2006, following sustained heavy rainfall and runoff, Governor Arnold Schwarzenegger declared a State of Emergency for California's levee system, commissioning up to $500 million of state funds (AB142) to repair and evaluate State/federal project levees. Following the emergency declaration, Governor Schwarzenegger directed the California Department of Water Resources (DWR) to secure the necessary means to fast-track repairs of critical erosion sites. To date, nearly 300 levee repair sites have been identified, with more than 100 of the most critical sites having already been completed with AB142 funds. Repairs to others are either in progress or scheduled to be completed in the near future, and still more repair sites are in the process of being identified, planned, and prioritized.

DWR is the lead agency for the Sacramento-San Joaquin Erosion Repairs Program, while the United States Army Corps of Engineers (USACE) is the lead agency for the Sacramento River Bank Protection Project. There are essential differences between the types of repair sites. "Critical Erosion Repair sites" are the highest-priority erosion sites where levee degradation from erosion has occurred to the extent that they are at risk of failure even during normal flow conditions.

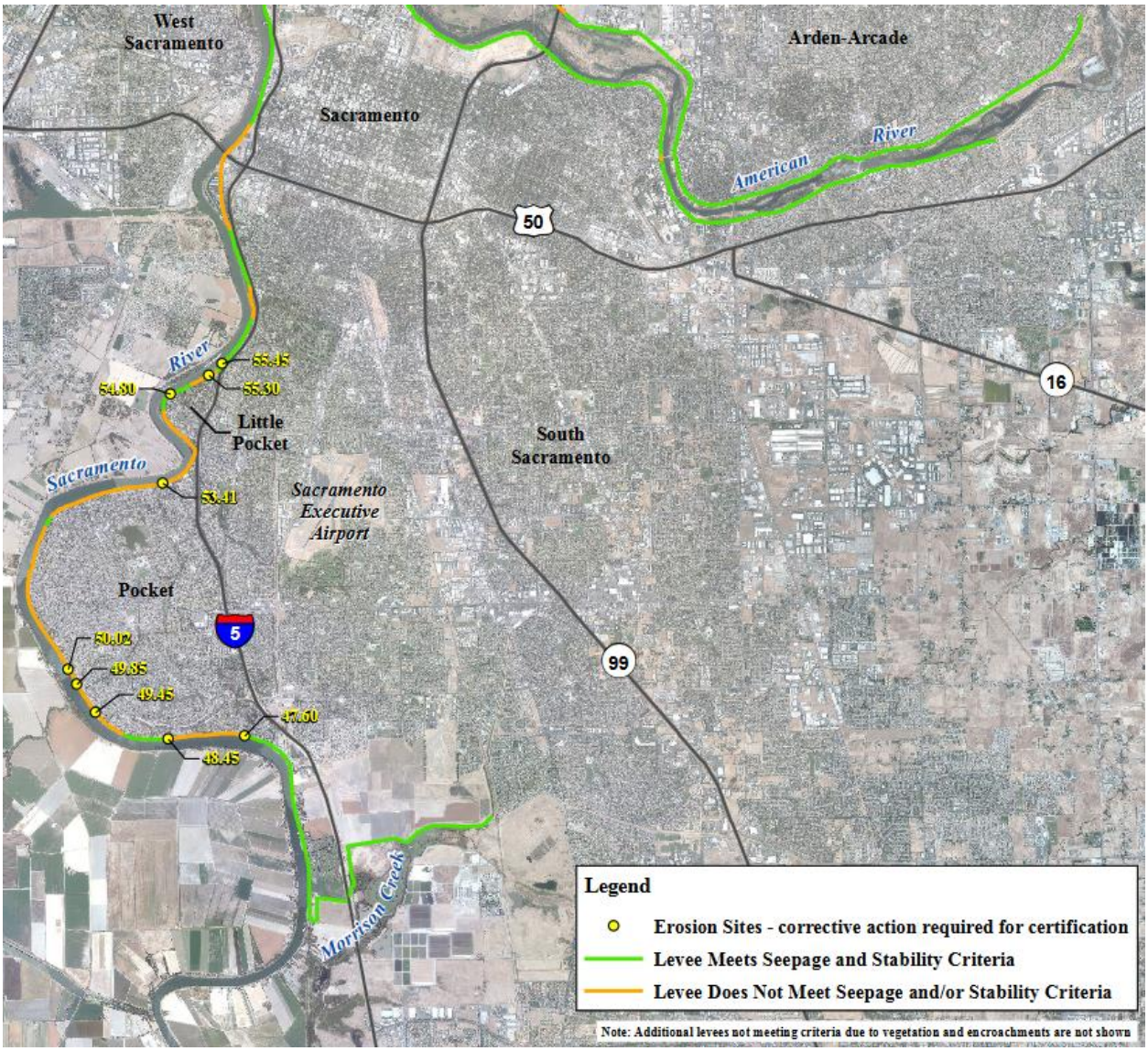
The Urban Level of Flood Protection Plan will address many erosion sites within the City of Sacramento over the next ten years. Recent erosion repair sites on levees that protect the City of Sacramento are shown on Figure F-33 and Figure F-34.

Figure F-33 Streambank Erosion Sites in 2009 and 2011



Source: California Department of Water Resources, Levee Repairs Program, 2009-2011 Sites

Figure F-34 Sacramento River Erosion Sites in 2013



Source: SAFCA Levee Certification, MBK Engineers, July 2013

Future Development

Within the Sacramento area, programs addressing long term erosion protection have been developed. Bank protection measures typically consist of large angular rock placed to protect the bank topped with a layer of soil/rock material to allow vegetation re-grow back on the bank. In addition, dead trees may be added to the mixture for additional habitat value.

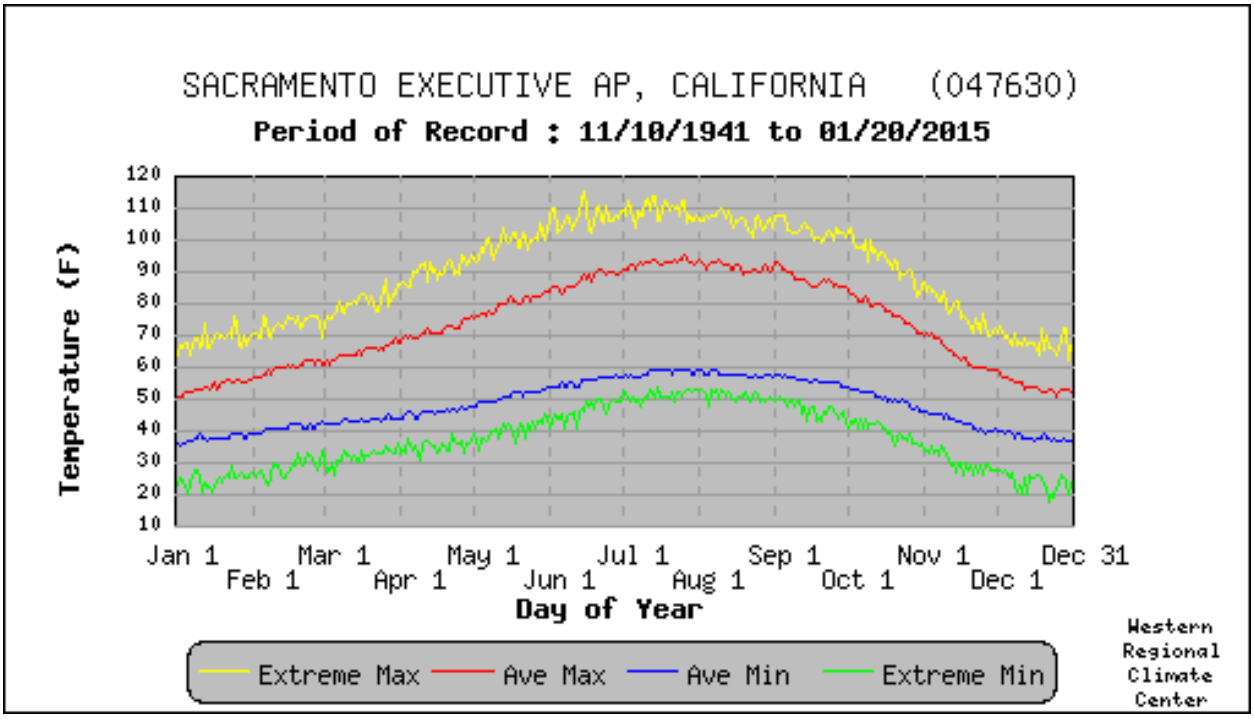
Severe Weather: Extreme Temperatures – Extreme Cold/Freeze

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

The City of Sacramento experiences severe weather including peak periods of extreme cold and freeze. In general, individuals are able to dress appropriately and stay sheltered during these peak periods, however the City's elderly population and homeless are highly susceptible to the extreme temperatures. The City experiences temperatures that hover around or below 32 degrees during the winter months (see Figure F-35). Many months see a high number of days where daily low temperatures fall below 32°F. Generally, people who live and work in this weather are prepared to cope with the extremes in that they dress appropriately and stay indoors.

Figure F-35 Daily Temperatures Averages and Extremes for the City of Sacramento



Source: Western Regional Climate Center, Sacramento FAA Airport Station

Past Occurrences

Past average occurrences of extreme cold in the City of Sacramento are shown in both Table F-47 and Table F-48.

Table F-47 Record Low Temperatures in the City of Sacramento

Month	Temperature	Date	Month	Temperature	Date
January	23°	1/1979	July	48°	7/1983
February	23°	2/1989	August	49°	8/1978
March	26°	3/1971	September	43°	9/1978
April	32°	4/1953	October	36°	10/1989
May	36°	5/1974	November	26°	11/1993
June	41°	6/1990	December	18°	12/1990

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Table F-48 Average Number of Days in a Month Below 32°F

Month	Days Below 32°F	Month	Days Below 32°F
January	7.2	July	0
February	2.2	August	0
March	0.5	September	0
April	0	October	0
May	0	November	1.5
June	0	December	6.4

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Vulnerability to Severe Weather: Extreme Temperatures – Extreme Cold/Freeze

Assets at Risk

Impact to such cold temperatures has resulted in damage to such infrastructure as; domestic water pipes, irrigation systems, unprotected fire protection systems (fire sprinklers) and surface icing on streets and walkways. Health impacts are the primary concern with this hazard, though economic impacts are also an issue. The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable.

Future Development

Future development in the City is regulated by building codes that mitigate the problems of cold and freeze on these structures. Future development will continue to happen in the City and will not be constrained by cold and freeze.

The Sacramento Housing and Rehabilitation Agency and County Department of Human Services currently operate programs such as the Winter Shelter Program and In-Home Support Services which help address severe weather conditions needs for vulnerable populations. Continued community outreach and

potential regulatory mitigation capabilities would further address the extreme cold/freeze hazard within the community.

Severe Weather: Extreme Temperatures – Extreme Heat

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The City of Sacramento experiences temperatures in excess of 100 degrees during the summer and fall months. The temperature moves to 105-110° F in rather extreme situations (see Figure F-35 above). Many months see a high number of days where daily high temperatures exceed 90°F. Generally, people who live and work in this weather are prepared to cope with the extremes in that they dress appropriately and stay in air conditioned buildings during the peak temperature periods of the day.

Past Occurrences

Past average occurrences of extreme heat in the City of Sacramento are shown in both Table F-49 and Table F-50.

Table F-49 Record High Temperatures in the City of Sacramento

Month	Temperature	Date	Month	Temperature	Date
January	74°	1/12/2009	July	114°	7//1983
February	76°	2/19/1964	August	110°	8/10/1996
March	88°	3/5/1971	September	108°	9/01/1950
April	95°	4/9/1999	October	104°	10/02/2001
May	105°	5/3/1950	November	87°	11/01/1960
June	115°	6/7/1950	December	73°	12/02/2011

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Table F-50 Average Number of Days in a Month Exceeding 90°F

Month	Days Exceeding 90°F	Month	Days Exceeding 90°F
January	0	July	21.3
February	0	August	19.1
March	0	September	12.8
April	0.5	October	2.5
May	5.4	November	0
June	11.6	December	0

Source: Western Regional Climate Center, Sacramento FAA Airport Station

During the writing of this plan, extreme temperatures were experienced in late July. Temperatures reached 105°F on multiple days.

Vulnerability to Extreme Heat

Assets at Risk

Health impacts are the primary concern with this hazard, though economic impacts are also an issue. The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable.

Reliance on air conditioning causes a strain on the electrical energy in the Sacramento area. Occasionally peak demands outweigh supply and a condition known as brown-out occurs. This is an extremely dangerous situation for electrical equipment as it operates without the needed electricity causing damage to the systems. Days of extreme heat have been known to result in medical emergencies, civil unrest, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts.

Future Development

Vulnerability to extreme heat will increase as the average age of the population in each City shifts. Greater numbers of future senior citizens will result from the large number of baby boomers in the City. The elderly are more at risk to the effects of extreme heat, especially those without proper air conditioning. However, many of the residents of the City are accustomed to living with extreme heat and take precautions to guard against the threat of extreme heat. The City will continue to enhance the City's tree canopy and encourage "green" infrastructure, such as rooftop gardens and light-colored pavement, to reduce urban heat island effects.

Severe Weather: Heavy Rains and Storms

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the City of Sacramento. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

December 2012 – Severe rain for several days. The DOC was activated for approximately a week due extreme weather forcasts.

December 2014 – Media and reports claimed severe rain predicted for multiple days. DOC activated for several days.

March 2016 – DOC was on alert due to heavy rain projections. DOC activation was ultimately not required.

Vulnerability to Heavy Rain and Storms

Assets at Risk

Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees.

Future Development

The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from heavy storms and rain. Future development in the City is subject to these building codes. New critical facilities such as communications towers should be built to withstand hail damage, lightning, and heavy rains.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

On an annual basis the City of Sacramento experiences severe storms accompanied by strong wind and wind gusts. High winds combined with cold temperatures have caused significant damage to public infrastructure (primarily the electric grid). Since 1978, the Sacramento area has experienced 12 tornados. The longest path of a tornado in the area was 2 miles and the widest path was 100 yards. No injuries or fatalities have been recorded.

Past Occurrences

- January 2006: A series of storms accompanied by winds as fast as 63 MPH struck Northern California for a period of a week. Two deaths were recorded by falling trees as a result of high winds. The storm resulted in over $300 million of damage and 10 counties, including Sacramento, being classified as federal disaster areas.
- January 2008: Severe winds exceeding hurricane force strength were a part of the January 2008 North American Storm Complex, a series of 3 storms that hit the California region. In California, 1.2 million residents were left without power due to the approximately 500 miles of power lines were damaged in the state. Listed below are the largest tornadoes for the Sacramento area.

Listed below are the largest tornadoes for the Sacramento area:

- **February 7, 1978**: Fujita 2, Width 20 yards, Length 1.9 miles
- **March 22, 1983**: Fujita 1, Width 50 yards, Length 2 miles
- **April 19, 1988**: Fujita 1, Width 30 yards, Length 1 mile

Source: Tornado History Project

Vulnerability to Severe Weather: Wind and Tornadoes

Assets at Risk

Strong wind is a frequent type of severe weather occurrence in the area. Wind often accompanies the region's storms and has caused damage in the past. Buildings that house populations at risk such as schools, nursing homes, hospitals, and urgent care facilities are at risk to wind and tornadoes. Also at risk are power lines, which can arc or be damaged during high wind events. The City has had power outages and damages to electric lines in past storms. This is especially difficult when the outages impact the stormwater pumps, which can exacerbate flooding.

Future Development

The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from high winds. Future development in the City is subject to these building codes.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Because of the expansion of development into the rural areas adjacent to and within many communities, the urban-wildland interface fire is one that burns along the interfaces and can result in major losses of property and structures. The City of Sacramento is not immune to the threat of an urban wildfire. Generally, the fire season extends from early spring to late fall. Hazards arise from a combination of hot weather, an accumulation of vegetation, and low moisture content of the air. These conditions, when coupled with high winds and years of drought, compound the potential impact of a fire.

Some areas of the City have been identified as susceptible to urban-wildland fires. The areas are generally along the America River Parkway from Watt Avenue to the Sacramento River and along the Garden Highway in the Natomas area.

The American River Parkway is a stretch of a dense trees and brush on both sides of the American River. It is bordered by extensive commercial and residential development, including California State University, Sacramento. The parkway property is owned by the State of California, maintained by the Sacramento County Parks Department, and protected from fire by the Sacramento City Fire Department. The area is natural habitat with no fire break areas. Access for fire equipment is difficult and is limited to the paved stretches of the bicycle path. Some of the potential fire areas are not accessible to vehicular traffic. Fires occurred in the area in 1985 and 1992.

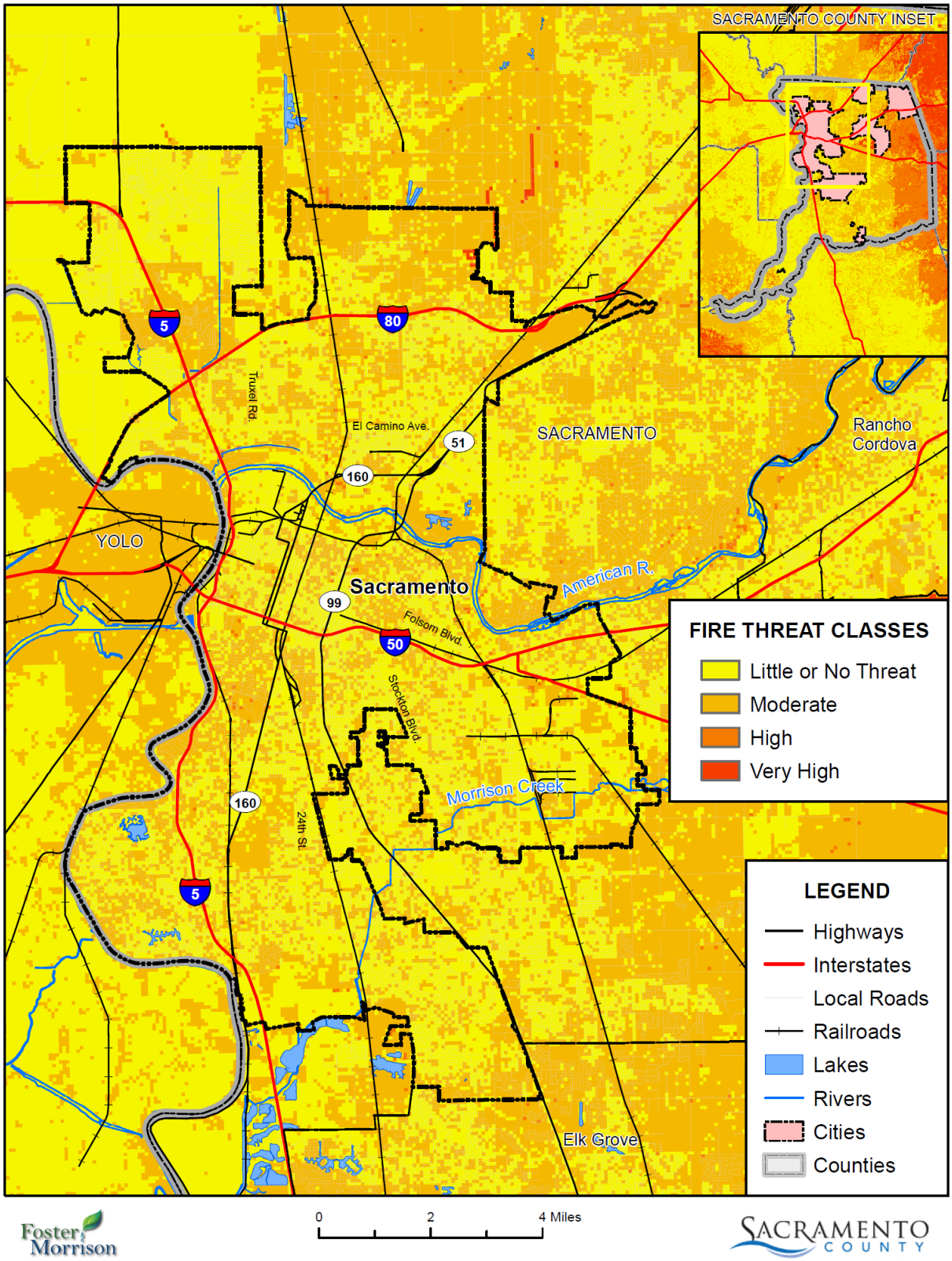
Past Occurrences

According to the City Planning Team, large wildland fires occur approximately every 2-3 years that require a large number of fire resources and affect the adjacent populations. The last large fire occurred on July 4, 2014 that burned approximately 100 acres in the Bushy Lake area adjacent to the Cal Expo Fairgrounds. The fire caused the evacuation of the nearby water park, caused the cancellation of the professional soccer game, and postponed the largest pyrotechnic show in the region. Additionally, the incident drew down fire resources from the entire county and required the request of resources from Cal Fires Amador, El Dorado Ranger Unit to assist in mitigation.

Vulnerability to Wildfire

Following the methodology described in Section 4.3.17, a wildfire map for the City of Sacramento was created (see Figure F-36). Wildfire threat within the City ranges from little or no threat to moderate.

Figure F-36 City of Sacramento's Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Assets at Risk

Analysis results for Sacramento are shown in Table F-51, which summarizes total parcel counts, improved parcel counts and their structure values by occupancy type as well as the percentage of parcels affected by fire.

Table F-51 City of Sacramento – Count and Value of Parcels by Property Use and Fire Threat Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Little or No Threat					
Agricultural	6	$2,922,804	1	$150,617	$3,073,421
Care / Health	138	$75,245,713	112	$881,890,901	$957,136,614
Church / Welfare	375	$62,106,825	319	$290,580,151	$352,686,976
Industrial	1,635	$435,394,978	1,435	$1,059,085,767	$1,494,480,745
Miscellaneous	826	$2,122,653	6	$258,050	$2,380,703
No Data	6	$444,194	4	$1,440,581	$1,884,775
Office	1,111	$764,938,813	988	$2,878,414,973	$3,643,353,786
Public / Utilities	2,147	$3,866,896	3	$886,814	$4,753,710
Recreational	95	$39,089,568	63	$64,799,459	$103,889,027
Residential	83,848	$5,131,555,605	82,879	$13,553,778,202	$18,685,333,807
Retail / Commercial	2,268	$832,161,746	1,912	$1,418,063,168	$2,250,224,914
Vacant	4,517	$412,550,184	109	$9,051,781	$421,601,965
Total	**96,972**	**$7,762,399,979**	**87,831**	**$20,158,400,464**	**$27,920,800,443**
Moderate					
Agricultural	2	$216,243	1	$213,247	$429,490
Care / Health	53	$18,710,523	42	$128,655,941	$147,366,464
Church / Welfare	140	$26,639,770	119	$160,246,560	$186,886,330
Industrial	353	$125,285,770	315	$394,912,479	$520,198,249
Miscellaneous	412	$377,284	2	$6,393	$383,677
No Data	1	$19,789	1	$20,124	$39,913
Office	312	$150,278,192	272	$670,343,055	$820,621,247
Public / Utilities	1,186	$1,032,988	1	$137,675	$1,170,663
Recreational	22	$6,574,575	14	$34,684,410	$41,258,985
Residential	42,580	$3,049,409,058	42,026	$7,137,878,153	$10,187,287,211
Retail / Commercial	403	$218,733,177	358	$427,427,904	$646,161,081
Vacant	2,596	$214,500,161	62	$3,942,846	$218,443,007
Total	**48,060**	**$3,811,777,530**	**43,213**	**$8,958,468,787**	**$12,770,246,317**

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
High					
Care / Health	2	$439,714	1	$1,125,271	$1,564,985
Industrial	1	$371,010	1	$491,197	$862,207
Miscellaneous	1	$0	0	$0	$0
No Data	1	$78,453	0	$0	$78,453
Office	2	$15,763,035	1	$333,387	$16,096,422
Public / Utilities	15	$0	0	$0	$0
Residential	36	$2,531,265	34	$6,437,865	$8,969,130
Retail / Commercial	1	$800,000	1	$1,900,000	$2,700,000
Vacant	4	$334,664	0	$0	$334,664
Total	**63**	**$20,318,141**	**38**	**$10,287,720**	**$30,605,861**
Very High					
Industrial	2	$322,080	2	$1,449,820	$1,771,900
Residential	1	$45,082	1	$25,614	$70,696
Vacant	4	$1,052,338	0	$0	$1,052,338
Total	**7**	**$1,419,500**	**3**	**$1,475,434**	**$2,894,934**
Grand Total	**145,102**	**$11,595,915,150**	**131,085**	**$29,128,632,405**	**$40,724,547,555**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data, CAL FIRE
*Land and structure values

Population at Risk

The Fire Threat Zone dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for each jurisdiction and unincorporated area. Results were tabulated by jurisdiction. According to this analysis, there is a total population of 110,200 residents of Sacramento at risk to moderate or higher wildfire risk. This is shown in Table F-52.

Table F-52 City of Sacramento – Count of Improved Residential Parcels and Population by Fire Threat Zone

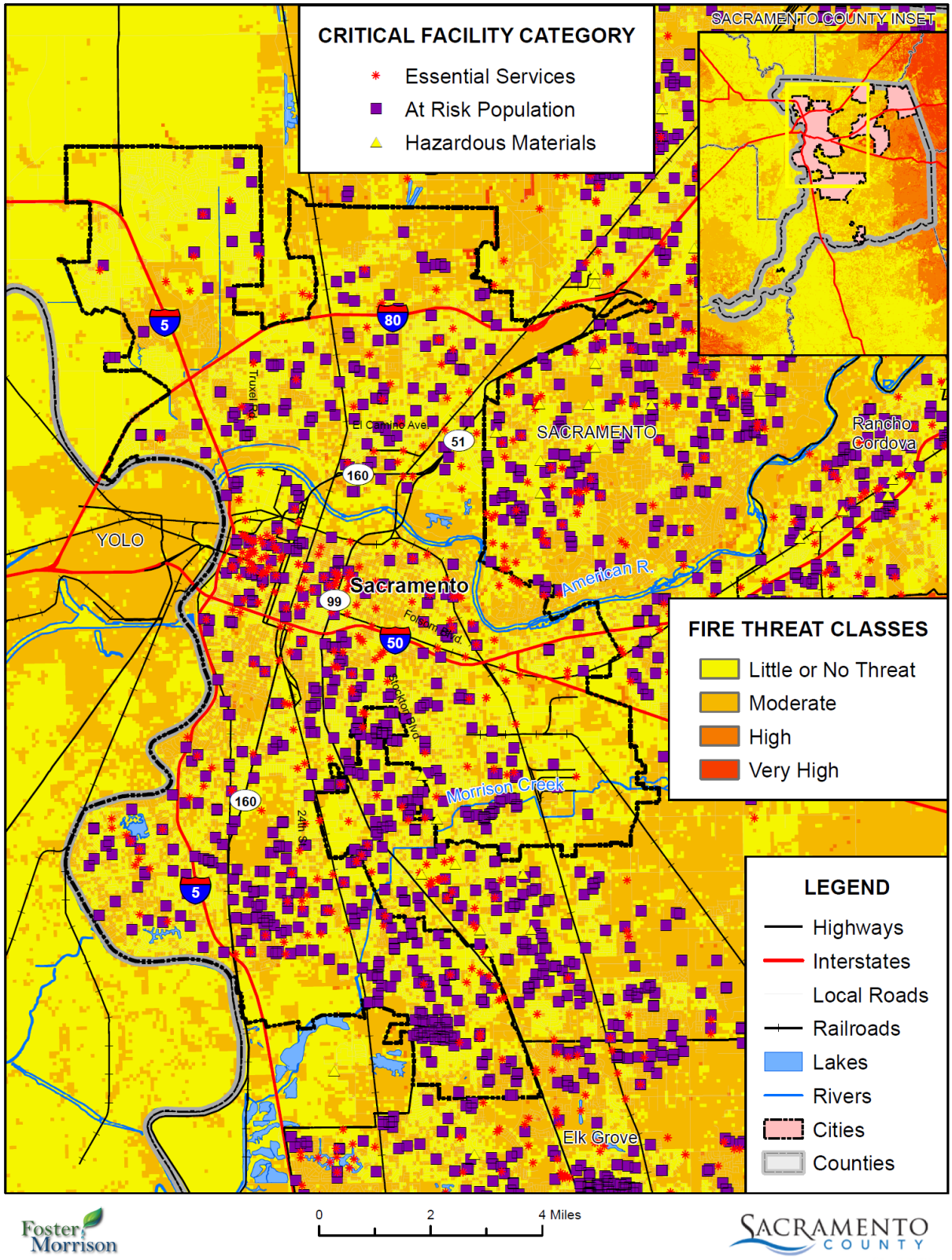
Fire Threat Zone	Improved Residential Parcels	Population*
Little or No Threat	82,879	217,142
Moderate	42,026	110,108
High	34	89
Very High	1	3

Source: Sacramento County 2016 Parcel/2015 Assessor's Data, CAL FIRE
* Average household populations for Sacramento (2.62) from the 2010 US Census were used

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect a fire severity zone provided by CAL FIRE, and if so, which zone it intersects. There are 289 facilities in the moderate or higher fire severity zone in the City. These are shown in Figure F-37 and detailed in Table F-53. Details of critical facility definition, type, name and address and jurisdiction by fire severity zone are listed in Appendix E.

Figure F-37 City of Sacramento – Critical Facilities by Fire Threat Zone



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table F-53 City of Sacramento – Critical Facilities in the Fire Severity Zone

Critical Facility Category	Facility Type	Facility Count
Little or No Threat		
Essential Services Facilities	Airport	1
	Arena	1
	Bus Terminal	5
	Convention Center	1
	Emergency Evacuation Shelter	44
	Fire Station	16
	General Acute Care Hospital	6
	Government Facilities	24
	Light Rail Stop	36
	Medical Health Facility	77
	Police	2
	Stadium	2
	Train Station	1
	Water Treatment Plant	2
	Total	**218**
At Risk Population Facilities	Adult Day Care	10
	Adult Education School	2
	Adult Residential	83
	Alternative Education School	1
	Charter School	11
	Children's Home	2
	College/University	3
	Community Day School	1
	Day Care Center	101
	Group Home	15
	Hotel	14
	Independent Study School	1
	Infant Center	10
	JAIL	1
	Private Elementary School	11
	Private High School	4
	Private K-12 School	7
	Public Continuation High School	2
	Public Elementary School	42
	Public High School	6

Critical Facility Category	Facility Type	Facility Count
	Public Middle School	10
	Residential Care/Elderly	46
	School-Age Day Care Center	19
	Social Rehabilitation Facility	1
	Total	**403**
Hazardous Materials Facilities	Oil Collection Center	3
	Total	**3**
Little or No Threat Total		**624**
Moderate		
Essential Services Facilities	Bus Terminal	1
	Emergency Evacuation Shelter	32
	Fire Station	5
	Government Facilities	5
	Medical Health Facility	20
	Police	1
	Total	**64**
At Risk Population Facilities		
	Adult Day Care	1
	Adult Education School	2
	Adult Residential	36
	Alternative Education School	1
	Assisted Living Centers	1
	Charter School	3
	College/University	1
	Community Day School	3
	Day Care Center	57
	Group Home	4
	Hotel	3
	Infant Center	4
	Private Elementary School	7
	Private High School	3
	Private K-12 School	2
	Public Continuation High School	2
	Public Elementary School	41
	Public High School	5
	Public Middle School	3
	Residential Care/Elderly	24

Critical Facility Category	Facility Type	Facility Count
	School-Age Day Care Center	22
	Total	**225**
Moderate Total		**289**
Grand Total		**913**

Source: CAL FIRE, Sacramento County GIS

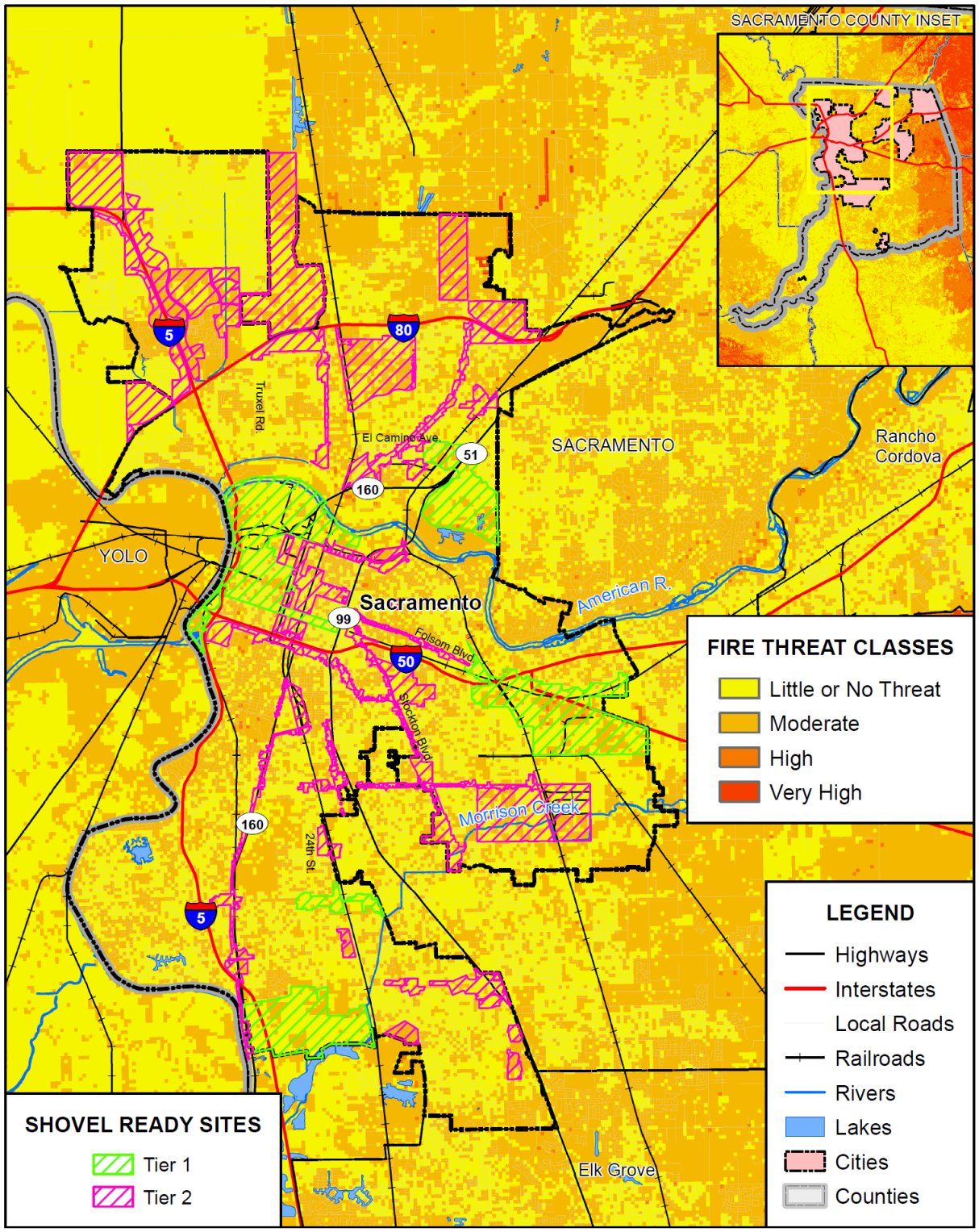
Future Development

Development may occur in the moderate or higher wildfire severity areas; however, City ordinances for buildings in these areas are enforced. Most the City's wildfire hazard area is owned by the State of California or Sacramento County and is preserved as a natural habitat.

GIS Analysis

Hazard analysis was performed to determine the number of parcels in the CAL FIRE fire threat zones within the Opportunity Areas. Results can serve as a vulnerability analysis guide for future development. Figure F-38 shows the Opportunity Areas overlaid on the fire threat zones. Table F-56 shows results of the parcel hazard analysis, sorted by Opportunity Area tier and type. There are 5,146 parcels in the moderate or higher fire threat zone.

Figure F-38 City of Sacramento – Future Development in Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table F-54 City of Sacramento – Future Development in Fire Threat Zones

Tier	Type	Parcel Count	Acres
Little or No Threat			
Tier 1	Centers	1,981	1,919
	Corridors	0	0
	Neighborhoods	0	0
	New Growth Areas	42	1,014
	Transit Center	592	1,165
	Total	**2,615**	**4,097**
Tier 2	Centers	1,004	1,294
	Corridors	3,703	1,622
	Neighborhoods	3,693	1,068
	New Growth Areas	196	1,556
	Transit Center	910	343
	Total	**9,506**	**5,883**
Little or No Threat Total		**12,121**	**9,980**
Moderate			
Tier 1	Centers	374	482
	Corridors	0	0
	Neighborhoods	0	0
	New Growth Areas	14	144
	Transit Center	114	539
	Total	**502**	**1,165**
Tier 2	Centers	576	848
	Corridors	1,099	466
	Neighborhoods	2,418	1,319
	New Growth Areas	118	692
	Transit Center	416	273
	Total	**4,627**	**3,598**
Moderate Total		**5,129**	**4,763**
High			
Tier 1	Centers	1	2
	Corridors	0	0
	Neighborhoods	0	0
	New Growth Areas	0	0
	Transit Center	5	7
	Total	**6**	**9**

Tier	Type	Parcel Count	Acres
Tier 2	Centers	0	0
	Corridors	4	0
	Neighborhoods	1	5
	New Growth Areas	6	2
	Transit Center	0	0
	Total	**11**	**7**
High Total		**17**	**16**
Grand Total		**17,267**	**14,759**

Source: CAL FIRE, City of Sacramento GIS

F.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

F.6.1. Regulatory Mitigation Capabilities

Table F-55 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Sacramento.

Table F-55 City of Sacramento's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan	Y 2015	The General Plan identifies hazards within the City. Identified mitigation actions can be implemented from this document.
Capital Improvements Program	Y 2012-2017	The Capital Improvement Program is a five-year expenditure plan which provides the City with a financial plan for the funding of infrastructure and facility projects. The program identifies projects to address the City's natural hazards.
Economic Development Plan	N	
City Emergency Operations Plans	Y 2016	This plan addresses potential hazards that face the community. Mitigation projects are not identified.
Continuity of Operations Plan	Y	Essential functions of City staff, relocation strategies, recover and reconstruction strategies have been developed in the event of a disaster. Does not identify mitigation strategies.

Transportation Plan	Y	This City's transportation plan is incorporated into the 2035 General Plan, Mobility. This portion of the plan identifies mitigation goal for greenhouse gases related to extreme weather hazards.
Stormwater Management Program	Y	This program regulates future and current stormwater standards to protect the City against high priority hazards, such as, flooding and severe storms.
Engineering Studies for Streams	Y	Many of the studies exam the impacts of a 100-year and 200-year storm. At times the studies provide mitigation options for flooding issues.
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y	The City has prepared the 2035 General Plan as a qualified plan for the reduction of greenhouse gas emissions. Therefore, the General Plan serves as the City's Climate Action Plan.
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: 2013 The Building Code is adequately enforced.
Building Code Effectiveness Grading Schedule (BCEGS) Score	Y	Score: 2/2 The Building Code is adequately enforced.
Fire department ISO rating:	Y	Rating: 2 (within city limits), 3 (in contract areas – Natomas and Fruitridge Pacific) The fire protection codes is adequately enforced.
Site plan review requirements	Y	Site plan review requirements are adequately enforced.
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Yes, the ordinance is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Subdivision ordinance	Y	Yes, the ordinance is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Floodplain ordinance	Y	Yes, the ordinance is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	2008 American River Parkway Plan is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Climate Action Plan	Y	This plan presents a set of strategies that will achieve a community-wide greenhouse gas reduction goal.
Flood insurance rate maps	Y	Yes, the FIRMs are an effective measure for reducing hazard impacts and is adequately administered and enforced.
Elevation Certificates	Y	Yes, the Elevation Certificates are an effective measure for reducing hazard impacts and is adequately administered and enforced.
Acquisition of land for open space and public recreation uses	Y	When used, acquisition of land is an effective measure for reducing hazard impacts and is adequately administered and enforced.

Erosion or sediment control program	Y	Yes, the erosion control program for the region is an effective measure for reducing hazard impacts and is adequately administered and enforced.
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: City of Sacramento

City of Sacramento 2035 General Plan

The City of Sacramento 2035 General Plan serves as a blueprint for future growth and development and provides comprehensive planning for the future. It encompasses what the City currently is and what it intends to be. It provides the general framework to achieve the desired future condition.

The General Plan includes a Public Health and Safety Element that focuses on safety issues to be considered in planning for the present and future development for the City. The General Plan also addresses Environmental Resources which considers climate change and severe weather hazards facing the City. Goals related to mitigation strategies are outlined.

City of Sacramento Emergency Operations Plan

The City of Sacramento Emergency Operations Plan (EOP) addresses the planned response for the City of Sacramento to emergencies associated with disasters, technological incidents, or other dangerous conditions created by either man or nature. It provides an overview of operational concepts, identifies components of the City emergency management organization, and describes the overall responsibilities of local, state, and federal entities. It addresses the hazards addressed in the previous 2011 City and County of Sacramento Hazard Mitigation Plan.

Sacramento County Warning and Evacuation Procedures

The City of Sacramento in conjunction with Sacramento County and other incorporated communities have a variety of systems and procedures established to protect its residents and visitors to plan for, avoid, and respond to a hazard event including those associated with floods and other natural disasters. This includes Pre-Disaster Public Awareness and Education information which is major component in successfully reducing loss of life and property in a community when faced with a potentially catastrophic incident. Much of this information is not specific to a given hazard event and is always accessible to the public on local City and County websites, while other information is incident-specific. A general overview of specific warning and evacuation systems and procedures are summarized further below.

Monitoring for Alerts, Watches and Warnings

Emergency officials constantly monitor events and the environment to identify specific threats that may affect their jurisdiction and increase awareness levels of emergency personnel and the community when a threat is approaching or imminent.

The National Weather Service (NWS), a part of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), is the prime agency for detecting meteorological threats, such as floods and severe weather. Severe weather warnings are transmitted through NOAA's Weather Radio System, considered by the federal government as the official source for weather information. Federal agencies can only look at the large scale, (e.g., whether conditions are appropriate for the formation of a thunderstorm.) Local emergency managers can provide more site-specific and timely recognition by sending out NWS trained spotters to watch the skies when the Weather Service issues a watch or a warning. The NWS page for Sacramento County and incorporated communities is accessible through the Sacramento County website and at the following: http://forecast.weather.gov/MapClick.php?zoneid=CAZ017

A flood threat recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On larger rivers, this measuring and calculating is performed by the NWS. Support for NOAA's efforts is provided by cooperating partners from state and local agencies. Forecasts of expected river stages are made through the Advanced Hydrologic Prediction Service (AHPS) of the NWS. Flood threat predictions are disseminated on the NOAA Weather Wire or NOAA Weather Radio.

On smaller rivers, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

The City and County EOPs include procedures for threat identification. The City and County work closely with the NWS for issuing an Emergency Alert System (EAS). Additional threat identification mechanisms include:

California Data Exchange Center (CDEC). The CDEC provides information for flood forecasting information at http://cdec.water.ca.gov/. The CDEC installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gages for the Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting.

Automated Local Evaluation in Real Time (ALERT) System. ALERT was created by the NWS to provide continuous and automatic reports from river levels and rainfall gauges detect impending high water levels. ALERT information includes:

- Rainfall Summary
- Stage Summary
- Storm Ready
- Sandbag Information

- Detailed Forecast
- Quantitative Precipitation Forecasts (QPF)
- NWS River Forecasts

The regional ALERT system consists of 2 base stations, and 50 gaging stations. The purpose of the County's ALERT website is to provide real time monitoring information to stage and rainfall information during storm events, which assist in informing the activation of additional warning and potential evacuation of affected areas. This information which can be accessed through links from the City of Sacramento's website to the Sacramento County website includes information for: Stream Level Summaries and Maps; and Rainfall Summaries and Maps. See https://www.sacflood.org/home.php.

Dam Protocols. Should an event trigger the activation of an Emergency Action Plan (EAP) for a potential dam failure, City and County OES receives this information via direct phone calls from the originating source/agency or from Sacramento County Dispatch and/or Cal OES. City OES then follows the notification and evacuation procedures called for in the EOP.

Notifications and Warning Systems

Once a disaster is imminent, action is taken to control the situation, save lives, protect property, and minimize the effects of the disaster. During this phase, warning systems are activated; resources and first responders notified and mobilized; and evacuations begin.

After a threat recognition system tells the emergency services office that a flood, severe weather or other hazard is coming, the next step is to notify the public and staff of other agencies and critical facilities. Providing adequate and timely notification to the public is the greatest challenge, especially with sudden or no-notice events. The earlier and more specific the warning, the greater the number of people that can implement protection measures.

As previously described, the NWS issues notices to the public using two levels of notification:

- **Watch.** Conditions are right for flooding, thunderstorms, or other hazard event.
- **Warning**. A flood or other event has started or been observed.

In coordination with established public safety warning protocols, the activated EOC will manage the dissemination of timely and adequate warnings to threatened populations in the most direct and effective means possible. Depending upon the threat and time availability, the City and County EOCs will initiate alerts and warnings utilizing any of the following methods:

- Activation of the Emergency Alert System (EAS)
- Activation of the Telephonic Alert and Warning System (Everbridge and Reverse 911)
- Activation of the Emergency Digital Information System (EDIS)
- Activation of the California Law Enforcement Mutual Aid Radio System (CLEMARS)
- Media broadcast alerts.
- Commercial or public radio or TV stations
  - ✓ Radio: KFBK 1530 am, KSTE 650, KGBY, 92.5 FM
  - ✓ TV: KCRA Channel 3, www.KCRA.com; KXTV Channel 10; KOVR Channel 13; KTXL Channel 40

- NOAA Weather Radio
- www.saccounty.net; SacramentoReady.org websites
- 211/311 Sacramento
- CalTrans 511
- Telephone trees/mass telephone notifications
- Tone activated receivers in key facilities
- Fire and Law enforcement loudspeakers
- Outdoor warning sirens
- Mobile public address sirens/systems
- Door-to-door contact
- Vulnerable population databases
- Email notifications

Multiple or redundant systems are most effective – if people do not hear one warning, they may still get the message from another part of the system. Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should have a public information aspect that details appropriate warnings and responses.

Sacramento ALERT

The City of Sacramento Police Department in partnership with all public safety agencies within Sacramento, Yolo and Placer counties, use a state-of-the-art emergency alert system known as Sacramento Alert. The system provides information to residents about emergency events quickly and through a variety of communication methods.

The alert system currently includes all listed and unlisted landline telephone numbers in Yolo, Placer, and Sacramento counties that are serviced by AT&T and Verizon.

To ensure emergency notices are received quickly both at work and home, residents are encouraged to log onto the Sacramento Alert Self- Registration Portal and provide phone numbers for both home and work, including land and cell phone numbers, email addresses, TTY device information and instant messaging information.

Residents will only receive alerts that are critical and time-sensitive, including: flooding, levee failures, severe weather, disaster events, unexpected road closures, missing persons, and evacuations of buildings or neighborhoods in specific geographic locations.

The system, which uses Everbridge Alert and Notifications System, was made possible for all three counties by a grant from CAL OES and supported by CA Department of Water Resources, Flood Operations Center.

StormReady

The NWS established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. The City of Sacramento and Sacramento County are StormReady certified. StormReady communities are better prepared to save live from the onslaught of severe weather through advanced planning, education, and awareness. Being designated a StormReady community by the NWS is a good measure of a community's emergency warning program for weather hazards.

Evacuation and Shelter-in-Place

The principle of evacuation is to move citizens from a place of relative danger to a place of relative safety, via a route that does not pose significant danger. There are six key components to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., disabled, hospital patients, school children)

Evacuation planning also considers sheltering options for those that cannot get out of harm's way. Shelters can also serve as a temporary place after the storm for those who have lost their homes.

The City maintains an Evacuation Plan that outline strategies and protocols for medium to high-level (catastrophic) evacuation events. These plans also include procedures for sheltering to provide people affected by a disaster with a safe, temporary place to be housed during or immediately after a disaster until they can either return to their homes or be relocated to other housing facilities. Highlights of these City plans are detailed below.

City of Sacramento Evacuation Plan

The Evacuation Plan is an Annex to the City of Sacramento's Emergency Operations Plan. As such its intent is to support and guide the City's Emergency Managers, Emergency Operations Center staff, and other governmental and non-governmental agencies who would be involved with an Evacuation Event in the City. The Evacuation Plan provides evacuation specific strategy and information that is intended to support but not supplant operational strategy as provided in the City's EOP and Departmental operations plans.

The primary threat that would incite the City to begin an evacuation event is a flood. As such, much of the material was written with flood as the primary concern. The overall evacuation strategy and associated plan details, however, would also serve the City in conducting an evacuation due to other hazards and as such the Plan is intended to provide an all-hazards approach.

The plan is organized such that the first five sections provide quick reference materials to support emergency workers. The plan begins with Section 1 – Triggers and Activation, which details the flood

threat triggers that would initiate the opening and staffing of the City EOC, and initiate notification, evacuation, and sheltering actions that need to take place as the imminent and substantial threat of a flood increases. Section 2 - Roles, Responsibilities, and Resources is meant to support emergency managers with deciding minimal personnel requirements to complete actions defined in the trigger section, who they should seek to fulfill certain roles, and to provide some general notion of resources likely already available for the situation. The next part, Section 3- Emergency Public Notifications, provides the emergency staff with a brief description of each of the notification systems the City has available to notify the citizenry, along with a How To Activate description. Section 4 – Area Evacuation Control by Police Beats, provides evacuation routes for every area of the City as broken out by the Sacramento Police Department Beat maps. Many critical facilities, schools and shelters in each beat are identified. This information is useful both for supporting evacuations out of an area, and supporting evacuees coming into an area. In Section 5 – Care and Sheltering, the community centers and schools that have been assessed as available and ready to support sheltering of people and their pets, and may be assessable to people with disabilities, are listed with contact information.

Evacuation maps, by police beat, are shown. Flood scenarios are also given, and evacuation routing planned for. An example is shown in Figure F-39.

Figure F-39 Sacramento River Sutter Scenario Evacuation Routes for Beat 1-A

Evacuation Routes: 0-4 Hours
Police Beat 1A

Flood Scenario **1 - Sacramento River - Sutter**

Status *PASSABLE STREETS (1)*

Street	*Direction*	*# of Lanes*	*Comments*
ARENA BLVD	E/W	4	
(2) DEL PASO RD	E/W	4	
EL CENTRO RD	N/S	2	
(2) ELKHORN BL	E/W	2	
(2) ELVERTA RD	E/W	2	
(2) GARDEN HWY	E/W	2	
N MARKET BLVD	E/W	4	
NATOMAS BLVD	N/S	4	
(2) SAN JUAN RD	E/W	2	

Notes:
(1) Streets that are expected to be open for at least the first 4 hours of an event.
(2) Roadways which take evacuees directly out of the flood area.
Source: City of Sacramento Evacuation Plan, 2008

Rescue and Evacuation Maps

These maps show the depth of flooding with a 300-foost levee breach, 100-year storm, and running 10 days straight without mitigation. These maps also show the rescue and evacuation areas. The rescue areas show which areas would have 2' of water within an hour. These maps are available online at: http://mysacramento.org/utilities/flood-ready/city_county_neighborhood_flood_depth_maps.cfm.

More information on the importance of including evacuation procedures and maps as part of a sound mitigation strategy can be found in Appendix C to this plan. In addition, Appendix C contains additional information on post mitigation policies and procedures. More information specific to the City can be found in their various other response and recovery plans.

City of Sacramento Post Disaster Mitigation Policies and Procedure

The City of Sacramento EOP, and related documents, are intended to facilitate multi-agency and multi-jurisdictional coordination during emergencies including hazard events. Through it policies and procedures it seeks to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system in order to return the community to their normal state of affairs.

The goal of the recovery phase of an emergency incident or natural disaster is to return the residents, public services and private sector in an impacted area to their pre-disaster state, and through implementation of hazard mitigation measures, seek to prevent, as much as possible, similar damage, destruction or chaos after incidents and disasters in the future. Sacramento policies include objectives, responsibilities and procedures for restoration of services and returning of the affected area to its pre-emergency condition. Mitigation is emphasized as a major component of recovery efforts.

Post-disaster recovery activities are designed to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrolling evacuated areas to prevent looting
- Providing safe drinking water
- Monitoring for diseases
- Vaccinating residents for tetanus and other diseases
- Clearing streets
- Cleaning up debris and garbage

As the initial and sustained operational priorities are met, emergency management officials consider the recovery phase needs. Short-term and long-term recovery is covered in EOP and related documents. Short-term recovery operations begin during the response phase and include rapid debris removal and cleanup and restoration of essential services to minimum operating standards. Long-term recovery operations work to restore the community to pre-disaster conditions and include hazard mitigation activities, restoration and reconstruction of public facilities, and disaster response cost recovery. Local Assistance Centers and/or Disaster Recovery Centers are opened and damages assessed. Elements of recovery include:

- Windshield survey and documentation of flood impacts
- Safety assessment
- Damage assessments
- Engineering assessments
- Post-flood building entry
- High water marks (also risk communication)
- Code enforcement/triage process

- Permitting process
- Temporary housing
- After action reporting

Regulating Reconstruction

Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

Mitigation

Mitigation measures to reduce the risk and vulnerability of a community to future disaster losses can be implemented in advance of a disaster event and also as part of post-disaster recovery efforts. Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. Effective mitigation can break the cycle of disaster damage, reconstruction, and repeated damage. Categories of mitigation measures include prevention, emergency services, property protection, natural resource protection, structural, and public information, many of which are discussed throughout this document.

Additional mitigation elements specific to the Sacramento area are discussed further below.

LHMP

The Federal Disaster Mitigation Act (DMA) of 2000 requires communities to develop an approved Local Hazard Mitigation Plan (LHMP) to remain eligible to apply for certain FEMA Hazard Mitigation Assistance (HMA) grants. Applications submitted for funding from the FEMA HMA grant programs must "be consistent with" the mitigation strategy outlined in the LHMP. Sacramento County and the City of Sacramento are in process with the update of their 2016 LHMP Update. Once complete and adopted, this LHMP update will provide continued eligibility for all participating jurisdictions for FEMA pre- and post- disaster mitigation funding.

Grant Funding

An understanding of the various funding streams and opportunities will enable the communities to match up identified flood mitigation projects with the grant programs that are most likely to fund them. Additionally, some of the funding opportunities can be utilized together. Mitigation grant funding opportunities available pre- and post- disaster include the following:

- FEMA Hazard Mitigation Assistance (HMA) Grants (Pre-disaster Mitigation (PDM), Flood Mitigation Assistance (FMA), and Hazard Mitigation Grant Program (HMGP))
- FEMA Public Assistance Section 406 Mitigation
- Community Development Block Grants
- Small Business Loans
- Increased Cost of Compliance

Other Key City of Sacramento Emergency Plans

- ✓ EOP, 2005; 2016 Update in process
- ✓ Annexes in Process for: Mass Care/Sheltering, Temporary Housing, Human Services
- ✓ Evacuation Plan for Flood and other Emergencies, 2008
- ✓ Continuity of Operations/Continuity of Government, 2009
- ✓ Field Services – Drainage Collection, Standard Operating Procedures (SOPs) for Emergency Response, 2007
- ✓ Utilities Operation Center Plan, 2007
- ✓ Resources and References – Drainage Collection
- ✓ Local Hazard Mitigation Plan, Update 2011, 2016 Update in process

Other Key City Data Related to Education and Communication of Flood Hazard Information

- FEMA DFIRMs and Flood Insurance Studies (FIS)
- DWR BAM maps
- Ultimate flood depths map
- Areas dependent on levees map
- Levee break scenario mapping
- Historical flood information which may include location of nearest high water mark, repetitive loss area, flood photos, and flood calls
- Rescue and evacuation maps
- Community assets inventory: people, structures, infrastructure, critical facilities
- Emergency Action Plans

Climate Action Plan

The City's Climate Action Plan (CAP) was adopted in February 2012 pursuant to General Plan Policy ER 6.1.7. The City's CAP presents a set of strategies that will achieve a community-wide greenhouse gas reduction goal. Many of these strategies will have environmental co-benefits including improving air quality.

City of Sacramento Extreme Heat Plan/Cooling Centers

When summer temperatures rise, staying safe in the heat is critical for Sacramento residents. The City publishes information on its website on how to deal with extreme heat.

> *It is necessary to take precautions to ensure that you, your friends and family, neighbors, and pets don't suffer the effects of extreme heat. Make sure that you stay hydrated as much as possible and try to limit your activities to indoor areas that are air conditioned to avoid possible heat–related illnesses*

The City has a cooling center plan. The criteria for opening one includes temperatures of 105 degrees or more for three consecutive days WITH night time low temperatures of 75 or above. If cooling centers are open at faith-based and other community facilities, the list is posted at 211sacramento.org or is available by calling 2-1-1.

The City website notes that:

A fun way to beat the heat and cool off is by using any of the 17 pools that are open in the City. Kids swim for as little as $2 per session, adults are $4. Discounts are available. There is free admission at play pools located in Colonial Park, Land Park, Robertson Park, Mama Marks Park, and Bertha Henschel Park.

A complete list of pools and openings can be found on the City's website.

Ordinances

The City of Sacramento has many ordinances related to mitigation. These ordinances can be primarily or secondarily focused on mitigation.

Ordinances Primarily Focused on Mitigation

Zoning and Land Use Ordinance (Title 17)

This title and its accompanying maps are known as "the comprehensive zoning plan of the City of Sacramento." It is adopted as a further refinement of the land use plan for Sacramento under the provisions of the "Conservation and Planning Law of the State of California." The purpose of these regulations is to do the following:

- Regulate the use of land, buildings, or other structures for residences, commerce, industry, and other uses required by the community;
- Regulate the location, height, and size of buildings or structures, yards, courts, and other open spaces, the amount of building coverage permitted in each zone, and population density, among other things;
- Divide the city into zones of such shape, size, and number best suited to carry out these regulations, and to provide for their enforcement;
- Ensure the provision of adequate open space for recreational, aesthetic and environmental amenities.

These zoning regulations are necessary to:

- Encourage the most appropriate use of land;
- Conserve, stabilize and improve the value of property;
- Provide adequate open space for recreational, aesthetic and environmental amenities;
- Control the distribution of population;
- Promote health, safety and the general welfare.

Subdivision Ordinance (Title 16)

This title is adopted pursuant to Article XI, Section 7 of the California Constitution, and to supplement and implement the Subdivision Map Act, Government Code Section 66410, et seq., and may be cited as the subdivision ordinance of the city. The regulations established by this title are designed to assist in the

systematic implementation of the general plan, specific and community plans, the zoning ordinance, and other land use regulations, and to provide for public needs, health and safety, convenience, and general welfare.

Neither the approval nor conditional approval of the tentative map shall constitute or waive compliance with any other applicable provisions of the city code or other applicable ordinances or regulations adopted by the city, nor shall any such approval authorize or be deemed to authorize a violation or failure to comply with other applicable provisions of the city code or other applicable ordinances or regulations adopted by the city. Nothing in these regulations shall be construed to permit the premature or haphazard subdivision of lands in violation of the applicable zoning and land use regulations.

Building Code (Title 15)

The chapters of this title shall be known and referred to as the Sacramento City Building Code, and may be cited as such, and will be referred to as "this code" or "this building code." The purpose of this code is to provide minimum requirements and standards for the protection of the public safety, health, property, and welfare. This code is not intended as a design specification or an instructional manual for untrained persons. This code shall apply to all new construction and to any alterations, repairs, relocations or reconstruction of a building or any portion thereof including any electrical, mechanical, gas, or plumbing equipment installed on any property or used on or within any building.

As part of the construction permitting process, the City requires completed reports of soil conditions at the specific construction sites to identify potentially unsuitable soil conditions including liquefaction, settlement, subsidence, lateral spreading, and collapse. The City requires that these evaluations be conducted by registered soil professionals, and measures to eliminate inappropriate soil conditions must be applied, depending on the soil conditions. The design of foundation and excavation-wall support must conform to the analysis and implementation criteria described in the CBC, Chapters 16, 18, 33, and the appendix to Chapter 33. Adherence to the CBC and City policies contained in the 2035 General Plan would ensure the maximum practicable protection available for users of buildings and infrastructure and their associated trenches, slopes, and foundations.

Floodplain Management Ordinance (Chapter 15.104)

This chapter is designed to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas. This chapter regulates development which is or might be dangerous to health, safety and property by requiring at the time of initial development or substantial improvement methods of protection against flood damage in areas vulnerable to flooding in order to minimize flood damage. This chapter regulates the following developmental impacts: filling, grading or erosion, alteration of natural flood plains, stream channels or water courses, the imposition of barriers which increase flood hazards, or any other impacts that aggravate or cause flood hazards. This ordinance establishes the City's participation in the NFIP, and establishes base flood elevations at 1 foot above the FIRM flood depth for zones A, AH, and AE. In zones AO, the lowest floor will be elevated to one foot above the FIRM flood depth, or two feet above the highest adjacent grade if not depth number is specified.

Since the floodway is an extremely hazardous area due to the velocity of flood waters which carry debris, potential projectiles, and erosion potential, the following provisions apply:

- Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless certification by a registered professional engineer is provided demonstrating that encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.
- If the above subsection of this section is satisfied, all new construction and substantial improvements shall comply with all other applicable flood hazard reduction provisions of this section.

The local administrator is empowered to issue a variance only for purposes consistent with the objectives of FEMA's floodplain management regulations. However, a variance could affect flood insurance rates and may result in flood insurance premium rates on structures which are beyond the means of the person receiving the variance. FEMA requires the city to make an annual report on any variance which is granted, and if FEMA determines that such variance is inconsistent with the objectives of sound floodplain management, FEMA may take action to suspend the city from the National Flood Insurance Program.

Weed and Rubbish Abatement Ordinance (Chapter 8.28)

In order to reduce wildfire potential in the City, excess weeds and rubbish must be mitigated. Weed and rubbish abatement in the city is performed pursuant to Title 4, Division 3, Part 2 of the Government Code. This ordinance places the fire chief as the code enforcement director.

Stormwater Management Ordinance (Chapter 13.16)

This chapter is known as the Stormwater Management and Discharge Control Code. The purpose of this chapter is to protect and promote the health, safety and general welfare of the citizens of the City by controlling non-stormwater discharges to the stormwater conveyance system, by eliminating discharges to the stormwater conveyance system from spills, dumping, or disposal of materials other than stormwater, and by reducing pollutants in urban stormwater discharges to the maximum extent practicable. This chapter is intended to assist in the protection and enhancement of the water quality of watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the Federal Water Pollution Control Act, Porter-Cologne Water Quality Control Act, and National Pollutant Discharge Elimination System (NPDES) Permit No. CAS082597, as such permit is amended and/or renewed.

Grading and Erosion and Sediment Control (Chapter 15.88)

The City's grading ordinance is enacted for the purpose of regulating grading on property within the city to safeguard life, limb, health, property and the public welfare; to avoid pollution of watercourses with nutrients, sediments, or other materials generated or caused by surface water runoff from construction sites; to comply with the City's National Pollution Discharge Elimination System (NPDES) Permit No. CAS082597 issued by the California Regional Water Quality Control Board; and to ensure that the graded site within the city limits complies with all applicable City ordinances and regulations. The grading ordinance is intended to control all aspects of grading operations within the city.

Ordinances Secondarily Focused on Mitigation

City of Sacramento Tree Preservation Ordinance

The City of Sacramento adopted the Tree Preservation Ordinance to protect trees as they are a significant resource for the community. It is the City's policy to retain trees whenever possible regardless of their size. When circumstances will not allow for retention, permits are required to remove heritage trees that are within the City's jurisdiction. Removal of, or construction around, trees that are protected by the tree ordinance are subject to permission and inspection by City arborists. The City of Sacramento Tree Service Division reviews project plans and works with the City of Sacramento Public Works during the construction process to minimize impacts to street trees in the city.

Historic Preservation Ordinance

The City of Sacramento's historic preservation program began in 1975 with the enactment of the City's first Historic Preservation Ordinance. The current Historic Preservation Ordinance (No. 2006-063) was enacted in October 2006. The purpose of the Historic Preservation Ordinance is to identify, protect, and encourage the preservation of significant resources; maintain an inventory and ensure the preservation of these resources; encourage maintenance and rehabilitation of the resources; encourage retention, preservation, and re-use of the resources; safeguard city resources; provide consistency with state and federal regulations; protect and enhance the city's attraction to tourists; foster civic pride in the city's resources; and encourage new development to be aesthetically compatible.

F.6.2. Administrative/Technical Mitigation Capabilities

Table F-56 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Sacramento.

Table F-56 City of Sacramento's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning and Design Commission	Y	Approves variances, special permits, tentative maps, and development plans
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Department of Utilities', RD1000, and American River Flood Control District, and State of CA maintain the drainage system, pump stations, and levees within the City. Public Works trims trees.
Mutual aid agreements	Y	Mutual aid agreements are maintained, but reside with different departments in the City.
Other	Y	Law and Legislation Committee

Staff	Y/N FT/PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	Y	Staff is adequate and trained. Coordination efforts between agencies.
Floodplain Administrator	Y	Staff is adequate and trained. Coordination efforts between agencies.
Emergency Managers	Y	Staff is adequate and trained. Coordination efforts between agencies.
Community Planners	Y	Staff is adequate and trained. Coordination efforts between agencies.
Civil Engineers	Y	Staff is adequate and trained. Coordination efforts between agencies.
GIS Coordinators	Y	Staff is adequate and trained. Coordination efforts between agencies.
Other		
Technical		
Warning systems/services (Everbridge, outdoor warning signals)	Y	Sacramento, Yolo, and Placer County oversee an alert system called Everbridge. In addition, the City has outdoor warning signals.
Hazard data and information	Y	Sacramento County Environmental Management runs a hazardous materials program
Grant writing	Y	The City employees grant writers. The Department of Utilities has a grant writer on staff in the Business Services Division.
Hazus analysis	N	Many of the studies performed include Hazus analysis.
California Data Exchange Center/ALERT system	Y	River and creeks conditions, water levels, forecasts, etc.
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: City of Sacramento

F.6.3. Fiscal Mitigation Capabilities

Table F-57 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table F-57 City of Sacramento's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Funding has been used for mitigation action projects. It also can be used for future projects.

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Authority to levy taxes for specific purposes	Y	There are special taxes to mitigate hazards (i.e., SAFCA development impact fee and property tax assessment). This method can be used in the future.
Fees for water, sewer, gas, or electric services	Y	Utility bill fees and development review costs are used and can be used in the future.
Impact fees for new development	Y	Development impact fees for certain hazards
Stormwater utility fee	Y	
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	Y	
Community Development Block Grant	Y	
Other federal funding programs	Y	FEMA, HUD, etc.
State funding programs	Y	DWR, SRF loans, etc.
Other		
How can these capabilities be expanded and improved to reduce risk?		
Future increases in the City's drainage rate will allow for needed improvements to the system. The improvements will reduce the flooding risk.		

Source: City of Sacramento

F.6.4. Mitigation Education, Outreach, and Partnerships

Table F-58 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information. More information can be found below the table.

Table F-58 City of Sacramento's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	American River Parkway Foundation Certified Emergency Response Teams (CERT)

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	The City of Sacramento has multiple public education campaigns that promote preparedness and mitigation information. The campaigns include: Stormwater Program CRS Program for Public Information (Flood) Fire Suppression Fire Safety
Natural disaster or safety related school programs	No	
StormReady certification	Yes	
Firewise Communities certification	No	
Public-private partnership initiatives addressing disaster-related issues	Yes	
Other		
How can these capabilities be expanded and improved to reduce risk?		
Work with teachers, students, and school administrators to develop a program that addresses natural hazards and preparedness.		

The City currently has several outreach programs that are conducted on an annual basis:

- Public Assistance: The City has a floodplain information hotline (916) 808-5061 or floodinfo@ciytofsacramento.org for citizen inquiries about flood insurance, development standards in a floodplain, and flood map information.
- "Be Flood Ready" brochure – this brochure is sent annually to all parcel owners in the City of Sacramento through their Utility bill in October/November.
- "Be Flood Ready" billboard – this billboard is posted up in various locations within the City of Sacramento in October/November.
- Dam Brochure – this brochure is sent annually in the Utility bill in November/December to warn residents about how to be prepared in case of a dam break.
- Repetitive Loss Outreach. The City annually mails a letter of notice on property protection to repetitive loss properties.
- Storm Preparation Outreach
  - ✓ The City annually encourages residents to purchase flood insurance with bus advertising and a billboard along Business 80.
  - ✓ The City works closely with its Fire Department and the City/County Office of Emergency Services to share information at community events about flood risks in our community and flood insurance.
  - ✓ The City is actively working with community volunteers through "Sacramento Ready" to prepare our community for flooding emergencies. The group works with Community Emergency Response Volunteers, American Red Cross and local service agencies to have a team of volunteers ready to assist residents with winter weather preparation and planning, evacuation, and care and shelter.

- "Flood Watch". SAFCA develops and distributes a newsletter called, "Flood Watch", to provide information to the public on levee work status, and assessment information. SAFCA periodically holds community meetings in coordination with the City in areas where levee work is being completed.
- "Flood Risk Notice". As part of Assembly Bill 156, which is part of the Central Valley Flood Protection Plan, the Department of Water Resources is required to send out a "Flood Risk Notice" to all property owners receiving protection from State-Federal project levees. The goal of the notice is to raise flood risk awareness and encourage actions on an individual basis to reduce flood losses. The first notice was sent in approximately September 2010 and will be continued to be sent annually. Instead of sending out a separate notice to all floodplain residents in the City, the City used this notice in 2010 instead as required by the Community Rating System program.
- "Program for Public Information". The City are completed an outreach program under the Community Rating System guidelines, which gives citizens discounts on flood insurance. This strategy will under Activity 330-Outreach Projects.
- The City sponsors/encourages participation in area clean up events and funded several clean up events in Spring/Summer through its Community Action Grant Program.
- The City funds the Sacramento Splash in the Class program, which provides presentations focused on stormwater pollution prevention to third through sixth grade classrooms. On average, the presentations are given to 102 classrooms throughout the City.
- The City supports/sponsors the Pups in the Parkway program which provides pet waste stations along the American River Parkway including Discovery Park.
- The City carries out stormwater pollution prevention outreach by participating in various community outreach events throughout the year (i.e., Earth Day events, cultural events, etc.).
- The City is part of the Sacramento Stormwater Quality Partnership, and as a partner, the City both sponsors and directly carries out stormwater pollution prevention outreach activities. These activities include, but are not limited to:
  - ✓ Participating in clean up events and engaging the public in clean ups.
  - ✓ Implementing pet waste reduction programs and promoting the use of pet waste disposal stations.
  - ✓ Developing and distributing stormwater pollution prevention brochures and promotional materials. Conducting mixed media campaigns (e.g., radio, print ads, television, signage, etc.).
  - ✓ Implementing home and garden care programs, including the distribution of educational materials (e.g., Our Water Our World, Waterwise, and River-Friendly Landscaping).
  - ✓ Increasing awareness on the impact of fundraiser carwash discharges in waterways by maintaining the River-Friendly Fundraiser Carwash Program (RFFCP) website and distributing promotional materials
  - ✓ Working with the Business Environmental Resource Center (BERC) to encourage stormwater pollution prevention and to establish stormwater practices for businesses and mobile businesses

F.6.5. Other Mitigation Efforts

To mitigate winter storms and the flooding associated with them, the Department of Utilities and Department of Public Works perform work year around.

- During the summer, crews assist in maintaining channels, canals and creeks by removing weeds and debris that can impede water flow during winter storms.
- Floodgates are inspected and maintained throughout the City. Also inspected and maintained are drainage inlets, pumps and generators, which are vital tools in removing water from City streets and discharging storm water into local waterways.

- Materials are stored close to floodgates or areas prone to flooding. Not only does this provide easy access to materials when needed, but also it helps City crews to open a sandbag station within two hours of being instructed to do so.
- Drills are held to rehearse floodgate closures to ensure that they can be quickly closed in an emergency.
- The City's 100,000 public trees are pruned on a 10-year cycle and crews respond promptly to calls about trees that may pose a safety hazard.
- During a storm event, extra crews are on-call after hours responding to hundreds of calls to 311.

F.7 Mitigation Strategy

F.7.1. Mitigation Goals and Objectives

The City of Sacramento adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

F.7.2. 2016 LHMP Update Mitigation Strategy

The City of Sacramento further adopts the overall mitigation Strategy developed by the HMPC and described in Chapter 5 Mitigation Strategy. This includes the following umbrella mitigation strategy:

- Communicate the hazard information collected and analyzed through this planning process as well as HMPC success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- Implement the action plan recommendations of this plan.
- Use existing rules, regulations, policies, and procedures already in existence.
- Monitor multi-objective management opportunities so that funding opportunities may be shared and packaged and broader constituent support may be garnered.

In addition, the City through its updates to the City's EOP and their Comprehensive Flood Management Plan, as well as through implementation of many of their mitigation actions detailed below, are committed to evaluating and revising their post-disaster redevelopment and mitigation policies and procedures as described in Chapter 5, Mitigation Strategy for this 2016 LHMP Update.

F.7.3. NFIP Mitigation Strategy

Given the flood hazard in the Planning Area, an emphasis will be placed on continued compliance with the National Flood Insurance Program (NFIP) and participation by Sacramento County and the City of Sacramento in the Community Rating System. Other cities are encouraged to begin participating in the CRS. Detailed below is a description of the City's flood management program to ensure continued compliance with the NFIP.

City of Sacramento's Flood Management Program: Recent Activities

The City of Sacramento has participated in the Regular Phase of the NFIP since September 1978. Since then, the City has administered floodplain management regulations that meet the minimum requirements

of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country.

The City of Sacramento submitted applications to participate in the CRS program in December 1990 and again 1992, shortly after its 1990 launch. It is designed to recognize floodplain management activities that are above and beyond the NFIP's minimum requirements. CRS is designed to reward a community for implementing public information, mapping, regulatory, loss reduction and/or flood preparedness activities. On a scale of 10 to 1, the City is currently ranked Class 5. As of January 2011, the City of Sacramento receives the highest reduction in flood insurance rates, about $1.7 million per year, than any other community in California.

The activities credited by the CRS provide direct benefits to the City of Sacramento and its residents, including:

- Enhanced public safety;
- A reduction in damage to property and public infrastructure;
- Avoidance of economic disruption and losses;
- Reduction of human suffering; and
- Protection of the environment.

The activities that City of Sacramento implements and receives CRS credits include:

- **Activity 310** – Elevation Certificates: The Department of Utilities (DOU) maintains elevation certificates for new and substantially improved buildings. Copies of elevation certificates are made available upon request. Elevation Certificates are also kept for post-FIRM and pre-FIRM buildings. The City maintains hard copies in folders at DOU (away from the permit office) and electronically in the City's building permit database.
- **Activity 320** – Map Information Service: Credit is provided for furnishing inquirers with flood zone information from the community's Flood Insurance Rate Map (FIRM), publicizing the service annually and maintaining records.
- **Activity 330** – Outreach Projects: A community brochure is mailed to all properties in the community on an annual basis. An outreach brochure is mailed annually to all properties in the community's Special Flood Hazard Area (SFHA). The community also provides flood information through displays on buses and billboards, and at community events.
- **Activity 340** – Hazard Disclosure: Credit is provided for state and community regulations requiring disclosure of flood hazards.
- **Activity 350** – Flood Protection Information: Documents relating to floodplain management are available in the reference section of the Sacramento Public Library. Credit is also provided for floodplain information displayed on the City's website.
- **Activity 360** – Flood Protection Assistance: The community provides technical advice and assistance to interested property owners and annually publicizes the service.
- **Activity 410** – Additional Flood Data: Credit is provided for conducting and adopting flood studies for areas not included on the flood insurance rate maps and that exceed minimum mapping standards. Credit for determining Base Flood Elevations in approximate A zones. Credit is also provided for a cooperating technical partnership agreement with FEMA.
- **Activity 420** – Open Space Preservation: Credit is provided for preserving approximately 5 acres in the Special Flood Hazard Area (SFHA) as open space. Credit is also provided for open space land that is deed restricted.

- **Activity 430** – Higher Regulatory Standards: Credit is provided for enforcing regulations that require freeboard for new and substantial improvement construction, protection of floodplain storage capacity, natural and beneficial functions, enclosure limits, other higher regulatory standards, land development criteria and state mandated regulatory standards. Credit is also provided for a Building Code Effectiveness Grading Schedule (BCEGS) Classification of 2/2, certification as a floodplain manager, EMI NFIP class graduates, and the adoption of the International Building Codes.
- **Activity 440** – Flood Data Maintenance: Credit is provided for maintaining and using digitized maps in the day to day management of the floodplain. Credit is also provided for maintaining copies of all previous FIRMs and Flood Insurance Study Reports.
- **Activity 450** – Stormwater Management: The community enforces regulations for stormwater management, soil and erosion control, and water quality. Credit is also provided for watershed management master planning.
- **Activity 510** – Floodplain Management Planning: Based on NFIP Repetitive Losses data as of January 2016, the City has 21 repetitive loss properties and is a Category C community for CRS purposes. Credit is provided for preparing an area analyses the covers the repetitive loss areas.
- **Activity 520** – Acquisition and Relocation: Credit is provided for acquiring and relocating buildings from the community's flood hazard area.
- **Activity 530** – Flood Protection: Credit is provided for buildings that have been flood proofed, elevated or otherwise modified to protect them from flood damage.
- **Activity 540** – Drainage System Maintenance: Portions of the community's drainage system are inspected regularly throughout the year and maintenance is performed as needed by the Department of Water Resources. Records are being maintained for both inspections and required maintenance. Credit is also provided for an ongoing Capital Improvements Program. The community also enforces a regulation prohibiting dumping in the drainage system.
- **Activity 610** – Flood Warning Program: Credit is provided for a program that provides timely identification of impending flood threats, disseminates warnings to appropriate floodplain residents, and coordinates flood response activities.
- **Activity 620** – Levees: Credit is provided for maintaining levees, having a warning system, a response operations, and critical facilities planning.
- **Activity 630** – Dam Safety: All California communities currently receive CRS credit for the state's dam safety program.

City of Sacramento's Flood Management Program: 5-year Outlook

The following is a description/list of those flood management activities that will be enhanced and/or added over the next five years to show continued compliance with the NFIP

- Continuing in the CRS program, while making an effort to implement new CRS activities to benefit the City of Sacramento and residents.
- Working with more Repetitive Loss properties to mitigate flooding problems and implement the Repetitive Loss Area Analysis
- Adding more restrictions in Building Divisions on building next to a levee and compensatory storage
- Increasing the amount of public outreach by implementing a Program for Public Information
- Implementing the requirements in the State of California's Central Valley Flood Protection Plan
- Improving the City/County's emergency response system
- Implementing flood control projects to better protect property and life safety

More information about the floodplain administration in the City of Sacramento can be found in Table F-59.

Table F-59 City of Sacramento Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	Policies: 43,937 Total Premiums: $20,734,054 Coverage: $14,355,078,500
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	Paid Claims: 967 Amount of Paid Claims: $9,906,307.99 Substantial Damage Claims: 33
How many structures are exposed to flood risk within the community?	149,004
Describe any areas of flood risk with limited NFIP policy coverage	The Natomas Basin (A99) is an area within the City that has a relatively low percentage of NFIP policies compared to the number of insurable structures.
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	Yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	The City reviews permits, provides flood insurance information, GIS support, and many outreach/education projects
What are the barriers to running an effective NFIP program in the community, if any?	The large community size makes communication with all residence difficult. Also, changes in the status of level certifications have cause major changes in the City's floodplains over the years.
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	7/16/2008
Is a CAV or CAC scheduled or needed?	Yes
Regulation	
When did the community enter the NFIP?	FM to complete
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes, Freeboard and local floodplain requirements
Provide an explanation of the permitting process.	Permit system flags permits applied for in floodplain areas. Floodplain staff review the permit and advise the owner of flood protection measures that must be done. Permit is not issued until flood projection requirements are met.
Community Rating System	
Does the community participate in CRS?	Yes

NFIP Topic	Comments
What is the community's CRS Class Ranking?	5
What categories and activities provide CRS points and how can the class be improved?	Receive points for all categories. Class will be improved by new Plan for Public Information, additional outreach to stakeholders, flood response projects, and completion of Comprehensive Flood Management Plan
Does the plan include CRS planning requirements?	Yes

F.7.4. Mitigation Actions

The planning team for the City of Sacramento identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Multi-Hazard Actions

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: All hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Local jurisdiction reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9. Specifically, this section requires that the City must adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the safety element of its general plan adopted pursuant to subdivision (g) of Section 65302. It is important for the City of Sacramento to incorporate the City's LHMP annex into the safety element as part of the next general plan update.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: The Long Range Planning section of the Community Development Department will be managing the City of Sacramento's General Plan Update.

Responsible Office: City of Sacramento Community Development Department

Priority (H, M, L): High

Cost Estimate: $100,000

Potential Funding: Local budgets, State and/or Federal Grant

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: Concurrent with the next General Plan Update (2018-2020).

Action 2. Coordination with Relevant Organizations and Agencies to Consider the Impacts of Urbanization and Climate Change on Long-Term Natural Hazard Safety

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: In 2014, due to extremely low water levels, the City of Sacramento Department of Utilities performed an emergency retrofit of the water intake on the Sacramento River. This is an example of the kind of adaptive measures that may be required in the future as Sacramento adapts to the impacts of climate change.

Climate change and urbanization may intensify natural and manmade hazards, sometimes combining to amplify hazards such as increased flooding, water shortages, disease vectors, and air pollution. The City of Sacramento provides infrastructure and services including water supply, wastewater, stormwater drainage, solid waste, street and urban forest maintenance. Management plans and specifications are prepared and updated by various City Departments and agencies, including but not limited to:

- Urban Water Management Plan – City of Sacramento Department of Utilities
- Comprehensive Flood Management Plan - City of Sacramento Department of Utilities
- City of Sacramento Standard Specifications for Public Construction (with Addendums #1 and #2)
- Stormwater Quality Design Manual for Sacramento and South Placer Regions
- Hydomodification Management Plan – Sacramento Stormwater Quality Partnership
- Additional standards and design manuals can be found at: http://www.cityofsacramento.org/Utilities/Resources/Specs-and-Drawings

The 2035 General Plan includes a policy to "continue to analyze information on potential impacts of climate change on government operations and the local economy, and actively share results to foster public awareness and support for adaptation policy."

Predictions on the specific local impacts of climate change are not necessarily available, however to the extent feasible, climate change impacts should be incorporated into City infrastructure and operations.

Project Description: Develop an Interagency Adaptation Team to work with appropriate agencies (e.g., California Natural Resources Agency, State Lands Commission, California Energy Commission, Sacramento Area Flood Control Agency [SAFCA], UC Davis) and neighboring jurisdictions (e.g., Sacramento County) to:

- Ensure that current information and data on climate change effects and impacts are considered and addressed as part of updates to infrastructure and utility plans, manuals, and specifications.
- Review existing infrastructure plans, policies, standards, and investments to ensure information about projected climate change impacts is included.

- Assess impacts of climate change effects when siting new infrastructure and maintaining or renovating existing infrastructure.
- Incorporate climate change impact information into the design, construction, operation, and maintenance of infrastructure.
- Identify inadequate existing infrastructure.

The work products of this effort are updated standards and specifications for infrastructure; updated management plans; and design guidelines; and an inventory of inadequate existing infrastructure.

Other Alternatives: Actively collaborate with regional agencies and neighboring jurisdictions to ensure that planning for future development and redevelopment incorporates risks from climate change effects/impacts.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Project is an implementation program listed in the 2035 General Plan.

Responsible Office/Partners: Community Development Department, Public Works Department, Department of Utilities

Project Priority: High

Cost Estimate: $500,000

Benefits (Losses Avoided): Reduced damage to property and/or infrastructure.

Potential Funding: State and/or Federal Grant

Timeline: 2014-2019

Action 3. Maintain and Identify Changes in Critical Facilities GIS Layer to Support Emergency Management Efforts

Hazards Addressed: Multi-Hazard – Flood, Wildfire, Dam Failure, Severe Weather, Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: GIS databases of critical facilities have been used by the City for incident management and emergency planning purposes. These databases need to be continuously updated with the results from GIS analysis associated with the development of the Multi-Hazard Mitigation Plan.

Project Description: Businesses, Schools, EMS Services or any other identified critical facilities will have contact information collected and mapped for analyzing and preparation for the Multi-Hazard Mitigation Plan.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implement through existing emergency preparedness activities.

Responsible Office/Partners: City GIS Technical Group, City Department of Utilities, and City & County Office of Emergency Services

Project Priority: High

Cost Estimate: City staff time

Benefits (Losses Avoided): Life safety and early notification

Potential Funding: None

Timeline: 2016

Action 4. Community Outreach on Multi-Hazard Preparation & Pre-mitigation

Hazards Addressed: Multi-Hazard – Flood, Dam Failure, Fire, Earthquake, Severe Weather, Drought

Goals Addressed: 1, 2, 3, 4

Issue/Background: With the broad spectrum of hazards that can affect the City of Sacramento it is important for the Community to know how to be prepared for and execute pre-mitigation (if possible) for these hazards.

Project Description: Construction of a webpage to address the multi-hazard threat and add measures for preparation and pre-mitigation. Webpage will be maintained and improved over time.

Other Alternatives: Other forms of media outreach (costlier)

Existing Planning Mechanism(s) through which Action Will Be Implemented: Adding to the flood preparation page managed by the City.

Responsible Office/Partners: City of Sacramento, Department of Utilities, Office of Emergency Services

Project Priority: High

Cost Estimate: Staff time

Benefits (Losses Avoided): Reduction in the loss of life & property damage through education. Better prepared citizens before and during an event.

Potential Funding: None

Timeline: Long-term

Action 5. Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas

Hazards Addressed: Multi-Hazard – Flood, Dam Inundation, Levee Failure, Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Based on the critical facility analysis completed for this plan, over 3,000 critical facilities have been identified within the Sacramento County Planning Area. This number is anticipated to go up based on additional mapping of critical facilities as the GIS mapping effort is completed. For Sacramento County, 52 mapped critical facilities have been identified within the 100-year floodplain and another 164 (81-city) in the 500-year floodplain. A detailed list of those affected critical facilities are included in Appendix E. Due to the significant number of critical facilities identified within the flood and other hazard areas, additional evaluation of each affected facility is required in order to determine which facilities should be potentially relocated and/or protected.

Project Description: This project addresses the additional evaluation of identified critical facilities to determine options for mitigation. The initial focus will be on those facilities within the flood hazard areas, with other hazard-prone facilities to follow. The end result of this analysis will be a list of facilities within the 100- and 500-year floodplain and their mitigation recommendations and priorities.

Other Alternatives: No action or remove all critical facilities from the floodplain

Existing Planning Mechanism(s) through which Action Will Be Implemented: This will be implemented through existing floodplain management programs.

Responsible Office/Partners: City of Sacramento, Department of Utilities

Project Priority: High

Cost Estimate: Analysis and recommendations should involve staff time; resulting mitigation measures will be cost on an individual facility basis.

Benefits (Losses Avoided): Analyzing mitigation measures for critical facilities will increase both property protection and life safety for City residents.

Potential Funding: City of Sacramento and possible grants

Timeline: 5 years

Action 6. Retrofit of Repetitive Loss Properties

Hazards Addressed: Multi-Hazard – Flood, Localized Stormwater Flooding, Severe Weather: Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento has 21 repetitive loss structures. Some of these structures can be structurally retrofitted or elevated to fix the flooding problem and remove them from FEMA's Repetitive Loss List.

Project Description: The City must identify property owners interested in retrofits and also obtain grant money to assist with the retrofits.

Other Alternatives: Promote Flood Insurance

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento's Repetitive Loss Area Analysis

Responsible Office/Partners: City of Sacramento, Department of Utilities

Project Priority: High

Cost Estimate: $250,000-$1,000,000 (depending on the number of structures retrofitted)

Benefits (Losses Avoided): The structures would no longer be damaged resulting in less flood insurance claims

Potential Funding: FEMA grants, Department of Utilities, and property owners.

Timeline: 3-5 years

Action 7. Safeguard Essential Communication Services

Hazards Addressed: Multi-Hazard – Flood, Dam Failure, Earthquake, Fire, Severe Weather, Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: Communication services during and after a disaster event is essential. The ability to communicate real time information to first responders, the public, and the Emergency Operations Center is critical.

Project Description: Maintenance and continued testing of essential communication services, and have a plan in place to restore those essential services should they be damaged in an event. They include the City phone system, electronic mail, network services and servers. The creation of redundancy and safeguarding the City's communication infrastructure will be necessary.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implement through existing emergency preparedness activities.

Responsible Office/Partners: Emergency Operations Center, City of Sacramento Department of Utilities, City of Sacramento Department of Information Technology

Project Priority: High

Cost Estimate: $300,000

Benefits (Losses Avoided): Ensured communication, faster response time

Potential Funding: None

Timeline: 2017

Action 8. Multi-lingual Disaster Education

Hazards Addressed: Multi-Hazard – Floods, Severe Weather, Fires, Earthquakes, Dam/Levee Failure, Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento is a diverse city. The City must establish a method to inform our diverse population of seasonal disaster safety issues and general emergency preparedness.

Project Description: Develop Public Service Announcements, educational videos, a social media campaign, and other material in a variety of languages to provide our diverse community with information on how to develop a personal/family safety plan.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Program for Public Information Committee (Flooding Hazard) and Neighborhood Services activities

Responsible Office/Partners: Office of Emergency Services, City of Sacramento Department of Utilities, City of Sacramento Community Development Department

Project Priority: High

Cost Estimate: $50,000

Benefits (Losses Avoided): Vulnerable populations will be better prepared to protect themselves and property before and during an event. As well as, faster notifications and evacuations.

Potential Funding: FEMA Grants

Timeline: End of 2017

Action 9. Cal OES Safety Assessment Program Evaluators

Hazards Addressed: Multi-Hazard – Flood, Levee Failure, Dam Failure, Earthquake, Fire, Severe Weather

Goals Addressed: 1, 2, 3, 4

Issue/Background: A large disaster in Sacramento would have a major impact on the city's built environment. The city's ability to quick recovery from a disaster will require a large amount of personnel to inspect and evaluate the condition of structures in the impacted areas. It is important city staff to be trained in post-disaster assessment. This will allow the community to return to their homes and business in a timely manner as well has prohibit people from entering unsafe structures after a disaster.

Project Description: Increase the number of Cal OES Safety Assessment Program Evaluators within the City. The Safety Assessment Program utilizes volunteers and mutual aid resources to provide professional engineers and architects and certified building inspectors to assist local governments in safety evaluation of their built environment in the aftermath of a disaster.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implement through current Building Department personnel training program.

Responsible Office/Partners: City of Sacramento, Community Development Department

Project Priority: High

Cost Estimate: $3,000

Benefits (Losses Avoided): Life Safety, Correct Structural Evaluation

Potential Funding: City of Sacramento, Community Development Department

Timeline: One year

Action 10. National Flood Insurance Program & Community Rating System Continuation

Hazards Addressed: Multi-Hazard – Flood, Levee/Dam Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento is susceptible to various types of flood events: riverine, flash, and localized stormwater flooding; and levee and dam failure flooding. Regardless of the type of flood, the cause is most often the result of severe weather patterns and excessive rainfall, either in the flood area or upstream reach. Flooding is the most significant natural hazard that the City faces.

Project Description: Continue to meet minimum NFIP requirements and exceed those requirements by participating in the CRS program.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Floodplain Management Staff

Responsible Office/Partners: Department of Utilities

Project Priority: High

Cost Estimate: $10,000-$20,000 and staff time

Benefits (Losses Avoided): Increased flood insurance, increased public awareness, and community preparedness

Potential Funding: Local

Timeline: On-going

Action 11. Coordinate with Sacramento Area Flood Control Agency on Completion of South Sacramento Streams Group Projects

Hazards Addressed: Multi-Hazard – Flooding and Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: The flood of 1986 revealed that the South Sacramento Streams do not provide the desired level of protection to the community. In 1997, another series of storms confirmed that additional protection was needed. A project study was undertaken that identified measures that would provide greater than 100-year level of protection to the community. A USACE document describes issues and alternatives and is available from Sacramento Area Flood Control Agency (SAFCA).

Project Description: Coordinate with SAFCA for the Completion of the South Sacramento Streams (includes Florin and Morrison Creeks) Group Projects to provide greater than 100-year protection by improving conveyance and raising levees.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: South Sacramento Streams Coordination Group

Responsible Office/Partners: Sacramento Area Flood Control Agency, California Department of Water Resources, State Reclamation Board, US Army Corp of Engineers, City of Sacramento, County of Sacramento

Project Priority: High

Cost Estimate: $90 Million

Benefits (Losses Avoided): Life safety, reduced flood losses, significantly reduced insurance premiums

Potential Funding: Sacramento Area Flood Control Agency, California Department of Water Resources, State Reclamation Board, US Army Corp of Engineers, Grants

Timeline: 2021

Action 12. Develop a Master Generation Plan for Pump Stations

Hazards Addressed: Multi-Hazard – Severe weather, Earthquakes, Floods, Dam/Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: The city is divided into approximately 120 drainage basins. Drainage from most of these basins flows to local rivers or creeks or drainage channels through pumping. The City owns and operates 105 storm drainage pumping stations throughout the city. The drainage canals and local creeks eventually drain into the Sacramento and American Rivers.

Project Description: Develop a plan for identifying, prioritizing, and implementing power generation needs for pumping stations. Perform a power audit to identify needs. Plan will identify needs, costs, funding, and lead personnel. Plan will include the purchase and installation of necessary built-in and mobile generators and additional equipment.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implement through existing Capital Improvement Program.

Responsible Office/Partners: City of Sacramento Department of Utilities

Project Priority: High

Cost Estimate: $100,000

Benefits (Losses Avoided): Avoids flooding during power outages to pumping stations

Potential Funding: FEMA Grant

Timeline: 2018

Action 13. Develop a Disaster Housing Plan

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: Effective disaster housing is a critical step on the road to long-term recovery. A balance between providing housing assistance rapidly in the wake of a disaster and meeting the diverse needs of individuals and households within the community for a longer period of time during disaster recovery.

Project Description: Develop a Disaster Housing Plan to identify potential disaster housing partners and outline the principles, practices, and implantation phase of such a plan.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Unknown

Responsible Office/Partners: City of Sacramento Community Development Department, City of Sacramento Office of Emergency Services

Project Priority: High

Cost Estimate: $30,000

Benefits (Losses Avoided): Increased community resiliency, avoid potential financial losses

Potential Funding: Grants

Timeline: 2020

Action 14. Disaster Resistant Business Program

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: During a disaster businesses are disrupted. This disruption can cause loss in revenue, costumers, and potentially employees.

Project Description: Provide materials and administrative support for a comprehensive Business Continuity Planning (BCP) program, to include presentation s to business, non-profits and professional groups, Chamber of Commerce events, etc. The program would include a one-day event with an overview on developing a Business Continuity Plan and breakout sessions addressing specific BCP issues.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: City of Sacramento and Local Business Partners

Project Priority: Medium

Cost Estimate: $80,000 ($30,000 annual program costs)

Benefits (Losses Avoided): Increased community resiliency and avoided financial losses.

Potential Funding: Grants, Local Funding

Timeline: 2020

Action 15. Develop Enhanced Emergency Planning for Special Needs Populations in the City of Sacramento Emergency Operations Plan and Other Planning Documents

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: Special needs populations will require additional measures in order to support alerts and warnings, evacuation, and medical response.

Project Description: By working with local advocacy groups, and by identifying weaknesses and gaps in the City's emergency planning, the increased capabilities of the enhanced plan will enable emergency responders to more effectively support the most vulnerable segment of the population.

Other Alternatives: No Action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Operations Plan

Responsible Office/Partners: City of Sacramento Office of Emergency Services

Project Priority: High

Cost Estimate: $20,000

Benefits (Losses Avoided): Preservation of life and ability to evacuate more effectively

Potential Funding: Grant Funding, City of Sacramento Office of Emergency Services

Timeline: 2020

Action 16. Establish a Post-Disaster Action Plan

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: As home of the State Capitol, it is imperative that the city of Sacramento can recover quickly from a disaster. The amount of time it takes for the City's infrastructure, cultural resources, and the economy to recover will impact the ability of California's government to function.

Project Description: Create a post-disaster action plan that outlines the procedures for public information, post-disaster damage assessment, code enforcement, financial recovery, and redundant operations.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency preparedness planning.

Responsible Office/Partners: City of Sacramento Emergency Services, Department of Utilities, Community Development Department

Project Priority: High

Cost Estimate: $50,000

Benefits (Losses Avoided): A more resilient community and avoided economic loss.

Potential Funding: Grants

Timeline: Short-Term

Action 17. Flood Recovery Plan

Hazards Addressed: Flood, Localized Flooding, Levee/Dam Break

Goals Addressed: 1, 2, 3, 4

Issue/Background: Immediately following a flood, the City will be left with massive amounts of debris and debilitated infrastructure. A proactive approach to this portion of the recovery process with increase the community's resiliency.

Project Description: Create a plan that addresses key elements of flood recovery, such as, restoring infrastructure, debris removal, water quality, building inspection, facilitating access to individual assistance, providing temporary housing, assisting with business recover, and identify needed resources to support recovery efforts.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Response Protocols for Floods

Responsible Office/Partners: City of Sacramento Department of Utilities, City of Sacramento Office of Emergency Services

Project Priority: Medium

Cost Estimate: $20,000 or Staff Time

Benefits (Losses Avoided): Improved Community Resilience

Potential Funding: Department Budgets, Grants

Timeline: 2018

Action 18. Public Information Flood Response Plan

Hazards Addressed: Flood, Levee/Dam Failure, Localized Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Program for Public Information (PPI) Committee recommends the development of outreach materials that will be implemented during and after a flood. These projects are drafted and made ready for production and dissemination after a flood warning. The PPI Committee also discussed the use of the City's website during a flood event. General emergency preparedness information and citywide evacuation routes are on the website, however, special elements will need to be added during a flood threat. Press releases providing information about the flood threat levels, conditions, evacuation routes, and preparedness actions will be posted on the City's website. The proposed projects are included in the City's Comprehensive Flood Management Plan.

Project Description: Develop a pre-flood plan for public information projects that will be implemented during and after a flood. The plan will include a collection of outreach projects templates including key messages that need to be disseminated before, during, and after a flood. The plan will also include written procedures that explain how the materials will be disseminated and when the information should be released.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Program for Public Information Committee

Responsible Office/Partners: City of Sacramento, Department of Utilities and City of Sacramento Office of Emergency Services

Project Priority: High

Cost Estimate: Staff Time

Benefits (Losses Avoided): Quicker flood warning response, better quality of information to the public during a flood event, coordinated disaster recovery information

Potential Funding: City of Sacramento, Department of Utilities and City of Sacramento Office of Emergency Services Budgets

Timeline: 2017

Action 19. Construction of a New Emergency Operation Center (EOC)

Hazards Addressed: Multi Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: The city of Sacramento's EOC is the central location of authority and information, and allows for face-to-face coordination among personnel who must make policy-level emergency decisions. The EOC can be activated and staffed to the extent deemed necessary to deal with the existing or impending emergency. The current size of the City EOC is inadequate for personnel needs and disrupts the face-to-face coordination necessary during an emergency situation.

Project Description: Build and equip a new Emergency Operations Center, to replace the inadequate EOC currently located in the city of Sacramento's dispatch center. The new facility would be developed to FEMA 361 standards. Grant funding would be used to supplement normal construction costs with the additional cost for increasing the armoring of the facility to meet the FEMA 361 standards for Community SafeRooms.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: City of Sacramento Office of Emergency Services

Project Priority: Medium

Cost Estimate: $10,000,000

Benefits (Losses Avoided): More space for operations & upgraded information technology systems

Potential Funding: City of Sacramento Emergency Services Budget, Grants

Timeline: 2020

Action 20. Emergency Operation Center (EOC) Expansion and Information Technology Upgrade

Hazards Addressed: Multi Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: The city of Sacramento's EOC is the central location of authority and information, and allows for face-to-face coordination among personnel who must make policy-level emergency decisions. The EOC can be activated and staffed to the extent deemed necessary to deal with the existing or impending emergency. The current size and information technology infrastructure of the City EOC is inadequate for personnel needs during an emergency situation.

Project Description: Improvements to the City current EOC is necessary to meet the demands of a large scale natural disaster. The facility has size limitations that will restrict the amount of personnel located in the same room. Potentially unit will have to operate in separate rooms or building which would reduce real-time communications. Also, the facility need improvements on the usability of the information technology infrastructure. A network separate from the police dispatch's system is needed. Currently there is a shared network which has high security restrictions. The security restrictions make it difficult for a city employee to sign in at the EOC and be fully functional.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Information Technology's updates and maintenance schedule for the EOC.

Responsible Office/Partners: City of Sacramento Office of Emergency Services

Project Priority: Medium

Cost Estimate: $3,000,000

Benefits (Losses Avoided): More space for operations & upgraded information technology systems, facilitates a more effective emergency response

Potential Funding: City of Sacramento Emergency Services Budget, Grants

Timeline: 2020

Action 21. Protection of Transportation Infrastructure

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City's roadway network consists of a combination of Federal interstates, a United States highway, California State highways, and city streets. This roadway network is used extensively for personal vehicle travel. Approximately 86 percent of all city residents travel from home to work by automobile.

Project Description: Retrofit all bridges in the city of Sacramento to current seismic standards. Elevate roads and bridges above the base flood elevation to maintain dry access. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage, but also stabilization or armoring of vulnerable shoulders or embankments.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Transportation Capital Improvement Project Planning Process

Responsible Office/Partners: City of Sacramento Department of Transportation

Project Priority: High

Cost Estimate: Estimated $200,000,000

Benefits (Losses Avoided): Enhanced bridge safety, increased evacuation routes possibilities, shorter disaster recovery timeline

Potential Funding: Grants, Capital Improvement Project Funding

Timeline: 2021

Action 22. Public Education Campaign for Everbridge System

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: The County Office of Emergency Services has replaced the Reverse 911 system with "Everbridge", a faster system than Reverse 911. Residents must register for this system in order to received emergency alerts.

Project Description: Outreach will be performed using a variety of methods to inform residents about the City emergency alert system, Everbridge. The campaign will direct resident to sign up for emergency alerts.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Neighborhood Services and Emergency Services Efforts

Responsible Office/Partners: City of Sacramento Office of Emergency Services

Project Priority: High

Cost Estimate: $100,000

Benefits (Losses Avoided): Avoided Loss of Life, More Evacuation Time

Potential Funding: Possible Grants, Emergency Services

Timeline: 2017

Action 23. Regional Emergency and Disaster Preparedness Exercises to Test Operational & Emergency Plans

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento has an Emergency Operation Plan that addresses the City's planned response to extraordinary emergency situations associated with natural disasters, technological incidents, and nuclear defense operations. The City of Sacramento has adopted the Standardized Emergency Management System for managing response to multi-agency and multi-jurisdiction emergencies and to facilitate communications and coordination between all levels of the system and among all responding agencies. Additionally, Sacramento is part of the State's mutual aid system and can give or receive support in an emergency situation.

Project Description: Conduct regional, multi-agency emergency and disaster preparedness exercises to test operational and emergency plans. Tests will include levee or dam failure and other natural hazards.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Services Training Program

Responsible Office/Partners: City of Sacramento Office of Emergency Services, City of Sacramento Department of Utilities

Project Priority: High

Cost Estimate: $10,000

Benefits (Losses Avoided): Identify weaknesses in current plans and communications, better prepared for a disaster

Potential Funding: Training Budgets, Grants

Timeline: Ongoing

Action 24. Special Needs and Critical Facilities Database and Advanced Warning System

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: Public alert and warning systems are necessary to increase public awareness of an impending threat and provide clear instructions. In the city of Sacramento, existing systems include the Emergency Alert System, fire and law enforcement vehicle loudspeakers, Everbridge, and agency websites. The Emergency Alert System is designed to provide emergency information via radio and

television. The city of Sacramento's Everbridge system can send pre-recorded messages to individuals who sign up for the service. However, an advanced warning system for special needs populations and critical facilities has not been developed.

Project Description: Through outreach activities, develop a database of vulnerable population groups and critical facilities in need of advance warning or evacuation assistance. Development and implementation of an advanced warning procedure. Successful programs have been developed in Houston, San Antonio and Florida and could serve as a model for implementation and personnel training.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Action Plan

Responsible Office/Partners: Office of Emergency Services

Cost Estimate: $200,000

Benefits (Losses Avoided): Avoid loss of life and critical facilities. Faster & more coordinated emergency response times.

Potential Funding: Grants or Emergency Services Budget

Timeline: Short-Term

Project Priority: High

Action 25. Asset Inventory

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: A current detailed list of city assets itemized by facility is needed in the case of disaster recovery. In the event that a city facility was damaged a during a natural disaster a detailed list of the assets impact would be needed.

Project Description: Development of a list of all city assets with specific location information that can be easily maintained by all departments. The list will include information technology equipment, communication equipment, machinery, office furniture, etc. The list will also indicate which facilities and assets are located in a hazard area.

Other Alternatives: Current Inventory Lists

Existing Planning Mechanism(s) through which Action Will Be Implemented: Each department within the City has asset tracking methods.

Responsible Office/Partners: City of Sacramento Asset Management

Project Priority: Medium

Cost Estimate: $200,000

Benefits (Losses Avoided): Identification of assets in hazard area may prompt relocation or protection of assets. Also, quick assessment of what city assets have been damaged or lost during a disaster which will allow for a quicker recovery period.

Potential Funding: City of Sacramento and Grants

Timeline: 2021

Action 26. Protection of City Assets from Cyber Terrorism

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3

Issue/Background: Due to the massive amount of destruction that can be caused by cyber terrorism it is vital to protect the City's network from attacks. Cyber-attacks can weaken and potentially disable the City's ability to respond to a natural disaster.

Project Description: Develop a system to withstand cyber terrorism and train users for prevention efforts, manage the use of privileged accounts, have antivirus software conduct regular scans, back up data, etc.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Information Technology's emergency training exercises.

Responsible Office/Partners: City of Sacramento Department of Information Technology

Project Priority: High

Cost Estimate: Unknown

Benefits (Losses Avoided): Protection of the city's ability to operate vital systems during emergency events and the protection of technical infrastructure and data.

Potential Funding: Department of Information Technology Budget, Possible Grants

Timeline: Ongoing

Action 27. Protection of City Information Technology Infrastructure

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3, 4

Issue/Background: Due to the massive amount of destruction that can be caused by cyber terrorism it is vital to protect the City's network from attacks. Disruption of the City's information technology infrastructure will weaken and potentially disable the City's ability to respond to a natural disaster.

Project Description: Develop a system to withstand the variety of natural disaster the City is vulnerable to, such as, flooding, fire, and severe storms and wind.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Information Technology's maintenance and upgrade schedule.

Responsible Office/Partners: City of Sacramento Department of Information Technology

Project Priority: High

Cost Estimate: Unknown

Benefits (Losses Avoided): Protection of the city's ability to operate vital systems during emergency events and the protection of technical infrastructure and data.

Potential Funding: Possible Grants, Department of Information Technology Budget

Timeline: Ongoing

Action 28. Cell Booster

Hazards Addressed: Multi-Hazard

Goals Addressed: 1, 2, 3

Issue/Background: The Department of Utilities' (DOU) Operation Control Center (OCC) is the prime communication for DOU during an emergency. During an activation, the cellular signal that is transmitted becomes intermittent. The problem appears to lie within the makeup of the building and that an external antenna (or cell phone booster) that is mounted on the building would keep a signal solid during high volume usage.

Project Description: Cellular Phone Booster for DOU's OCC.

Other Alternatives: Small internally mounted antennas which provide limited boost to the current signal

Existing Planning Mechanism(s) through which Action Will Be Implemented: Emergency Action Planning

Responsible Office/Partners: Department of Utilities

Project Priority: High

Cost Estimate: Approximately $4,000

Benefits (Losses Avoided): Strong transmission of cellular signal during high volume usage. Avoids failure in communication system during activation.

Potential Funding: FEMA Grant or Department of Utilities

Timeline: 1 year

Action 29. Travel Time Model for Lower American and Sacramento Rivers and their Major Tributaries

Hazards Addressed: All

Goals Addressed: 1, 2, 3, 4

Issue/Background: Drinking water source water is potentially vulnerable to watershed spills, which can be caused or contributed to by natural disaster events. It is important to be able to estimate the travel time from the location of the spill to the water treatment plant intakes. The City of Sacramento has developed a rough river travel time estimating tool for the Lower American River and Sacramento River using model information obtained from the National Oceanic and Atmospheric Administration (NOAA) CA/NV River Forecast Center. The travel time tool was developed to allow a rough estimate for the amount of time it will take for water to move downstream from selected locations on the rivers to the City's water treatment plant intakes. The existing tool is shared with the other Lower American and Sacramento River water utilities, but the information is not developed for other intake locations. The current river model has limitations, including locations modelled and other features that an updated model may be able to address. To our best knowledge, there is no information available on travel time for major tributaries to the Lower American River and Sacramento Rivers within or proximate to Sacramento County.

Project Description: Provide resources for improved travel time modeling of the Lower American and Sacramento Rivers, and develop model for travel time on major tributaries and other water bodies of interest. Translate model results into resource(s) that is readily available for Lower American and Sacramento River water treatment plant operators and water utility management to use as a tool for preparedness, response, and recovery for watershed hazardous material spill events. There is potential to include water quality modeling in the model capabilities, or develop the model for future expansion to include water quality.

Other Alternatives: Continue to use current rough estimating tool for river travel time and networking with NOAA for other opportunities.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Source Water Protection Program\Potentially through Lower American River and Sacramento River Joint Source Water Protection Programs

Responsible Office/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources Division, Environmental and Regulatory Compliance Section or Potential for other Responsible Office/Other Drinking Water Utilities that Treat Lower American River and Sacramento River Water/Potential for Partnership with National Oceanic and Atmospheric Administration (NOAA)

Project Priority: High

Cost Estimate: $500,000-$3,000,000

Benefits (Losses Avoided): Protection of public health, reducing cost emergency response or other alternate water supplies.

Potential Funding: Grant, to be determined

Timeline: 2-5 years

Action 30. Watershed Spill Contamination to Drinking Water Quality: Preparedness for Events and Recovery

Hazards Addressed: All

Issue/Background: When utilizing surface water as a source of drinking water, the source water is potentially vulnerable to watershed spills that can enter the supply. Watershed spills can be caused or contributed to by natural hazards. Spills have the potential to impact source water quality and therefore water treatment plant operations. Changes in source water quality may necessitate a response action at a drinking water treatment plant, such as implementing an increased level of treatment, alternate treatment, or avoiding diversion altogether. Both during a spill and after a watershed spill has ended, it is important to determine if there is residual contamination in the surface water and if the water treatment plant intakes and treatment facilities have been impacted. There could be a wide range of contaminants released in watershed spills, including petroleum products from fuel spills, a wide range of synthetic chemicals, and those associated with wastewater such as bacteria, viruses, and protozoa. The contamination may constitute a hazard to public health for regulated and unregulated water quality contaminants.

Project Description: Provide resources to support water utility preparedness and recovery planning for chemical and wastewater hazardous spills in the watersheds upstream of water treatment plant intakes caused or contributed to by natural disaster events. This includes development of information and resources to identify the potential impacts of the spill, conduct of emergency exercises, planning coordination with emergency response agencies regarding environmental mitigation and cleanups, and preparing information and resources for water treatment facilities and treatment recovery. The project

may also include providing supplies to support spill containment and watershed/surface water clean-up and water treatment intake and plant clean-up and restoration.

Other Alternatives: Continue to support and develop resources to support City of Sacramento Water Treatment Plant Operations, and continue to share information with other Sacramento and American River water utilities. Continue to coordinate and manage the Lower American River and Sacramento River Water Utilities Voluntary Spill Notification Program including potential opportunities to develop additional preparedness resources together. Continue to coordinate with and participate in the American River Water Utilities Voluntary Spill Notification Program.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Source Water Protection Program/Potentially through Lower American River and Sacramento River Joint Source Water Protection Programs

Responsible Office/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources Division, Environmental and Regulatory Compliance Section or Potential for other Responsible Office/Other Local Drinking Water Utilities that Treat Lower American River and Sacramento River water.

Project Priority: High

Cost Estimate: $250,000-$500,000

Benefits (Losses Avoided): Protection of public health, reducing cost for emergency response or other alternate water supplies.

Potential Funding: Grant, to be determined

Timeline: 1-2 years

Action 31. Purchase Drones for Use in Disaster Preparedness, Mitigation, and Response

Hazards Addressed: Multi-hazard. (Compromised or failing structural integrity that would cause a critical facility to not withstand a hazard or disaster event as designed or as expected/anticipated. Earth movement or subsidence, or a change in earth properties which jeopardizes an area's intended purpose or gives rise to unanticipated negative consequences. Levee deterioration, damage and failure. Loss of protective banks (barriers/constraints) over time.)

Goals Addressed: 1, 2, 3, 4

Issue/Background: Critical facilities are assessed and a determined to be able to withstand hazards/events at a certain level. As the structural integrity of a facility deteriorates, its ability to perform as anticipated is compromised, possibly leading to increased damages/costs. A primary California hazard is earthquake activity, which can result in liquefaction. Due to its location, the City of Sacramento relies heavily on its levee system for flood control/ protection. The City of Sacramento area has numerous creeks/channels with a bank network that serves as barriers or water constraints.

Project Description:

- Integrate the use of drones into the City's scheduled facility inspection program. Implement inspection of areas that may have been impossible and/or very difficult to inspect in the past, with a program goal to increase efficiency, comprehensiveness, and frequency of inspections as a best practices measure.
- Integrate the use of drones in establishing a program (if one does not already exist) to (1) document the position of baseline land markers in areas identified as being susceptible to liquefaction and (2) verify/ update the positions of the land markers on a scheduled basis. Following a seismic event, use drones to conduct a priority re-check of land mark locations over a designated time span to determine whether a susceptible area is demonstrating signs of liquefaction and at what rate in order to take mitigating action.
- Integrate the use of drones in the regulatory inspection process in order to capture, retain, and utilize imagery/GPS coordinates for geospatial analysis. The geospatial analysis would provide information and/or changes in condition of levees and banks not readily detectible by the human eye, and can be used to visually demonstrate the changes over time and potentially project out a timeline that could predict critical failure. This information can then be used by Operations & Maintenance to conduct proactive high-level maintenance and spot repair activities and by Engineering/Asset Management to analyze changes in noted anomalies in order to determine areas where large scale rehabilitation/reinforcement and/or CIP needs should be addressed to ensure levee and bank integrity. The drones can also be used to inspect levees from the water-side potentially increasing the safety of City staff as well as the efficiency with which they are conducted. Because of the numerous environmental regulatory guidelines in place, drones can be used to view areas where protected species are habituating, greatly increasing our ability to leave them as undisturbed as possible while conducting operations.

Other Alternatives: None.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The current facility maintenance program is scheduled in Maintenance Connections and is performed visually by experienced City staff. Inspections are currently scheduled in CityWorks and conducted visually by experienced City staff.

Responsible Office/Partners: City of Sacramento, Department of Utilities, Drainage Levee Inspection Section

Project Priority: High

Cost Estimate: $35,000 - $45,000 per drone

Benefits (Losses Avoided): The benefits are as noted above the Project Description.

Potential Funding: FEMA Grant or Department of Utilities

Timeline: 1-3 years

Climate Change Actions

Action 32. Map and Assess Vulnerability to Sea Level Rise

Hazards Addressed: Climate Change

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Sacramento and American Rivers are affected by sea level rise. When originally constructed, the majority of the City's drainage and levee systems did not account for future sea level rise. This rise may impact the City's levee freeboard and the drainage capacity.

Project Description: Model various "what-if" scenarios to estimate potential vulnerability in order to develop sea level rise mitigation priorities. Develop an inventory of critical facilities and infrastructure that may be particularly vulnerable to sea level rise.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento, Department of Utilities Capital Improvement Planning

Responsible Office/Partners: City of Sacramento, Department of Utilities

Project Priority: Medium

Cost Estimate: Unknown

Benefits (Losses Avoided): This study would allow the City of Sacramento to proactively safeguard development and improve systems to accommodate the Sea Level Rise.

Potential Funding: Possible grants and capital improvement funds

Timeline: 5 years

Action 33. Emission Study of City Sump and Pump Stations

Hazards Addressed: Climate Change

Goals Addressed: 1, 2, 3

Issue/Background: During the last 200 years the atmospheric concentrations of greenhouse gases (GHGs) have been increasing. Human activities such as agriculture, industry, waste disposal, deforestation, and especially fossil fuel have been producing increasing amounts of GHGs.

Project Description: Determine the level of emissions from all 94 sumps and pumps operated by the City of Sacramento Department of Utilities. Provide recommendations for mitigation and reduction of emissions.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Capital Improvement Plans

Responsible Office/Partners: City of Sacramento Department of Utilities

Project Priority: Medium

Cost Estimate: $200,000

Benefits (Losses Avoided): Reduction in greenhouse gases. Improvement of air quality.

Potential Funding: City of Sacramento Wastewater and Stormwater Drainage Fund and Grants

Timeline: 2 years

Action 34. Climate Change Mitigation Actions/Climate Change Adaptation Plan for Drinking Water Quality

Hazards Addressed: Drought, Severe Weather

Goals Addressed: 1, 2, 3, 4

Issue/Background: Studies and evaluations by US EPA and others indicate that climate change may result in long-term significant changes to watersheds, watershed management, and drinking water source water quality. Changes can include snowpack, timing of storms and runoff, reservoir operations, and wildfires. The result of such changes can have a significant impact on drinking water source water quality, which can result in the need to modify water treatment operations and treatment facilities.

Project Description: Develop a City of Sacramento Climate Change Adaptation Plan for Drinking Water Quality. (Or potentially Multiple Jurisdiction Plan/Resources for some components). Project could include development/preparation of tools and long-term water quality data review and analysis on selected constituents.

Other Alternatives: Continue general tracking of climate change potential impacts to Sacramento and Lower American River water quality through the Lower American River Joint Source Water Protection Program, watershed sanitary survey reports, and other tracking of water industry information.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Engineering and Water Resources Division

Responsible Office/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources Division

Project Priority: High

Cost Estimate: $100,000-$750,000 (Large range to provide range of resources for developing a plan to also provide support for plan implementation including setting up tools and resources, long-term review/evaluations, etc.)

Benefits (Losses Avoided): Protection of public health, planning ahead for potential future changes to water treatment plant processes and facilities for cost efficiency, and potentially avoiding costs for response to impacted water quality from watershed emergencies that are linked to climate change.

Potential Funding: Grant, to be determined

Timeline: 2 years

Action 35. Harmful Algal Bloom (HAB) Surveillance and Response Planning

Hazards Addressed: Climate Change (Drought and Severe Weather)

Goals Addressed: 1, 2, 3

Issue/Background: A harmful algal bloom (HAB) can occur in water bodies and can affect those who use these water bodies for recreation, agricultural, or drinking. People can be exposed to a HAB or HAB toxins when they swim, wade, or play in or near contaminated water; eat contaminated fish or shellfish; or use contaminated drinking water. The severity of illness and symptoms can vary depending on the type of exposure and the type of HAB toxin.

The main routes of exposure to HAB toxins are:

- Skin contact (through activities like swimming)
- Inhalation (by breathing in tiny airborne droplets or mist contaminated with HAB toxins)
- Ingestion (by eating or drinking food or water contaminated with HAB toxins)

Reference: http://www.cdc.gov/habs/exposure-sources.html

In June 2015, USEPA issued drinking water health advisories (HA) for two cyanotoxins – microcystin and cylindrospermopsin. Health advisories are non-regulatory values that serve as informal technical guidance to assist federal, state and local officials, and managers of public or community water systems to protect public health from contaminants.

Health effects including gastroenteritis, and liver and kidney damage have been reported in humans following short-term exposure to cyanotoxins in drinking water. Recreational exposure to cyanobacterial blooms has been reported to lead to allergic reactions including hay fever-like symptoms, skin rashes, and gastrointestinal distress. Animal studies have shown that long-term health effects from cyanotoxins include liver and kidney damage. However, more research is needed to quantify these effects.

Cyanobacteria blooms have occurred throughout California, and drought and extreme heat events can contribute to the factors that can lead to HAB events.

Project Description: Develop a County-wide (preferred) or City of Sacramento plan for surveillance and response planning for Harmful Algal Bloom events that may impact drinking water source waters and/or

water bodies with recreational use. The project could be used to support monitoring. The project could also be used to identify new technologies and develop opportunities to support national, state, regional, or local programs that may provide early warning and other environmental indicators to help local agencies prepare for HABs and mitigate their effects.

Other Alternatives: Continue City of Sacramento tracking and response efforts, which includes lead efforts by the Department of Utilities Engineering and Water Resources Division Water Quality Lab and R&D Section for preparedness and coordination with other local water utilities, as well as tracking information on source water surveillance programs and the latest drinking water industry research.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Engineering and Water Resources Division to provide initial coordination to help identify the best fit for the lead role in the Sacramento County area.

Responsible Office/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources Division /Potentially Sacramento County Environmental Health Department/Potentially Other Drinking Water Utilities that Treat Lower American River and Sacramento River Water

Cost Estimate: $100,000-$3,000,000 (large range to show range for potential efforts from Plan only to Plan plus supporting technical programs to provide monitoring, surveillance and early warning, and other ideas/technologies to protect public health.)

Benefits (Losses Avoided): Protection of public health, reducing cost for emergency response or other alternate water supplies.

Potential Funding: Grant, to be determined

Timeline: 2 -3 years

Project Priority: High

Drought and Water Shortage Actions

Action 36. Aquifer Storage

Hazards Addressed: Drought & Water Shortage

Goals Addressed: 1, 2, 3, 4

Issue/Background: There are two aquifer systems: an upper unconfined system consisting of the Victor, Fair Oaks, Laguna, Modesto Formations, and a lower, semi-confined system in the Mehrten Formation. These geologic formations are composed of lenses and layers of inter-bedded sand, silt, and clay with coarse-grained stream channel deposits. The groundwater contained in the upper aquifer system of the Victor, Fair Oaks, Laguna, Modesto, Riverbank, and Turlock Lake Formations along with Arroyo Seco and South Fork Gravels is of superior quality compared to that in the lower semi-confined system, mainly because the water in the Mehrten Formation is higher in iron and manganese, and requires more treatment. The upper unconfined system only requires chlorination treatment to be potable.

Project Description: Implement aquifer storage and recovery program that uses direct injection technique in areas identified as appropriate.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Utilities Water Treatment

Responsible Office/Partners: Department of Utilities

Project Priority: Medium

Cost Estimate: $600,000

Benefits (Losses Avoided): Increased Water Supply

Potential Funding: Grant, Department of Utilities

Timeline: 2021

Action 37. Preform a Groundwater Recharge Feasibility Study

Hazards Addressed: Drought & Water Storage

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City currently operates 27 active municipal groundwater supply wells within the city limits. Twenty-five of these wells are located north of the American River in the communities of North Sacramento, South Natomas and Arcade-Arden. The City wells supply the City with a maximum total capacity of about 20.7 mgd. In 2010, the groundwater supply wells pumped approximately 21.1

mgd. The City also operates 14 wells for the irrigation of parks. Although the City relies predominantly on surface water as its primary source of water supply, the groundwater well system provides flexibility in providing domestic water to the City, especially in years when there are low river flows, as well as providing water that can be delivered on a retail or wholesale basis outside the area authorized to receive delivery of the City's surface water supply.

Project Description: Preform a groundwater recharge feasibility study to determine the most cost-effective way to replenish groundwater resources within Sacramento.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Utilities Water Treatment

Responsible Office/Partners: City of Sacramento Department of Utilities

Project Priority: Medium

Cost Estimate: $80,000

Benefits (Losses Avoided): Increased water supply

Potential Funding: Grants

Timeline: 2020

Earthquake Actions

Action 38. Map and Assess Community Vulnerability to Earthquakes

Hazards Addressed: Earthquake

Goals Addressed: 1, 2, 3, 4

Issue/Background: Although all of California is typically regarded as seismically active, the city of Sacramento does not commonly experience strong groundshaking resulting from earthquakes along known or previously unknown active faults. There are, however, isolated areas within the city that have soils and other conditions which could result in structural damage induced by seismic activity. Seismic hazards that may affect portions of the City during, or in the aftermath of, a major seismic event may include minor groundshaking and liquefaction.

Project Description: Develop an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage. Collect geologic information on seismic sources, soil conditions and related potential hazards. Identify potential damages and existing vulnerabilities within the community to develop mitigation priorities.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Unknown

Responsible Office/Partners: City of Sacramento Community Development Department

Project Priority: Medium

Cost Estimate: $250,000

Benefits (Losses Avoided): Better understanding of vulnerabilities which will lead to better disaster planning as well as prioritized mitigation projects.

Potential Funding: State Programs, Seismic Hazards Mapping Act, Grants

Timeline: Short-term

Action 39. Seismic Vulnerability Assessment on Sacramento Levees, Infrastructure & Buildings

Hazards Addressed: Earthquake

Goals Addressed: 1, 2, 3, 4

Issue/Background: Sacramento has aging infrastructure, roads, highways, bridges and light rail system that may not be able to survive a seismic event. Being located in a geographical region that may be impacted by seismic activity it is important to test the vulnerability of the levees protecting the region as well as aging infrastructure.

Project Description: Perform a levee and infrastructure specific, structural seismic vulnerability assessment of the levees and aging infrastructure surrounding the Sacramento region. Included in the assessment will be mitigation alternatives and measures to be taken for improved protection.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City Operation and Maintenance Funding

Responsible Office/Partners: City of Sacramento Department of Transportation, Community Development Department, Sacramento Transportation Authority

Project Priority: High

Cost Estimate: $250,000-1,000,000

Benefits (Losses Avoided): Life Safety, Avoided EMS Costs, Loss-of-Function Costs & Reduced Physical Damages

Potential Funding: FEMA/State grants, Department Budgets

Timeline: Short-term

Action 40. Retrofit Historical Buildings

Hazards Addressed: Earthquake

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento has many older structures that are not protected against earthquakes because they were designed and constructed according to current building standards. These types of buildings are the single biggest contributor to seismic risk in the United States today. Seismic retrofitting of vulnerable structures is critical to reducing risk, protection of life and property, and preservation of historical points of interest.

Project Description: Evaluating older buildings and retrofitting structural and non-structural components.

Other Alternatives: Retrofit buildings when major improvement are made to structure.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Building Permit Process and Code Enforcement

Responsible Office/Partners: City of Sacramento Community Development Department

Project Priority: Medium

Cost Estimate: $3,000,000-$20,000,000

Benefits (Losses Avoided): Protection of life and assets. Increased resilience after an earthquake. Preservation of historical structures within the City.

Potential Funding: City of Sacramento Community Development Department and Grants

Timeline: 2021

Extreme Cold and Heat Actions

Action 41. Heating Centers in High Priority Locations

Hazards Addressed: Extreme Cold

Goals Addressed: 1, 2, 3, 4

Issue/Background: Cold weather does not occur in Sacramento as severely as it does in other regions of Northern California as well as the rest of the United States. The average lowest temperature in Sacramento during December is 38°F. However, for the vulnerable populations, especially the homeless this cold weather can be harsh for them resulting in the need of heating centers.

Project Description: This project entails the identification of the locations of the most vulnerable populations too extreme cold and working with recreational and faith based centers to provide a refuge from the harsh weather to keep them warm throughout the night when temperatures drop to the lowest. This can be achieved by providing a stipend for every night the center is in use to cover the costs of heat generation. Centers would be placed in locations closest to populations in need.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: This will be implemented through current offerings of cooling centers by the City, faith-based, and recreational facilities and can be upgrade to include city owned facilities not in use.

Responsible Office/Partners: City of Sacramento – Homeless Coordination

Project Priority: High

Cost Estimate: $10,000

Benefits (Losses Avoided): Homeless assistance, health & safety of vulnerable populations

Potential Funding: City of Sacramento, Grants

Timeline: Winter 2017

Action 42. Cooling Centers in High Priority Locations

Hazards Addressed: Extreme Heat

Goals Addressed: 1, 2, 3, 4

Issue/Background: With increasing temperatures every summer at risks residents of Sacramento including, the homeless population need a place to escape the harsh weather. It is at this time that the at-risk populations such as low income, homeless and the elderly are at risk for heat exhaustion, heat stroke

and dehydration among other illnesses. Heat related deaths rose in 2015 compared to 2014 where they were up to 45 from 20 deaths.

Project Description: This project includes the opening of cooling centers in high priority locations throughout the City where these at risk populations are centered as well as high population areas where the general public may need to cool down. This can be an incentive for recreational centers and faith-based centers that can receive stipends for every day they are in use.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: This will be implemented through current offerings of cooling centers by the City, faith-based, and recreational facilities and can be upgrade to include city owned facilities not in use.

Responsible Office/Partners: City of Sacramento

Project Priority: High

Cost Estimate: $25,000

Benefits (Losses Avoided): Health & safety of residents, reduced emergency service calls

Potential Funding: City of Sacramento, Grants

Timeline: Summer 2017

Action 43. Extreme Weather Outreach Strategy

Hazards Addressed: Extreme heat/cold

Goals Addressed: 1, 2, 3, 4

Issue/Background: Extreme heat and cold weather are no stranger to the Sacramento region. In July of 2016 we saw the temperature mark hit over 100F for five days straight. And during the winter months some residents of Sacramento are used to seeing their pipes freezing overnight. The biggest group of people affected by this come from the homeless population and low-income areas around Sacramento who do not have adequate resources to keep themselves warm or cool during these harsh times.

Project Description: This project is meant to serve as an outreach to the population in Sacramento. It will be completed mainly by providing social media toolkits for the general population with access to internet. For more at-risk populations such as the homeless the outreach will be completed in person by targeting the areas of Sacramento where the homeless population tends to stay. Outreach will also be completed via food banks and homeless assistance centers.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Public Information Office

Responsible Office/Partners: City of Sacramento – Homeless Coordination, Sacramento Steps Forward

Project Priority: High

Cost Estimate: $5,000 + Staff Time

Benefits (Losses Avoided): Reduced calls for emergency services, health & safety of Sacramento's population

Potential Funding: City of Sacramento, Grants

Timeline: Summer 2017

Action 44. Severe Weather Action Plan

Hazards Addressed: Extreme heat/cold

Goals Addressed: 1, 2, 3, 4

Issue/Background: Extreme heat and cold weather are no stranger to the Sacramento region. In July of 2016 the City saw the temperature mark hit over 100F for five days straight. During the winter months some residents of Sacramento experience pipes freezing overnight and low temperatures. There are individuals in the community who do not have adequate resources to keep themselves warm or cool during these harsh times. The largest group of people affected by Sacramento's severe weather is the homeless population and low-income areas around Sacramento.

Project Description: The Severe Weather Action Plan will outline key triggers, such as, when to begin weather monitoring and cooling/warming centers activations. The Plan would also outline media and boots-on-the-ground outreach to the populations in need. The Plan will also identify community partners who will provide shelter and/or services during severe weather events.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Office of Emergency Services Planning Process

Responsible Office/Partners: City of Sacramento – Homeless Coordination, Sacramento Steps Forward

Project Priority: High

Cost Estimate: $50,000

Benefits (Losses Avoided): Reduced calls for emergency services, health & safety of Sacramento's population

Potential Funding: Local Funding, Grants

Timeline: Summer 2017

Flood, Localized Flooding, and Levee Failure Actions

Action 45. Coordinate with Stakeholder on Proposed Flood Control Project on Magpie Creek

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Since the early 1990s, SAFCA has been working with USACE and CVFPB to improve the Magpie Creek Diversion Channel (MCDC) and levee to reduce the risk of overflow into the historic Magpie Creek floodplain downstream of the diversion channel. This effort has focused on a combination of floodplain storage and levee rehabilitation improvements that would be carried out as part of the American River Common Features General Reevaluation Report (ARCF GRR). This is a low priority on SAFCA's list.

Project Description: The project would raise approximately 2,100 feet of the MCDC left bank levee and extending the levee south along the west side of Raley Boulevard to Santa Ana Avenue, with floodgates at two driveways.

Other Alternatives: Increase pumping capacity at Magpie Creek and the NEMDC

Existing Planning Mechanism(s) through which Action Will Be Implemented: US Army Corps of Engineers, Sacramento District, General Reevaluation Report (GRR)

Responsible Office/Partners: Sacramento Area Flood Control Association, US Army Corps of Engineers, County of Sacramento, Department of Water Resources, City of Sacramento, Department of Utilities

Project Priority: Medium

Cost Estimate: Unknown

Benefits (Losses Avoided): Protects the safety of residents and their structures. Flood insurance relief to residents in the Historic Magpie Creek floodplain.

Potential Funding: SAFCA/Grants/City

Timeline: Unknown

Action 46. Adopt Additional Floodplain Development Standards

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City has created a Development Services Task Force that meets on a regular basis to discuss the City's floodplain development standards. Additional regulations may include

evacuation and rescue requirements, additional freeboard, elevation of utilities, and 200-year level of protection.

Project Description: The Development Services Task Force will discuss the adoption of additional development standards related to floodplain management and best practices.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Development Service Task Force would implement necessary action.

Responsible Office/Partners: City of Sacramento, Department of Utilities and Community Development Department

Project Priority: Medium

Cost Estimate: Staff time

Benefits (Losses Avoided): New and substantially improved structures will be better protected from flooding.

Potential Funding: City of Sacramento, Department of Utilities and Community Development Department

Timeline: 1 year

Action 47. Drainage Projects for Repetitive Loss Properties

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City has set a goal to remove at least four repetitive loss (RL) structures from FEMA‟s Repetitive Loss List within the City by September 2018. A lot of the RL structure have flooded because undersized local drainage issues.

Project Description: Many potential drainage projects that have been identified in the City's Drainage Master Plans. These projects include upsizing pipelines, adding detention basins, adding bypass pipelines, retrofitting pump stations, and land acquisition. These projects will be ranked and grant funding will be pursued.

Other Alternatives: Promote flood insurance.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Mitigation of repetitive loss properties is a mitigation measure in the City's Corrective Action Plan approved by FEMA.

Responsible Office/Partners: City of Sacramento, Department of Utilities

Project Priority: Medium

Cost Estimate: $0.2 million - $15 million per project

Benefits (Losses Avoided): No more structural damage and flood insurance claims

Potential Funding: FEMA grants, Corrective Action Plan funding, and DOU

Timeline: August 2017-September 2019

Action 48. Emergency Notification and Evacuation Planning

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: As part of a corrective action plan approved by FEMA, the City of Sacramento in conjunction with the Sacramento Office of Emergency Services has committed to upgrading and improving emergency notification and evacuation planning systems and processes using the current Reverse 911 system, which is administered by the Sacramento Police Department, as the primary method.

Project Description: Enhancements to the existing Reverse 911 system to more effectively notify mass populations of evacuation orders and routes, consistent with FEMA guidelines, identifying special needs communities and transportation providers, targeted outreach to maximize the capabilities of Reverse 911, and strategic training to assure effective deployment of the enhanced capabilities.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The multi-hazard response plan and ongoing training programs administered by Sacramento Office of Emergency Services (SOES).

Responsible Office/Partners: SOES

Project Priority: High

Cost Estimate: Approximately $350,000

Benefits (Losses Avoided): Early notification times, better prepared evacuations, preventing loss of life and property

Potential Funding: $350,000 appropriated from the City's Community Development Department as part of the City's Corrective Action Plan to FEMA

Timeline: Full deployment, outreach and training completed by October 2016

Action 49. Historic Magpie Creek

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: For years, the City has used floodplain maps and data from the City's Drainage Master Plan and a Corps of Engineers study for development purposes in the Historic Magpie Creek floodplain. The City would like to have this area studied and have the actual current floodplain and BFEs incorporated into FEMA's DFIRMs. FEMA is in the process of restudying this area.

Project Description: FEMA to complete a restudy of the Historic Magpie Creek Floodplain.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: FEMA is in the process of restudying historic Magpie Creek.

Responsible Office/Partners: City of Sacramento, DOU

Project Priority: Medium

Cost Estimate: $0

Benefits (Losses Avoided): Base Flood Elevations provided for development will be more accurate, and the correct data will be on the DFIRMs. Structures that will be put into the floodplain will be required to carry flood insurance, which will protect those structures.

Potential Funding: $0 (Funded by FEMA)

Timeline: End of 2017

Action 50. Natomas Internal Drainage Canals/Levees

Hazards Addressed: Flooding and Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: Based on the hydrology and hydraulics modeling, the majority of the area greater than 3 feet in the 200-year Natomas interior floodplain is confined to the drainage basins, parks, and street flooding. Contrarily, the internal levees along the canals were last certified to the 100-year in 1989. Once the exterior levee work around the Natomas Basin is complete (approx. 10 years), the internal levees will need to be recertified. The recertification will need to be submitted to FEMA. Also, while in the process of recertifying to the 100-year, the internal levees should be certified to the 200-year (meet the State ULDC requirements).

Project Description: Certify the Natomas Internal Drainage Canals/Levees to the 100-year and 200-year Level.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The regional coordination process facilitated through Sacramento Area Flood Control Association (SAFCA).

Responsible Office/Partners: SAFCA, USACE, City of Sacramento Department of Water Resources, City of Sacramento Department of Utilities, Reclamation District 1000, Sutter County

Project Priority: High

Cost Estimate: $800,000

Benefits (Losses Avoided): Once completed the protection level of the Natomas Internal Basin will be verified. Weakness within the system will be identified and addressed. This will also allow residents to purchase PRP flood insurance and development will be protected.

Potential Funding: City of Sacramento Department of Utilities, County of Sacramento Department of Water Resources, Sutter County, Reclamation District 1000, Grants

Timeline: 2021

Action 51. Drainage Projects from the City's Priority Drainage Project List

Hazards Addressed: Local Flooding, Severe Rain and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City is continually improving the local drainage system and the combined sewer and storm water system.

Project Description: Many potential drainage projects that have been identified in the City's Drainage Master Plans and have been prioritized on a Basin Master Planning and Improvement Projects priority list. These projects include upsizing pipelines, adding detention basins, adding pipelines, retrofitting pump stations, and land acquisition. These projects are ranked by priority.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Department of Utilities has a Drainage CIP Group

Responsible Office/Partners: City of Sacramento, Department of Utilities

Project Priority: Medium

Cost Estimate: $200,000 to 15,000,000 per project

Benefits (Losses Avoided): Eliminate structural damages and flood insurance claims, avoid economic loss from flooded streets, and life safety

Potential Funding: FEMA grants and DOU CIP funds

Timeline: August 2016-September 2020

Action 52. Projects Identified in the Combined Sewer System Improvement Plan Update

Hazards Addressed: Localized Stormwater Flooding and Severe Rain and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento (City) owns and operates a combined sewer system (CSS) that conveys residential and commercial wastewater and storm water runoff from approximately 11.7 square miles in downtown Sacramento, East Sacramento, Oak Park, and the Land Park area. There are 5.8 square miles of separated areas of the City north, east, and south of the CSS that contribute sanitary flows to the CSS. The City also includes approximately 76 square miles of separated areas that are not served by the CSS. The CSS serves approximately 205,000 people. The CSS includes four key facilities to manage the collected flow: Sumps 1/1A, Sumps 2/2A, Pioneer Reservoir, and the Combined Wastewater Treatment Plant (CWTP). Sumps 1/1A and 2/2A pump up to 60 million gallons per day (mgd) of flows to the Sacramento Regional County Sanitation District's Regional Wastewater Treatment Plant (SRWTP). Pioneer Reservoir and CWTP provide additional storage and, when needed, primary treatment, and disinfection of combined sewage prior to discharge to the Sacramento River. The CSS is regulated under the August 2015 National Pollutant Discharge Elimination System (NPDES) waste discharge permit, No. CA0079111. The permit allows for CSS discharge to the Sacramento River at six locations: two for primary treated (plus disinfection) effluent, and four that can discharge untreated combined sewage. The secondary treated effluent from SRWTP is discharged to the Sacramento River at a permitted location under a separate NPDES permit.

The Combined Sewer System Improvement Plan outlines improvement projects and programs to reduce flooding, constructability and cost/benefit analysis, and project prioritization for implementation.

Project Description: Identified projects were categorized into storage and conveyance. The storage projects are located upstream or downstream of local flooding areas, and are intended to detain flows until the CSS has re-generated capacity (i.e., peak of the storm has passed and HGL in the system has receded from peak conditions) and the storage facilities can be dewatered. The storage projects can be linear or parcel based.

Conveyance projects would generally be located in proximity to or just downstream of localized flooding areas. Their objective would generally be to convey peak flows from and through the flood-prone areas to points downstream with greater capacity. The analysis carefully considered whether the increased conveyance had the potential to cause or exacerbate downstream flooding. If that was determined to be true, the conveyance project(s) were combined with upstream or downstream storage projects to mitigate

the downstream flood exacerbation risk. Conveyance projects included upsizing existing pipes or constructing new pipes. Where baseline flooding occurred in a location with no opportunities for storage, a new pipe was sized to convey the 10-year storm design peak flows to the downstream system. Factors such as ground cover requirements, right-of-way width, and existing system pipe invert elevations (to which linear storage facilities must connect) were factored into the storage configurations

Other Alternatives: No improvements to the system.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Responsible Office/Partners: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Project Priority: High

Cost Estimate: Projects range from $510,000 to $22,000,000.

Benefits (Losses Avoided): Reduced of localized flooding. Increased system resiliency and capacity.

Potential Funding: City of Sacramento Department of Utilities and Grants

Timeline: 2021

Action 53. Easements for Open Land Along Levees

Hazards Addressed: Flood and Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Urban Levee Design Criteria (ULDC) requires fee title or an easement for the entire levee prism extending to a minimum of 20 feet beyond the landside toe of the flood protection system needs to be acquired. This is needed to provide adequate room for maintenance, inspection, flood-fighting and protection of the levees.

Project Description: Analysis of current levee easements and setback to determine where additional and future easements will be needed. Develop a method and funding source to acquire the needed easements and open space to meet the ULDC standards.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Development Review

Responsible Office/Partners: City of Sacramento, Department of Utilities and Community Development Department, Sacramento Area Flood Control Agency

Project Priority: High

Cost Estimate: $2,000,000

Benefits (Losses Avoided): Quicker detection of levee distress during high water events, higher level of flood projection, the ability to widen the levee in the future, if needed.

Potential Funding: City of Sacramento and Grants

Timeline: 2021

Action 54. Emergency Management Planning and Levee Security

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento focuses its emergency management activities within the City on four phases: preparedness, response, recovery, and mitigation. Public outreach, warning systems, post-flood building entry, levee security, and EOC operations are examples of the City's extensive emergency management system.

Project Description: Implementation of the emergency management and levee security action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include continued National Incident Management System (NIMS) and Standardized Emergency Management System (SEMS) exercises and training, creation of a disaster housing plan, increased public education and alerts efforts, development of an intergovernmental flood management and control standards, annual review of the Levee Security Plan, and improvement of flood warning systems.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Office/Partners: City of Sacramento, Department of Utilities, Office of Emergency Services, and other maintaining agencies responsible of levee systems within the region.

Project Priority: High

Cost Estimate: $100,000 and staff time

Benefits (Losses Avoided): These projects would decrease the loss of life and property and establishes clear guidelines for recovery from a flood.

Potential Funding: City of Sacramento Department Budgets, Grants

Timeline: 2019-2021

Action 55. Flood Fighting Equipment

Hazards Addressed: Flood and Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: During high water events an effort will be made to prevent the effects of flood waters. The City of Sacramento currently has to barrow necessary equipment from neighboring agencies to conduct levee repair and flood fighting operations.

Project Description: Purchase flood fighting equipment such as a utility landing craft, long reach excavator, and the tuck (tractor) trailer.

Other Alternatives: Barrow equipment from neighboring agencies.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Operations and Maintenance equipment budgetary and procurement process.

Responsible Office/Partners: City of Sacramento Department of Utilities Operations and Maintenance

Project Priority: High

Cost Estimate: $550,000

Benefits (Losses Avoided): Shortened response time to flood hazards and more efficient repair and maintenance of the levee system.

Potential Funding: City of Sacramento Operations and Maintenance and Grants

Timeline: 2017

Action 56. Flood Management Land Use Planning and Development

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: Both land use planning and development guidelines are implemented using the City's zoning, building, and subdivision codes. The City is currently implementing various federal, state, and local mandates for land use planning and development.

Project Description: Implementation of the land use planning and development action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include 200-year floodplain ordinance and projection plan, development guidelines for rescue and evacuation areas, City Code update for new development adjacent to levees.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Office/Partners: City of Sacramento, Department of Utilities and Community Development Department

Project Priority: High

Cost Estimate: Staff time

Benefits (Losses Avoided): Decrease the number of structures at risk from flooding and an increased in levee and structure protection measures.

Potential Funding: City of Sacramento Department Budgets, Grants

Timeline: 2018

Action 57. Florin Creek Pump at Pomegranate Avenue

Hazards Addressed: Localized Flooding, Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: The U.S. Army Corps of Engineers (Corps) is constructing improvements to the Florin Creek Channel Project from Highway 99 to Franklin Boulevard. In addition, Sacramento Area Flood Control Agency (SAFCA) is constructing a multi-use detention basin upstream. These improvements will increase the channel capacity and enable the conveyance of 100-year event flood flows within the channel. This public safety improvement project will reduce the risk of flooding in the area during extreme storm events and ultimately provide financial relief to several-hundred property owners currently subject to mandatory, high-cost flood insurance. To provide additional flood protection in this area a pump station at Pomegranate Avenue would be necessary.

Project Description: Construction of a Florin Creek pump station at Pomegranate Avenue.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: SAFCA's South Sacramento County Streams Project

Responsible Office/Partners: City of Sacramento Department of Utilities

Project Priority: High

Cost Estimate: $800,000

Benefits (Losses Avoided): Increased flood protection to local residence. Decrease in property damage and insurance claims.

Potential Funding: City of Sacramento Department of Utilities Stormwater Drainage Fund and Grants

Timeline: 1 year

Action 58. Internal Drainage System Improvements

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: In addition to the risk of flooding from levee failure, a considerable flood risk exists due to aging internal drainage infrastructure. Although levee failure may result in much more catastrophic damage than flooding from internal drainage, most of the City's flood damage since 1955 has resulted from drainage deficiencies. In 1995, for instance, approximately 100 homes in four south area drainage basins incurred flood damage due to internal drainage system failure during a particularly intense storm.

Project Description: Implementation of the internal drainage system improvement action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include development of a grant program for drainage improvements, develop an Engineering Services efficiency plan, work on the passage of Proposition 218 drainage fee increase, and drainage master planning.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Office/Partners: City of Sacramento, Department of Utilities

Project Priority: High

Cost Estimate: Range from staff time to $800,000

Benefits (Losses Avoided): These projects would decrease property damage and the number of flood insurance claims. Drainage system improvements will also increase the City's resiliency after a large scale weather event.

Potential Funding: City of Sacramento, Department of Utilities, and Grants

Timeline: 2021

Action 59. Levee and Structural Flood Management Improvements

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento works alongside the Sacramento Area Flood Control Agency, US Army Corps of Engineers, Central Valley Flood Protection Board, Reclamation District No. 1000, Maintaining Agency 9, American River Flood Control District, and others to implement and maintain flood control projects that protect the City.

Project Description: Implementation of the levee and structural improvement action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include support of local efforts to improve flood facilities, plan and implement modernization phase of levee accreditation and ULDC, and participate in the Regional Flood Management Plan.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Office/Partners: City of Sacramento, Department of Utilities, Community Development Department, SAFCA

Project Priority: High

Cost Estimate: Range from staff time to $1,000,000

Benefits (Losses Avoided): These projects would decrease the loss of life and property and decrease the number of flood insurance claims.

Potential Funding: City of Sacramento, SAFCA, and possible grants

Timeline: 2021

Action 60. Master planning to identify facilities needed to prevent 10-year event street flooding and 100-year event structure flooding

Hazards Addressed: Localized Stormwater Flooding and Severe Rain and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: The majority of the City has master plans in place, however with additional development needs and infrastructure projects master planning is needed in portions of the City.

Project Description: Develop master plans to identify facilities needed to prevent 10-year event street flooding and 100-year event structure flooding in areas of the City that do not currently have master planning. Prioritize the projects and formulate timeline for the identified projects. Execute the projects to provide protection from flooding.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Responsible Office/Partners: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Project Priority: High

Cost Estimate: $900,000

Benefits (Losses Avoided): Protection of life and property and reduced flooding on roadways

Potential Funding: City of Sacramento Department of Utilities and Grants

Timeline: 2021

Action 61. Retrofit Pumping Plants with Discharge Monitoring Devices

Hazards Addressed: Localized Stormwater Flooding and Severe Rain and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: All our drainage master plans recommend retrofit of our pumping plants with discharge measuring/monitoring devices. The average test capacity of pumps is approximately 75 percent of Rated Capacity.

Project Description: Retrofit pumping plants to measure discharge and monitor devices. Identify pumps that are underperforming and raise Reliable Capacity to 90 percent service factor.

Other Alternatives: Check pumping capacity when issues arise or develop a testing schedule.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Operations and Maintenance Procedures

Responsible Office/Partners: City of Sacramento Department of Utilities Operations and Maintenance

Project Priority: High

Cost Estimate: $500,000

Benefits (Losses Avoided): Protection of life and property, increased pumping capacity, and early identification of device fatigue.

Potential Funding: City of Sacramento Department of Utilities Capital Improvement Funds and Grants

Timeline: 2020

Action 62. Risk Communication and NFIP/CRS Projects

Hazards Addressed: Flood

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento residents hold over 40,000 National Flood Insurance Program (NFIP) policies and the City has a Class 5 standing in FEMA's Community Rating System (CRS). In coordinate with these two programs, the City has also established a Program of Public Information (PPI) Committee which develops communication strategies related to flood and flood insurance information.

Project Description: Implementation of the risk communication and NFIP/CRS action items outlined in the City of Sacramento's Comprehensive Flood Management Plan. Highlighted projects include implementation of the City's Program of Public Information, develop a Flood Response PPI projects, increase freeboard development to two feet, write a Levee Failure Response Plan for Critical Facilities, and sign a Memorandum of Agreement with the County of Sacramento for flood control planning of the South Sacramento County Streams.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Implementation of the Comprehensive Flood Management Plan

Responsible Office/Partners: City of Sacramento, Department of Utilities, Community Development Department, Office of Emergency Services

Project Priority: High

Cost Estimate: Projects range from $10,000 to $200,000

Benefits (Losses Avoided): Increased public awareness and preparedness which would decrease the amount of property damage and loss of life. Also, increase awareness of flood risk areas and impacts of development.

Potential Funding: City of Sacramento and Grants

Timeline: 2019

Action 63. Steamers and Rio City Café Floodwalls

Hazards Addressed: Flood and Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Sacramento River floodwall is a vertical concrete wall along the Embarcadero. The top elevation of the wall is 34.5' msl. The face and top of the concrete wall has a wood fascia board

to match the wood boards along the walking surface of the Embarcadero. There are existing openings in the floodwall, such as the entrance to the Delta King, where flood control is provided using stoplogs that slip into steel rails and cover the opening and stored in non-flood periods adjacent to the opening. The top of the stoplogs are at the elevation of the top of the concrete floodwall. There are areas on the perimeter of the precast concrete decks where the floodwall is constructed of a wood timber.

Project Description: Ensure the floodway elevation and materials are maintained. The repair will include removal of the existing wood fascia boards on both sides and top of the existing flood wall, and replacement with new wood on the easterly (land) side, and new wood on the top of the floodwall to match the existing height. The westerly (river) side of the wall will remain exposed concrete. The bolts will be cut or ground to be flush with the face of wall and existing blemishes patched to match the adjacent concrete surface. Low-profile ground-illuminating lights will be placed in the wood veneer on the easterly (land) side of the floodwall. The lights will be fed from new conduit which will be run behind the new wood, where there are currently existing conduits for other feeds.

On the elevated sections of the embarcadero and around the buildings, the floodwall is comprised of a timber beam bolted to the concrete slab under the embarcadero.

Other Alternatives: No Action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Repair and maintenance schedule for Old Sacramento floodways.

Responsible Office/Partners: City of Sacramento, Department of Utilities, Operations and Maintenance and Department of Public Works

Project Priority: High

Cost Estimate: $400,000

Benefits (Losses Avoided): Increased flood protection. Decrease in the loss of life and property.

Potential Funding: City of Sacramento, Department of Public Works and Grants

Timeline: 2017

Action 64. Trash Racks and Debris Cages

Hazards Addressed: Localized Stormwater Flooding and Severe Rain and Storms

Goals Addressed: 1, 2, 3

Issue/Background: The City relies heavily on our pumping stations and other drainage facilities to reduce our localized flooding risk. Trash rack and debris cages prevent debris from entering the intake of a pumping station or water conveyance system while still allowing water to flow though.

Project Description: Identify high impact locations in need of trash racks or debris cages. Install devices and develop maintenance schedule.

Other Alternatives: No improvements to the system.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Responsible Office/Partners: City of Sacramento Department of Utilities Wastewater & Storm Drain Engineering Program

Project Priority: Medium

Cost Estimate: $1,250 to $4,000 per rack or cage

Benefits (Losses Avoided): Loss of life and property avoided. Increased system resiliency and capacity.

Potential Funding: City of Sacramento Department of Utilities and Grants

Timeline: 2019

Action 65. Multi-Jurisdictional Modeling for Drainage Watersheds Greater Than 10 Square Miles

Hazards Addressed: Flooding and Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Sacramento encompasses several streams, creeks and associated watersheds. The majority of these watersheds drain into the City from the County of Sacramento. Some of the major drainage watersheds in the City are identified as Natomas Area Stream Group, American River Stream Group, Sacramento Stream Group, and Natural Stream Groups. These groups are identified in the County of Sacramento Watershed Management Plan (2011).

Project Description: Development of a unified model for each watershed that extends over jurisdictional lines. The model would be maintained to reflect changes to the watershed, including development.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Sacramento Area Flood Control Agency Coordination Group

Responsible Office/Partners: Sacramento Area Flood Control Agency, County of Sacramento Department of Water Resources, City of Sacramento Department of Utilities

Project Priority: High

Cost Estimate: $350,000, plus annual fee to maintain the model

Benefits (Losses Avoided): Accurate modeling of development impacts and flood control planning

Potential Funding: Cost Share Between Sacramento Area Flood Control Agency, County of Sacramento Department of Water Resources, City of Sacramento Department of Utilities

Timeline: 2020

Action 66. Post-Flood Water Treatment Facility Recovery

Hazards Addressed: Flood, Local Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Flood waters may impact drinking water system infrastructure such as wells, intakes, and treatment plants by transporting contaminants carried by surface waters or saturated soil. There could be a wide range of contaminants, depending on the severity of the flood and its impacts to the surrounding area. Contaminants may include bacteria, viruses, protozoa, petroleum products from fuel spills, and other known or unknown synthetic chemicals. The contamination may constitute a hazard to public health for regulated and unregulated water quality contaminants.

Project Description: Provide resources for planning and implementing facility cleaning, monitoring, and actions to restore water treatment services.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Sacramento Department of Utilities Water Quality Incident Response Planning

Responsible Office/Partners: City of Sacramento Department of Utilities, Engineering and Water Resources, Water Quality Laboratory and R&D

Project Priority: High

Cost Estimate: $100,000-900,000,000 (large range includes planning, cleanup, monitoring and potential costs for repair/replacement of facilities for full recovery)

Benefits (Losses Avoided): Protection of public health, reducing cost for continuing emergency or other alternate water supplies.

Potential Funding: Grant, to be determined

Timeline: 1-2 years with updates on a to be determined frequency

Wind and Tornado Actions

Action 67. Tree Trimming & Debris Removal

Hazards Addressed: Severe Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: Dead branches fall very easily during high winds or a severe storm. These falling branches are a threat to nearby power lines. Trimming of trees treat diseases that can weaken the tree and make it susceptible to toppling during severe winds and storms.

Project Description: This project includes the year-round pruning of trees throughout the City that can pose a threat to power lines.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Department of Public Works Operations & Maintenance

Responsible Office/Partners: Department of Public Works, SMUD, PG&E

Project Priority: High

Cost Estimate: $80,000-100,000

Benefits (Losses Avoided): Reduced power outages, cost savings

Potential Funding: Department of Public Works Maintenance Budget

Timeline: Ongoing

Action 68. Upgrading Overhead Utility Lines & Burying Critical Power Lines

Hazards Addressed: Severe Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: Northern California is no stranger to winds and in recent history severe weather & winds have cause many power outages in the Sacramento region. The power outages come in the form of a fallen power line or pole not strong enough to withstand the force or trees and limbs that break and hit the power lines.

Project Description: Project would entail the identification and burial of critical powerlines, and the upgrading of ageing utility poles that can withstand the force put out by severe winds and weather.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Unkown

Responsible Office/Partners: Department of Utilities, SMUD, PG&E

Project Priority: Medium

Cost Estimate: $40,000,000

Benefits (Losses Avoided): Reduction in power outages during severe weather

Potential Funding: Increase in utility rates, Grants

Timeline: 2022

Action 69. Install Redundancies and Loop Feeds for Power Lines & Infrastructure

Hazards Addressed: Severe Wind

Goals Addressed: 1, 2, 3

Issue/Background: During times of severe wind and weather Sacramento sees an increase in power outages. These outages have at times lasted up to 2-3 days, such as the winter storm of 2008. A need to redundancies and loop feeds is needed to reduce power outages and provide residents a means of communication should they have an emergency during such an event.

Project Description: This project involves reducing the deficiencies in the electrical transmission lines and the electrical transmission system radial feeds to substations. High voltage lines will be installed that allow the energy to travel longer distances and then be dropped for consumption at distribution transformers.

Other Alternatives: Increased inspection and maintenance on the system

Existing Planning Mechanism(s) through which Action Will Be Implemented: SMUD Infrastructure

Responsible Office/Partners: Department of Utilities, SMUD, PG&E

Project Priority: Low

Cost Estimate: $175,000/mile

Benefits (Losses Avoided): Reduction of power outages, community resiliency

Potential Funding: Possible Grants, SMUD Capital Improvements

Timeline: 2021

Streambank Erosion Actions

Action 70. Stabilization of Erosion Hazard Areas

Hazards Addressed: Streambank Erosion

Goals Addressed: 1, 2, 3, 4

Issue/Background: Bank erosion is a critical concern in Sacramento River because the eroding stream banks threaten levee integrity. Over 50% of the rivers 193 miles have been riprapped in the last 40 years according to the US Fish and Wildlife Service and over a hundred erosion sites have been identified along the river in recent years. It is critical to mitigate these sites to reduce their threats to the integrity of Sacramento's levee system.

Project Description: This project will include the identification and mitigation of erosion sites along the Sacramento river and other rivers in the region that pose a threat to levees and raise flooding concerns.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The US Army Corp of Engineers has headed the Sacramento River Bank protection Project and this mitigation action will be channeled through them as an expansion to their ongoing efforts.

Responsible Office/Partners: California Department of Water Resources, Army Corps of Engineers, City and County of Sacramento

Project Priority: High

Cost Estimate: $1,000,000

Benefits (Losses Avoided): Preventing levee failure and flooding, reduced risk to life and nearby structures

Potential Funding: Grants

Timeline: 2021

Wildfire Actions

Action 71. Implement a Fire Education and Information Program

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Sacramento is a developed city that has relatively few remaining wildland areas. Areas of the city that have been identified as fairly susceptible to an urban wildfire are generally along the American River Parkway from Watt Avenue to the Sacramento River and along the Garden Highway in the Natomas area. The American River Parkway is a stretch of dense trees and brush on both sides of the American River. The property is owned by the State of California, maintained by the Sacramento County Parks Department, and protected from fire by the Sacramento City Fire Department. The area consists of natural habitat with no fire break areas. Fire equipment access is difficult and limited to the paved stretches of the bicycle path. Some of the potential fire areas are not accessible to vehicular traffic.

Project Description: Implement an urban-wildfire safety program using materials for the community. Train educators and inspectors, identifies high risk neighborhoods and buildings, and develop agreed-upon, area specific solutions to fire issues.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Add to the Sacramento City Fire Department's current outreach activities.

Responsible Office/Partners: Sacramento City Fire Department

Project Priority: Medium

Cost Estimate: $10,000

Benefits (Losses Avoided): Educated and more prepared community, increased defensible space for at risk structures

Potential Funding: FEMA & State Grants, Community Wildfire Planning Grant

Timeline: 2019

Action 72. Fuels Reduction on the American River Parkway

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: The American River Parkway is identified as a State Recognized Fire Hazard. The vegetation along the parkway would be a source of fuel to any fire that could burn due to its wild

interface. In addition, an invasive series of plants and weeds growing in the area would allow the fire to burn and spread rapidly.

Project Description: The goal of the project would be to maintain the vegetation growing along the parkway and rid the area of the invasive species which are a greater source of fuel for fires.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Sacramento Regional Conservation Corp works on fuel reduction projects and their work will be expanded to cover areas at risk along the American River Parkway.

Responsible Office/Partners: Sacramento City Fire District

Project Priority: High

Cost Estimate: $80,000-$100,000

Benefits (Losses Avoided): Reduced risk to nearby homes and structures.

Potential Funding: Grants

Timeline: Summer 2017

Action 73. Outreach on the Effects of Smoke on Air Quality

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Sacramento region is surrounded by a large number to locations that have recently caught ablaze over the last several years. The Northern California fire season has been highly active with large scale wildfires. These fires have affected Sacramento's air quality. Winds will carry the smoke from fires a significant distance into Sacramento.

Project Description: The purpose of the project is to educate Sacramento residents on the effects of smoke in the air and provide resources to check the air quality in their area. This will be carried out via social and network media. The city will utilize its social media pages and radio advertisements to convey knowledge and resources residents can use to know when to use precaution. The project will also provide helpful tips to decrease the impacts of poor air quality in their homes and through the daily routines.

Other Alternatives: No Action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing city webpages, Spare the Air Sacramento Region

Responsible Office/Partners: Sacramento City Fire Department, City of Sacramento Public Information Office, Spare the Air Sacramento Region

Project Priority: Medium

Cost Estimate: $5,000 + Staff time

Benefits (Losses Avoided): Greater public awareness, health risks reduced

Potential Funding: Local Funding

Timeline: Summer 2017

Annex G Delta Annex

G.1 Introduction

This Delta Annex details the hazard mitigation planning elements specific to that portion of the Sacramento-San Joaquin River Delta located within unincorporated Sacramento County. This portion of the Delta includes six (6) unincorporated communities, known as legacy communities, and the City of Isleton (also defined as a legacy community). The purpose of this Annex is to provide an umbrella document that includes descriptions, data, and information on the Delta common to all LHMP participating jurisdictions from this region. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Plan document. As such, all sections of the Plan, including the planning process and other procedural requirements apply to and were met by the all participating jurisdictions included in this Delta Annex. This Annex provides information specific to Delta jurisdictions, with a focus on risk assessment and mitigation strategy.

G.2 Participating Jurisdictions

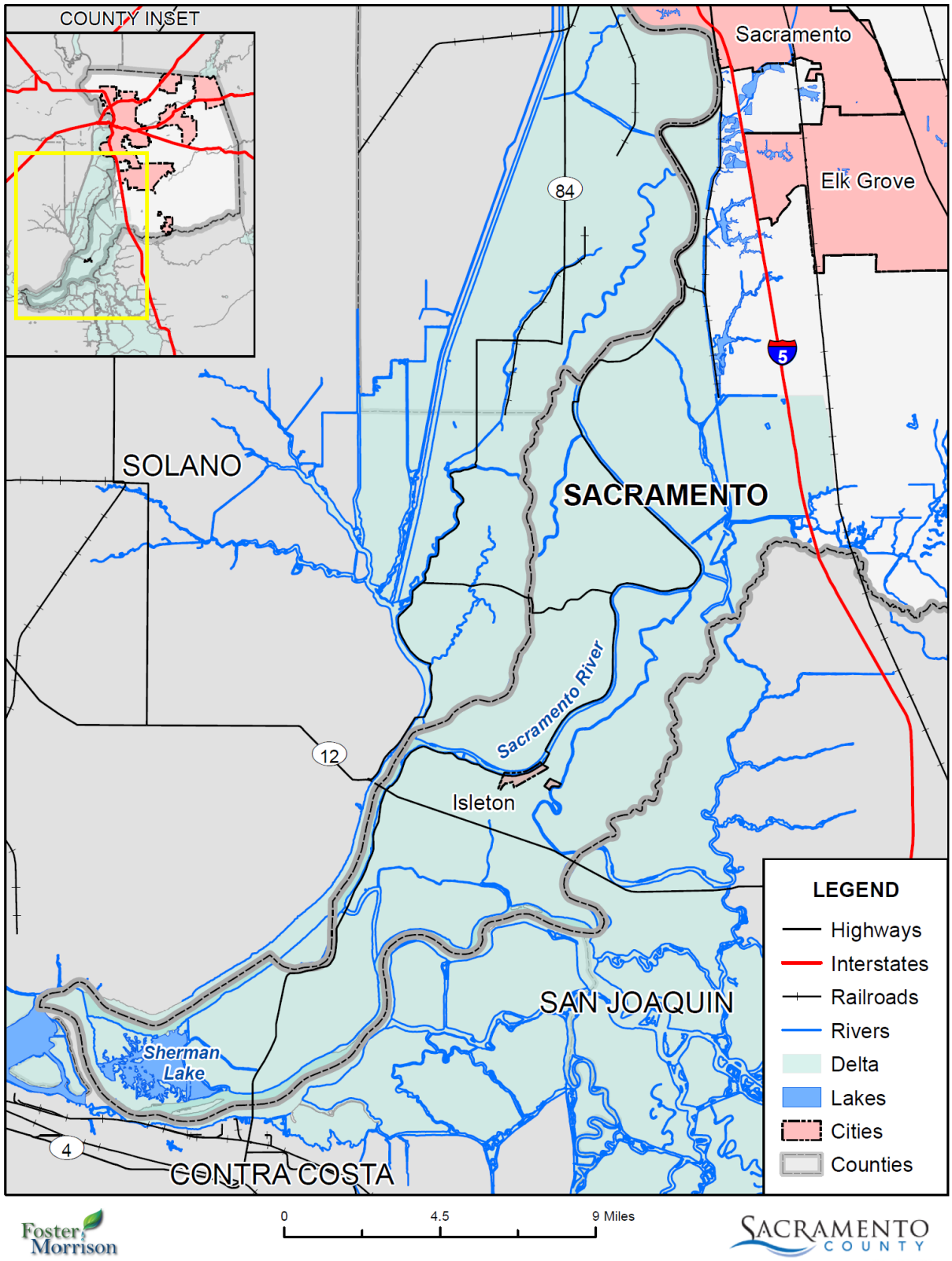
As described in the Base Plan document, the 2016 Sacramento LHMP Update is a multi-jurisdictional plan that geographically covers the entire area within Sacramento County's jurisdictional boundaries (i.e. the Sacramento County Planning Area). This Delta Annex provides a framework for the region's participating jurisdictions to this 2016 LHMP Update. The following agencies/organizations participated in the overall planning process and are seeking FEMA approval of this 2016 LHMP Update:

- City of Isleton
- Brannan Andrus Levee District (Reclamation Districts #317, #407, #2067)
- Reclamation District #3
- Reclamation District #341
- Reclamation District #551
- Reclamation District #554
- Reclamation District #556
- Reclamation District #563
- Reclamation District #1002
- Reclamation District #1601
- Reclamation District #2111

G.3 Community Profile

The community profile for the Sacramento Delta is further detailed in the following sections. Figure G-1 displays a map and the location of the Delta within Sacramento County.

Figure G-1 Sacramento County Delta Area



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

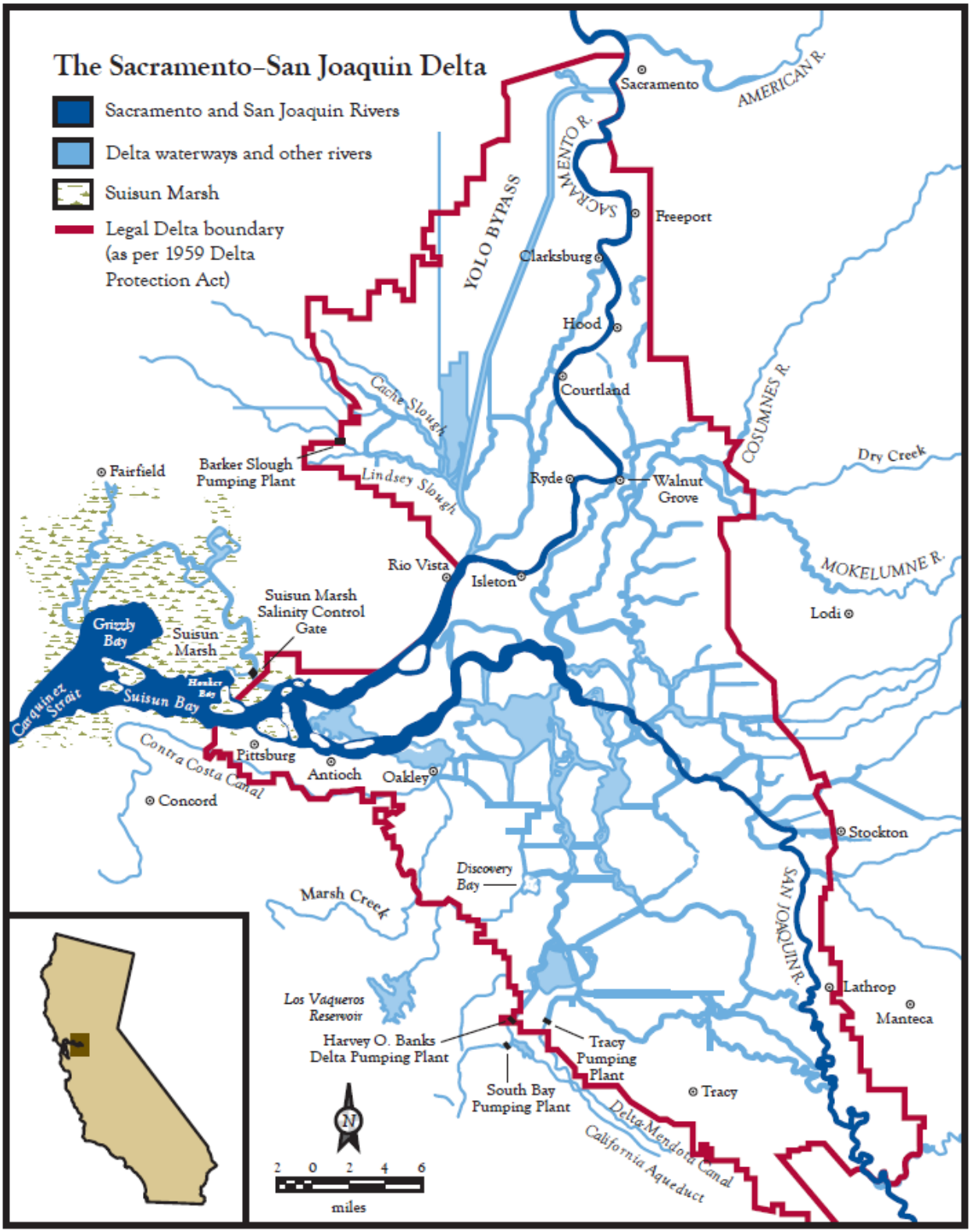
G.3.1. Geography and Location

The Sacramento River Delta, in the southwest corner of Sacramento County, is interlaced with numerous tidal sloughs that include a number of peat islands reclaimed for agriculture by an extensive levee system. These waterways provide important fisheries and aquatic ecosystems, water for Delta farms and are important recreational areas.

The Delta is located in Northern California, inland of the San Francisco Bay going towards Sacramento. Highways 80 and 5 run north-south, bordering the Delta and Highway 12 runs east to west crossing the Delta about midway. The Delta boundaries were legislatively defined by the Federal and State governments as part of the "New Deal" Central Valley Project after the Depression. The Primary and Secondary Zones of the legal Delta include land in six counties, including although one area in Alameda County is very small), and portions of the cities of, Sacramento, West Sacramento, Stockton and Antioch along the periphery of the Delta. The smaller cities of Rio Vista and Isleton along with unincorporated communities of Byron, Ryde, Hood, Locke, Walnut Grove, Freeport, Clarksburg, and Courtland are located in the heart of the Delta... Comprising over 700,000 acres, this region includes 62 major named islands and hundreds of smaller islands. (see Figure G-2).

As described in the County's floodplain management ordinance, that portion of the Delta located within unincorporated Sacramento includes: that area south of the City of Sacramento to the tip of Sherman Island protected from flooding by levees as bound by Reclamation District numbers: 3, 317, 341, 349, 369, 407, 551, 554, 556, 563, 744, 746, 755, 813, 1002, 1601, 2067, 2110, and 2111. This legal boundary is the Delta region used throughout this Annex.

Figure G-2 Sacramento–San Joaquin Delta Legal Boundaries



Source: Delta Protection Commission

The Delta region is one of the County's most fertile areas and accounts for much of the $470 million in agricultural production in the County. The Delta communities have a quiet rural lifestyle and is unique as a getaway from the hurried pace of much of the remainder of Sacramento County. This 162 square mile area is crisscrossed by numerous waterways, which divide the land into distinct islands or tracts which includes the incorporated City of Isleton and the legacy communities of Locke, Ryde, Courtland, Freeport, Hood and Walnut Grove where roughly 6,000 residents live.

G.3.2. History

Originally, the Delta was a shallow wetland with water covering the area for many months of the year. Natural levees, created by deposits of sediment, allowed some islands to emerge during the dry summer months. Salinity would fluctuate, depending on the season and the amount of precipitation in any one year, and the species that comprised the Delta ecosystem had evolved and adapted to this unique, dynamic system.

The federal Swamp Land Act of 1850 set the stage for property ownership in the Delta. State legislation followed in 1861, which is approximately the same period in which the 1,000+ mile levee system began to take shape.

In 1933, the Legislature approved the California Central Valley Project Act, which relied upon the transfer of Sacramento River water south through the Delta and maintenance of a more constant salinity regime by using upstream reservoir releases of freshwater to create a hydraulic salinity barrier. As a result of the operations of state and federal water projects, the natural salinity variations in the Delta have been altered.

Fast forward to the November 2009 enactment of the Sacramento-San Joaquin Delta Reform Act. The Act resulted in a lengthy list of changes to the Delta's regulatory and governance framework and specifically identified a key statutory objective of ensuring for a safe and reliable water supply for the State, while preserving and enhancing the Delta's ecosystem. These "coequal" goals are now defined in California Water Code section 85054.

Today

The Delta, at 1,300 square miles, is the largest estuary and wetland ecosystem on the west coasts of both North and South America, and home to more than 500,000 people and 200,000 jobs. Further, the economic health of California, to the tune of $400B, is heavily reliant on existing communications, energy, and transportation facilities/infrastructure that are located in and traverse the Delta.

In spite of acknowledged water system and ecosystem degradation, the Delta remains a unique and critically important natural resource for California, as well as the entire nation. It serves as the hub of California's water supply system, which plays a vital role in supporting the basic economies of several major regions within the State, which are dependent on the ability of water exporters to access and transport water from the Delta watershed. This is evidenced by the fact that more than two-thirds of the State's residents (25 of 39 million) and more than three million acres of highly productive farmland receive water exported from the Delta watershed.

G.3.3. Current Delta Issues

As stated previously, the enactment of the 2009 Delta Reform Act resulted in a "re-set" of the Delta's regulations and governance. As an example, the Delta Stewardship Council (DSC) and the Sacramento-San Joaquin Delta Conservancy Board (SSJDCB) were created, and Delta Protection Commission (DPC) membership was reduced in size. However, without question the proposed CA WaterFix (formerly the Bay Delta Conservation Plan) has the greatest potential to result in immitigable and irreversible impacts to/on the Delta. The "California Water Fix" is now essentially a massive public works project. The "preferred alternative" continues to consist of an isolated water conveyance facility similar in design and operation to the "preferred alternative" described in the draft BDCP. The basic system design and operational protocol remains unchanged from the draft BDCP's preferred alternative. As a result, approval and implementation of the projects could result in a long list of significant and unavoidable impacts including, but not limited to, impacts to land use, water management and water quality, transportation, and socioeconomics.

G.3.4. Assets at Risk

This section identifies the Sacramento Delta's assets at risk, including values, populations, critical facilities and infrastructure, cultural and historic assets, and growth and development trends.

Values at Risk

The following is from the Sacramento County Assessor's Office 2015 database. The methodology used to derive property values is the same as in Section 4.3.1 of the Base Plan. This data has limitations and should only be used as a guideline to overall values in the County.. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. Additionally, values include both land and improvements for each parcel, whereas during disasters generally it is only the improvements at risk. Table G-1 shows the 2015 Assessor's values (e.g., the values at risk) broken down by property type for the Delta (both the City of Isleton and unincorporated areas). Table G-2 shows the 2015 Assessor's values (e.g., the values at risk) broken down by property type for the Delta (the unincorporated area). A break down by property type for the City of Isleton is included in its Chapter to this Delta annex.

Table G-1 Sacramento Delta Total Values at Risk by Jurisdiction

Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Delta (Isleton)	525	334	$16,873,341	$28,552,704	$45,426,045
Delta (Unincorporated)	2,618	1,602	$294,367,492	$316,964,796	$611,332,288
Grand Delta Total	**3,143**	**1,936**	**$311,240,833**	**$345,517,500**	**$656,758,333**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Table G-2 Sacramento Delta – Unincorporated Delta Total Values at Risk by Property Use

Property Use	Total Parcels	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	747	469	$167,734,672	$147,225,848	$314,960,520
Care / Health	2	0	$777	$0	$777
Church / Welfare	9	6	$94,451	$432,635	$527,086
Industrial	41	31	$4,043,879	$6,716,660	$10,760,539
Miscellaneous	123	5	$228,567	$12,426	$240,993
Office	18	16	$1,433,428	$2,182,226	$3,615,654
Public / Utilities	281	0	$56,826	$0	$56,826
Recreational	62	46	$13,902,452	$14,501,921	$28,404,373
Residential	1,004	920	$89,710,332	$131,681,695	$221,392,027
Retail / Commercial	78	75	$3,900,930	$9,273,692	$13,174,622
Vacant	253	34	$13,261,178	$4,937,693	$18,198,871
No Data	0	0	$0	$0	$0
Total	**2,618**	**1,602**	**$294,367,492**	**$316,964,796**	**$611,332,288**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facilities and Infrastructure

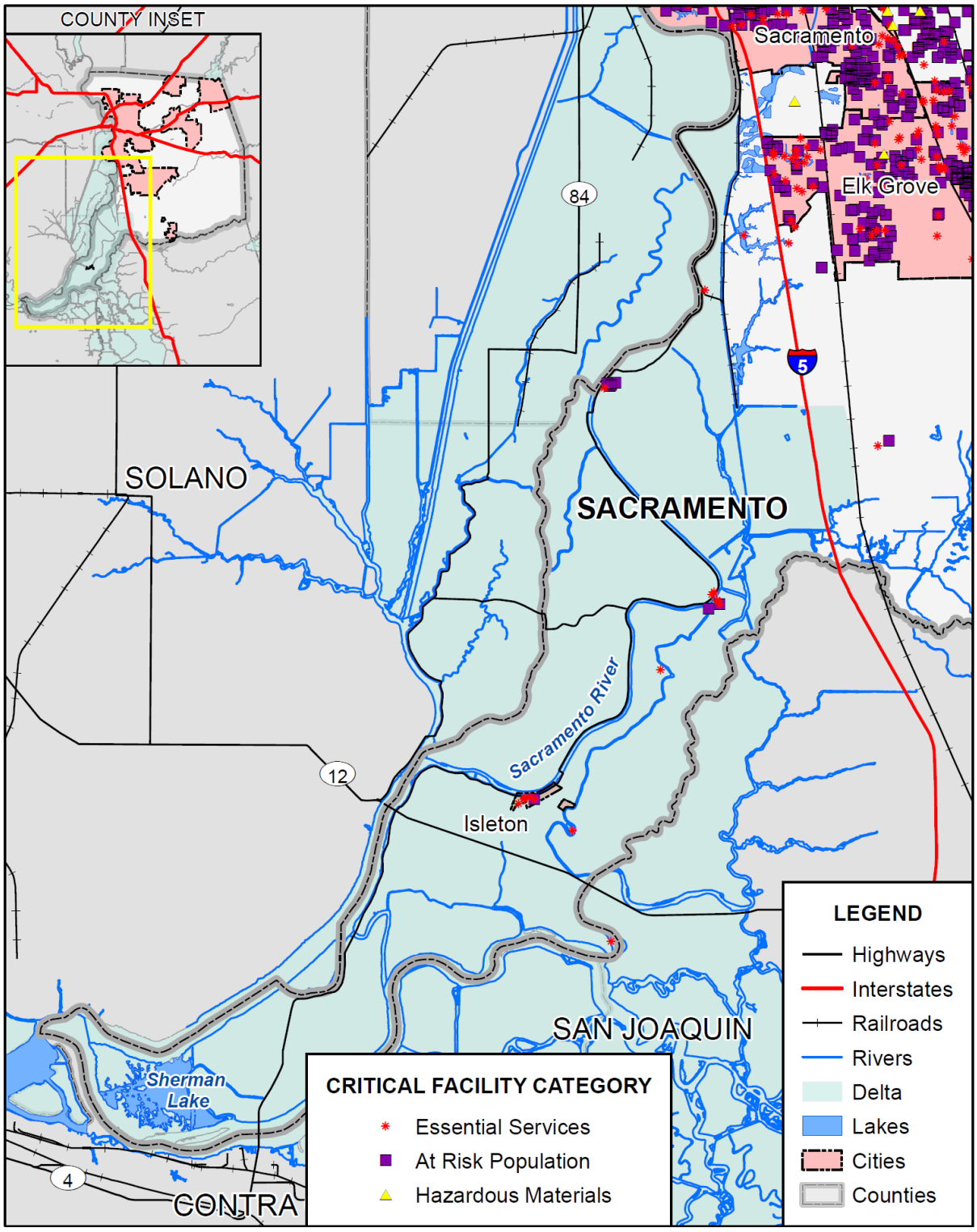
For purposes of this plan, a critical facility is defined as:

> *Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.*

This definition was refined by separating out three classes of critical facilities, that include Essential Services Facilities, At Risk Population Facilities, and Hazardous Materials Facilities, as further described in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the Delta from Sacramento County GIS is shown on Figure G-3 and detailed in Table G-3. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix E.

Figure G-3 Sacramento County Delta– Critical Facilities



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

Table G-3 Sacramento County Delta– Critical Facilities Inventory

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	Airport	1
	Emergency Evacuation Shelter	5
	Fire Station	4
	Government Facilities	2
	Police	3
	Total	**15**
At Risk Population Facilities	Community Day School	1
	Day Care Center	2
	Public Continuation High School	1
	Public Elementary School	3
	Total	**7**
Hazardous Materials Facilities	–	0
	Total	**0**
Grand Total		**22**

Source: Sacramento County GIS

Natural Resources

The Delta ecosystem is the lower drainage area of the vast Central Valley of California. It is inextricably linked to the Sacramento and San Joaquin River watersheds as a recipient of flows and constituents from natural and man caused activities and events upstream. It is distinguished by various aquatic ecosystems that host rare native fish, and by several distinct terrestrial and wetland habitats that support abundant bird and animal life. These key habitats include tidal marshes, managed freshwater wetlands, in-channel fresh and brackish water habitats, open water habitats, seasonal wetlands, riparian forest, and grasslands, among others. In all of these habitats there exist both resident and migratory species of great conservation value. This means that Delta ecosystem management must consider not only localized contexts but also the way that Delta habitats fit within regional, watershed, and even continental-scale ecosystems.

Importantly, some Delta agricultural lands also provide rich seasonal wildlife habitat. Thousands of acres are shallowly flooded after harvest and provide feeding and resting areas for resident and migratory birds and other wildlife. This practice of seasonal flooding is one example of a management practice that supports both the Delta ecosystem and the economy.

The Delta is also the single most important link in California's water supply system. Two of the state's biggest water projects – the State Water Project and the federal Central Valley Project – depend on Delta waterways to convey water from Northern California rivers to pumping facilities in the southern Delta. Delta levees play a critical role in preventing salty water from San Francisco Bay from intruding into critical parts of the Delta and contaminating the fresh water that supplies communities and farms.

While the California WaterFix includes ecosystem/habitat mitigation measures for the severe environmental impacts it causes the habitat restoration component of the prior habitat conservation plan (i.e., the BDCP) has been divorced from the project. Proposed mitigation, termed "environmental commitments" in the revised documents, include 2,100 acres of habitat repair along the footprint of the conveyance project,

"California EcoRestore" now proposes the creation/enhancement of approximately 30,000 acres of habitat; significantly reduced from the 153,000 acres previously identified in the draft BDCP. As proposed, EcoRestore will restore these 30,000 acres to habitat, primarily floodplain and tidal marsh, by 2020. As part of this effort EcoRestore will develop an adaptive management program (aka: the EcoRestore Adaptive Management Program) to achieve its habitat restoration goals and increase restoration success for the benefit of the long-term health of the Sacramento-San Joaquin Delta and Suisun Marsh's native fish and wildlife species.

In addition, the California Department of Fish and Wildlife is developing the "Delta Conservation Framework" that will work in tandem with EcoRestore. As proposed, the Framework will identify a 25-year vision for Delta-wide ecosystem conservation consistent with and in the context of the Delta as a place, and act to backfill the conservation measures) lost (or significantly eroded) when BDCP morphed into the Cal WaterFix and EcoRestore.

Historic and Cultural Resources

There is rich historic and cultural heritage in the Delta. It is home to several historically significant legacy communities, including Bethel Island, Clarksburg, Courtland, Freeport, Hood, Isleton, Knightsen, Locke, Rio Vista, Ryde, and Walnut Grove. Locke, the largest remaining town built by early Chinese immigrants to the United States, is a National Historic Landmark District. More information can be found in the Base Plan, as well as in the City of Isleton's and each reclamation district's chapter of this Annex.

Growth and Development Trends

Major planning activities are occurring in the Delta by the State and Federal Governments related to water supplies and environmental issues. This effort's co-equal goals are water reliability and habitat restoration while still protecting, enhancing and sustaining the unique cultural, historical, recreational, agricultural and economic values of the Delta, and addressing flood protection, continued socio-economic sustainability of agriculture and its infrastructure, and legacy communities in the Delta. The outcomes of these planning actions are likely to shape the future of the County's Delta community.

Future Development

The 2030 Sacramento County General Plan estimated future populations for the Delta Area of the County. These are shown below.

- 2005 – 6,109
- 2010 – 6,442
- 2015 – 6,789

- 2020 – 7,023
- 2025 – 7,250

G.4 Hazard Identification

Based on information provided by the participating jurisdictions within the Delta Area, in conjunction with input from Sacramento County, hazards that affect the Delta are summarized, including information on their frequency of occurrence, spatial extent, potential magnitude, and significance specific to the Delta Area (see Table G-4). Additional hazard information specific to each of the participating Delta jurisdictions is included in the Chapter to this Annex.

Table G-4 Sacramento County Delta—Hazard Identification Assessment

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Likely	Limited	Medium
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Significant	Likely	Significant	Medium
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Significant	Likely	Significant	Medium
Earthquake	Significant	Occasional	Limited	Low
Earthquake: Liquefaction	Limited	Occasional	Critical	High
Flood: 100/200/500-year	Limited	Unlikely	Critical	High
Flood: Localized Stormwater Flooding	Significant	Likely	Critical	Medium
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Significant	Unlikely	Critical	High
River/Stream/Creek Bank Erosion	Extensive	Highly Likely	Limited	Medium
Severe Weather: Extreme Temperatures Cold and Freeze	Extensive	Occasional	Critical	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Likely	Critical	Low
Severe Weather: Fog	Extensive	Likely	Critical	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail/Lightning)	Extensive	Likely	Limited	Medium
Severe Weather: Wind and Tornadoes	Limited	Occasional	Negligible	Medium
Subsidence	Significant	Likely	Critical	Medium
Volcano	Limited	Unlikely	Negligible	Low
Wildfire	Limited	High	Limited	Low

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

G.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile the Delta's hazards and assess the region's vulnerability separate from that of the Planning Area as a whole, has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the Base Plan discuss overall impacts to the Planning Area and describe the hazard, the geographic extent of the hazard, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the Delta as an area is included in this Annex (specific risks and vulnerabilities to each reclamation district and the City of Isleton can be found in their chapters to this Annex). This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked from medium to high significance and also includes a vulnerability assessment to the flood, levee failure, and wildfire. An inventory of critical facilities in the Delta Area was also performed. For more information about how hazards affect the entire Sacramento County Planning Area, see Chapter 4 Risk Assessment in the main plan.

G.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section G.5.2, includes a description as to how the hazard affects the Delta and information about past occurrences. The intent of this section is to provide Delta specific information on hazards and further describe how the hazards and risks affect the Delta and differ across the entire Sacramento County Planning Area.

G.5.2. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table G-4 as low, medium or high significance hazards and primary hazards in the State of California. Impacts of past events and vulnerability of the Delta to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area) and also in the chapters specific to the City of Isleton and the Reclamation Districts. Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the Base Plan.

An estimate of the vulnerability of the Sacramento Delta area to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Agricultural Hazards

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Agricultural production in Sacramento County remains a significant contributor to the local economy. In addition to the almost $470 million in 2015 annual production value (much of it in the Delta), there are hundreds of jobs directly tied to agricultural production and thousands more that are impacted indirectly in the production, processing, transportation, and marketing of those commodities. Thus hazard impacts to the agricultural industry could potentially result in impacts on the local Delta and larger County economy in excess of the $470 million in ag production values.

Past Occurrences

Agricultural hazards occur on a yearly basis, with varying degrees of damage caused each year.

Vulnerability to Agricultural Hazards

According to the US Department of Agriculture (USDA), every year natural disasters, such as droughts, earthquakes, extreme heat and cold, floods, fires, earthquakes, hail, landslides, and tornadoes, challenge agricultural production. Because agriculture relies on the weather, climate, and water availability to thrive, it is easily impacted by natural events and disasters. Agricultural impacts from natural events and disasters most commonly include: contamination of water bodies, loss of harvest or livestock, increased susceptibility to disease, and destruction of irrigation systems and other agricultural infrastructure. These impacts can have long lasting effects on agricultural production including crops, forest growth, and arable lands, which require time to mature. Specific impacts to Delta assets are listed below:

- Drought's most severe effects on agriculture include water quality and quantity issues. Other impacts include decreased crop yields, impact to feed and forage, and altered plant populations.
  - ✓ The County has been in a drought for the last 5 years. The County Agricultural Commissioner has written a "Letter of Loss" to the USDA/FSA (USDA/Farm Services Agency) for the Livestock Forage Disaster Program, every year since 2011 due to losses in pasture or forage areas. The FSA has various ag insurance programs to assist growers. Growers can enroll in crop insurance programs for all natural causes of loss listed in their policies (such as fire, flood, extreme temperatures). For those without insurance, NAP (the Non-insured Crop Disaster Assistance Program) managed by USDA's Farm Service Agency provides financial assistance to producers of non-insurable crops when low yields, loss of inventory or due to natural disasters. The county agricultural commissioners can write a "Letter of Ag Loss", identifying the crop & % of loss, to allow growers to receive either low cost loans or monetary compensation.

- Earthquakes can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on agricultural production and the environment. These impacts could include loss of harvest or livestock and destruction of irrigation systems and other agricultural infrastructure.
- Extreme cold may result in loss of crops, livestock, downed power lines, and increased use of generators.
- Hot weather and extreme heat can worsen ozone levels and air quality as well as leading to drought conditions. Excessive heat and prolonged dry or drought conditions can impact agriculture by creating worker safety issues for farm field workers, severely damaging crops, and reducing availability of water and food supply for livestock.
- Wildfires can spread quickly and devastate thousands of acres of land, which may include agricultural lands. This devastation could lead to large losses in crops, livestock, and agricultural infrastructure.
- Flooding causes many impacts to agricultural production, including water contamination, damage to crops, loss of livestock, increased susceptibility of livestock to disease, flooded farm machinery, and environmental damage to and from agricultural chemicals.
  - ✓ Reclamation Districts and Flood Control Districts are responsible for maintenance of levees. There are also private levees maintained by the landowners. Vegetation and vertebrates (ground squirrels) are controlled to maintain the integrity of the levees. There are permanent crops and winter crops which may be affected during the times of year when flooding is most likely to occur. Permanent crops such as vineyards and orchards can withstand temporary flooding, such as 1-2 days, before permanent damage may begin to occur. Winter wheat and young plantings may be washed away in a flood event.
- High Winds and microbursts can appear without much warning and have the potential to devastate an area very quickly. This devastation can impact agriculture by contaminating water and destroying crops, livestock, and other farm property.

In addition to impacts from natural hazards, the County noted that invasive pests can cause economic damage, affecting the ability to ship agricultural commodities oversees, inter-state and intra-state. Trade can be impacted significantly. The California Department of Food & Agriculture (CDFA) is responsible for managing invasive pests statewide. CDFA works closely with the CAC's to manage the pests through quarantines, detection and eradication programs. USDA is also responsible for managing invasive pests which have the potential to impact agriculture nationally. USDA works in partnership with CDFA and the CACs to manage pests.

The County also noted that there are possible threats of bioterrorism. Bioterrorism threats to agriculture would be handled by the USDA, in cooperation with CDFA and the CAC's.

Future Development

Future development in the County is not likely to have an impact on agricultural hazards in the Delta Area of Sacramento County.

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. This is discussed in more detail in Chapter 4 the Base Plan.

Past Occurrences

The Planning Team noted no past occurrences of climate change impacts.

Vulnerability to Climate Change

The APG: Understanding Regional Characteristics identified the following impacts specific to the Bay-Delta region in which the Sacramento County Planning Area is part of:

- Temperature increases
- Reduced precipitation
- Sea level rise
- Flooding – increased flows in areas below sea level, exacerbated by levee failure
- Reduced agricultural productivity
- Reduced water supply
- Public health – heat & air pollution
- Decline in Biodiversity

Future Development

Sacramento County in general could see population fluctuations as a result of climate impacts relative to those experienced in other regions, and these fluctuations are expected to impact demand for housing and other development. For example, sea level rise may disrupt economic activity and housing in affected communities, resulting in migration to inland urban areas like the Sacramento region. While there are currently no formal studies of specific migration patterns expected to impact the Sacramento region, climate-induced migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2015 and is expected to be the focus of future studies. More information can be found in Section 4.3.5 of the Base Plan. Future development may be affected by climate change as follows:

- Climate change, coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development.
  - ✓ Higher flood risks, especially if coupled with increased federal flood insurance rates, may decrease market demand for housing and other types of development in floodplains, while increased risk of wildfires may do the same for new developments in the urban-wildland interface.
- Climate change will stress water resources.

- Similarly protecting and enhancing water supply will also need to be addressed. California's Sustainable Groundwater Management Act (SGMA) will contribute to addressing groundwater and aquifer recharge needs.
- Climate Change will affect Transportation. The transportation network is vital to the county and the region's economy, safety, and quality of life. While it is widely recognized that emissions from transportation have impacts on climate change, climate will also likely have significant impacts on transportation infrastructure and operations.
- Climate change will affect land uses and planning., Climate change coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development.
- Climate change will affect Utilities. California is already experiencing impacts from climate change such as an increased number of wildfires, sea level rise and severe drought. Utility efforts to deal with these impacts range from emergency and risk management protocols to new standards for infrastructure design and new resource management techniques.
- Addressing Urban Heat Islands and Heat Events. New development will contribute to urban heat island (UHI) impacts and will need to incorporate urban greening methods into all aspects of development; interior and exterior of buildings, surrounding environment and beyond.

Drought and Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends. Water districts normally require at least a 10-year planning horizon to implement a multiagency improvement project to mitigate the effects of a drought and water supply shortage.

Past Occurrences

The past occurrences of drought to the Delta are the same as those of the County, as drought is a regional phenomenon. A list of past occurrences can be found in Section 4.2.11 of the Base Plan.

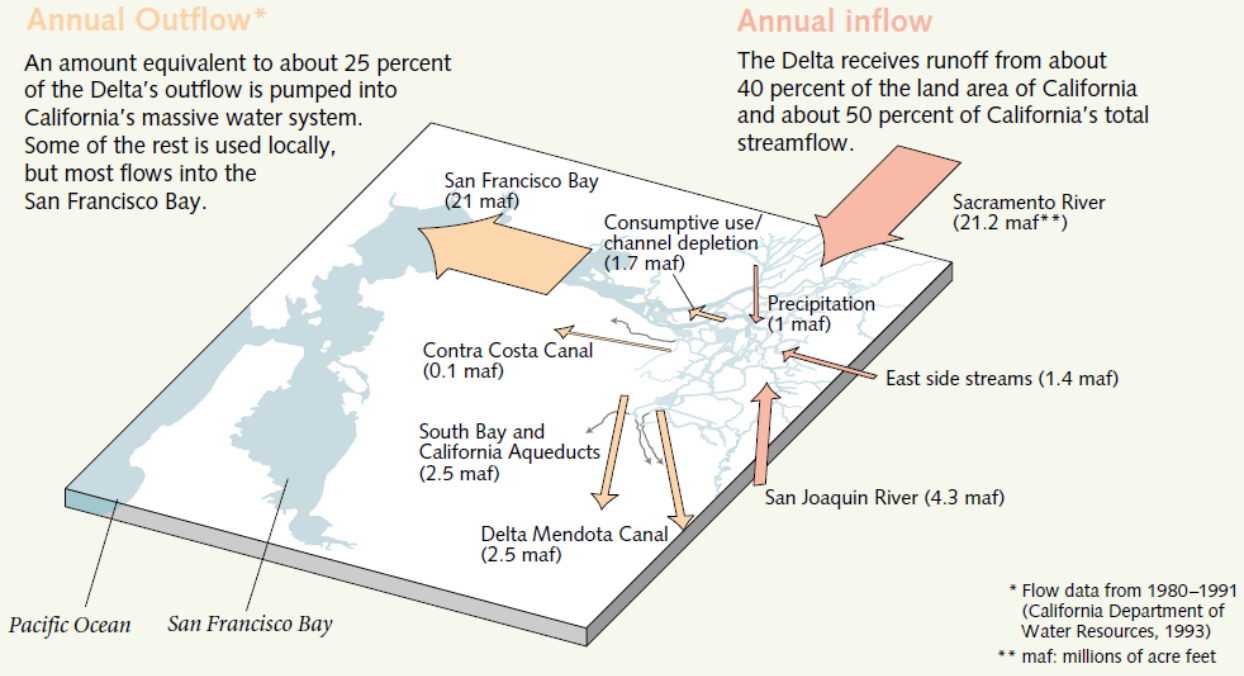
Vulnerability to Drought and Water Shortage

In the Delta, drought has multiple effects. It has an economic effect on the agricultural industry, as high value crops are raised on many of the Delta islands. Prolonged drought can also exacerbate subsidence in the Delta.

There are also issues posed to the State of California from drought in the Delta. The Delta receives runoff from about 40 percent of the land area of California and about 50 percent of California's total streamflow, as shown in Figure G-4. It is the heart of a massive north-to-south water-delivery system whose giant engineered arterials transport water southward. State and Federal contracts provide for export of up to 7.5 million acre-feet per year from two huge pumping stations in the southern Delta near the Clifton Court

Forebay. About 83 percent of this water is used for agriculture and the remainder for various urban uses in central and southern California. Two-thirds of California's population (more than 20 million people) gets at least part of its drinking water from the Delta.

Figure G-4 The Delta and California's Water System



Source: USGS Publication "Sacramento-San Joaquin Delta: The Sinking Heart of the State." Report FS-005-00

Future Development

According to the 2010 Urban Water Management Plan, Sacramento County, through the Sacramento County Water Agency, has access to large quantities of water through surface water, groundwater, and recycled water. However, population growth in the County will add additional pressure to water companies during periods of drought and water shortage.

Earthquake: Liquefaction

Likelihood of Future Occurrence–Occasional
Vulnerability–Very High

Hazard Profile and Problem Description

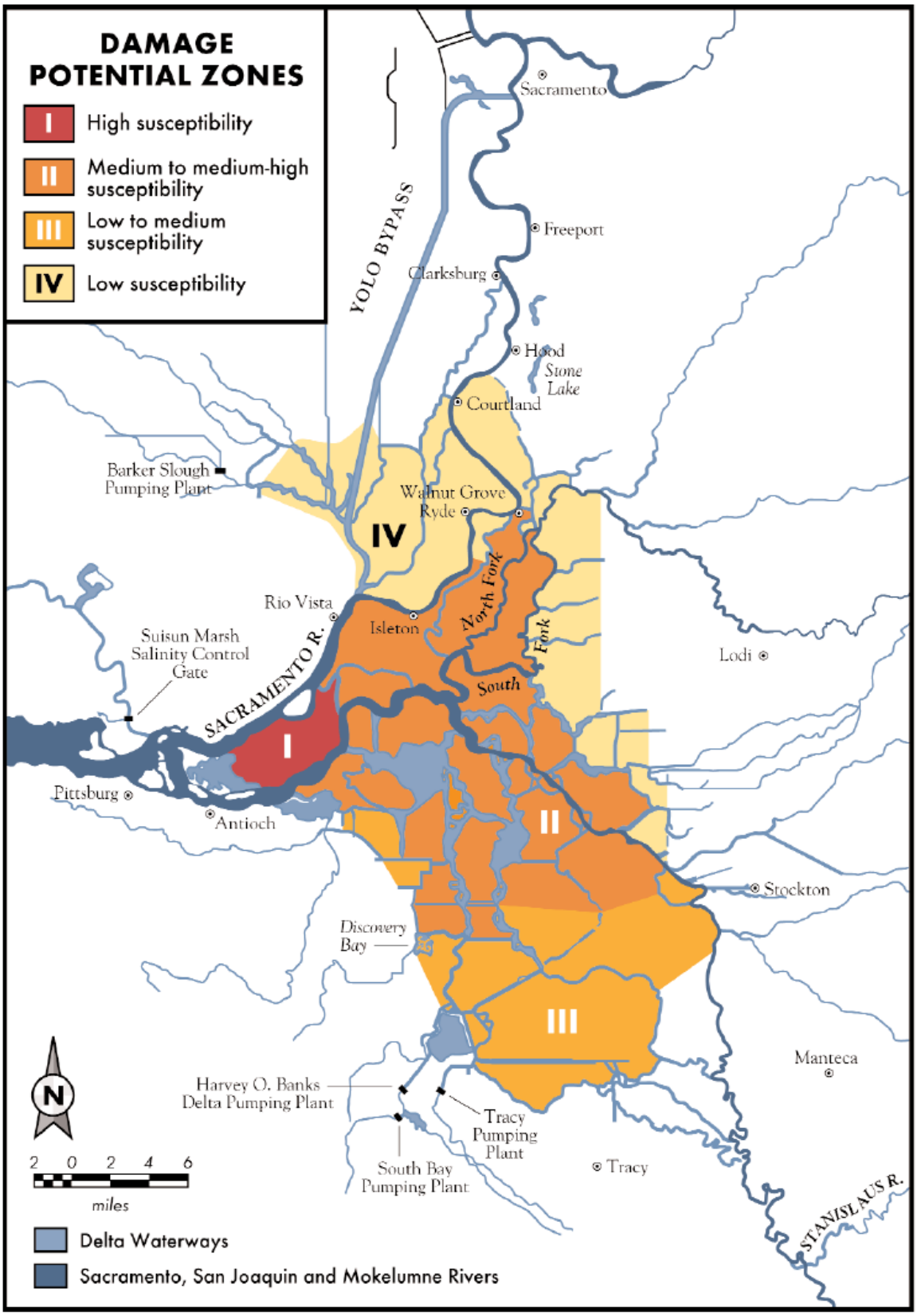
The Delta sits atop a blind fault system on the western edge of the Central Valley. Moderate earthquakes in 1892 near Vacaville and in 1983 near Coalinga demonstrate the seismic potential of this structural belt. The increasing height of the levee system has prompted growing concern about the seismic stability of the levees. The concern is based on the proximity of faulting, the nature of the levee foundations, and the materials used to build the levees. Many levees consist of uncompacted weak local soils that may be

unstable under seismic loading. The presence of sand and silt in the levees and their foundations indicates that liquefaction is also a possibility.

Although there have been no significant quakes in or closely adjacent to the Delta since high levees were originally constructed, there are at least five major faults within the vicinity of the Delta capable of generating peak ground acceleration values that would likely lead to levee failures.

A preliminary analysis of the risk of levee failure due to seismicity was prepared for the CALFED Levee System Integrity Program. Based on standard methods and local expertise, it was estimated the magnitude and recurrence intervals of peak ground accelerations throughout the Delta. Two competing fault models were evaluated for this study, producing a wide range of potential accelerations. Then, based on local knowledge and limited geotechnical information, Damage Potential Zones were established for the Delta (Figure G-5). The zones of highest risk lie in the central and west Delta where tall levees are constructed on unstable soils that are at high risk of settling or liquefaction during an earthquake.

Figure G-5 Delta Area – Potential Damage Due to Liquefaction and Levee Collapse



This report estimated recurrence intervals for ground accelerations and the number of potential levee failures in each Damage Potential Zone. It is useful to examine their estimates of the number of failures that might occur during a 100-year event, or an event with a 0.01 probability of being equaled or exceeded in any given year. Based on their estimates, it is a roughly 50-50 chance that 5 to 20 levee segments will fail during a 100-year event in the Delta. This does not imply that 5 to 20 islands will flood, but just that 5 to 20 levee segments will fail. The loss of 5 to 20 levee segments in the Delta constitutes considerable and abrupt landscape change, since island flooding is likely to be widespread and persistent for a long period of time.

In sum, liquefaction may pose a serious threat to levees, especially as levees are built larger and higher to deal with continuing island subsidence. Levee failure, depending on the extent, could have disastrous effects on agriculture, natural gas supply, fisheries, and salt water intrusion of the San Francisco Bay. Water supply to California could be affected for years.

Past Occurrences

Although no historic examples of seismically induced levee failure are known in the Delta, the modern levee network has not been subjected to strong shaking. Levees were either smaller or non-existent in 1906 when the region was strongly shaken by the great San Francisco earthquake.

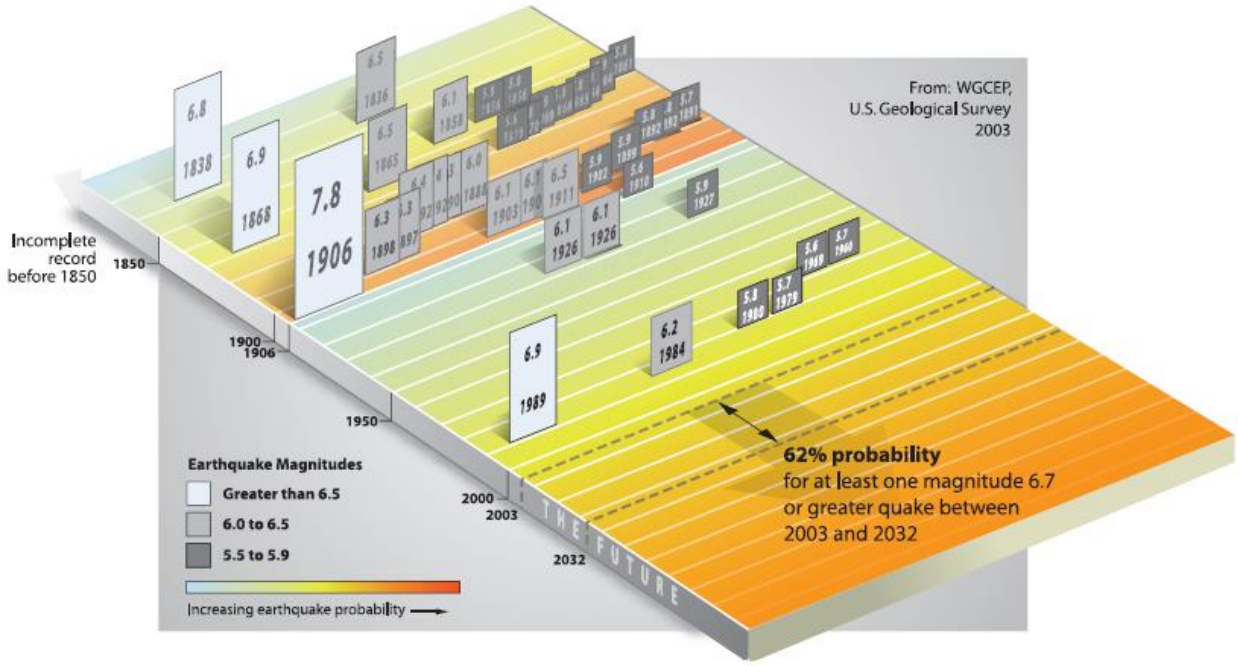
Vulnerability to Earthquake: Liquefaction

Historically, there have been 165 Delta and Suisun Marsh flood-induced levee failures leading to island inundations since 1900. Most of these failures occurred prior to 1990. Also, many of these failures were outside of Sacramento County. Since that time, there have been few levee failures due to improvements on the levee system in Sacramento as a whole.

No reports could be found to indicate that seismic shaking had ever induced significant damage or were the cause of the levee failures mentioned above. However, the lack of historical damage is not a reliable indicator that Delta levees are not vulnerable to earthquake shaking. Furthermore, the present-day Delta levees, at their current size, have not been significantly tested by moderate to high seismic shaking.

The U.S. Geological Survey estimates that an earthquake of magnitude 6.7 or greater has a 62 percent probability of occurring in the San Francisco Bay Area between 2003 and 2032 (see Figure G-6). Such an earthquake is capable of causing multiple levee failures in the Delta Region which could result in fatalities, extensive property damage and the interruption of water exports from the Delta for an extended period of time. Potential earthquakes on the Hayward, Calaveras or San Andreas faults pose the highest risk to Delta Region levees.

Figure G-6 Past and Future Earthquakes in the San Francisco Bay Area and the Delta



Source: DRMS Risk Report (URS/JBA 2008c) Figure 13-8

The largest earthquakes experienced in recent history in the region include the 1906 Great San Francisco Earthquake and the 1989 Loma Prieta Earthquake. The 1906 earthquake occurred while the levees were in their early stages of construction. They were much smaller than they are today, and were not representative of the current configuration. The epicenter of the 1989 Loma Prieta earthquake was too distant and registered levels of shaking in the Delta too small to cause perceptible damage to the levees. In 2009, the California Department of Water Resources, in their document titled Delta Risk Management Strategy, performed a special simulation analysis of the 1906 Great San Francisco Earthquake to evaluate the potential effects of that event on the current levees.

In addition to the simulation of these largest regional earthquakes, recent smaller and closer earthquakes were also evaluated. They include: the 1980 Livermore Earthquake (M 5.8) and the 1984 Morgan Hill Earthquake (M 6.2). Except for the 1906 earthquake, which would have caused deformations of some of the weakest levees, the other earthquakes were either too small or too distant to cause any significant damage to the Delta levees. These results are consistent with the seismic vulnerability prediction model developed for this study.

General seismic performance observations were:

- The areas most prone to liquefaction potential are in the northern region and the southeastern region of the Delta. The central and western regions of the Delta and Suisun Marsh show discontinuous areas of moderate to low liquefaction potential.
- The vulnerability classes 1 through 4 are the most vulnerable levees to seismic loading. These include islands with liquefiable levee fill, and peat/organic soil deposits and potentially liquefiable

sand deposits in the foundation. Such islands include but are not limited to Sherman, Brannan-Andrus, Twitchel, Webb, Venice, Bouldin, and many others.

- The majority of the islands have at least one levee reach in vulnerability classes 1 to 4,
- Levees composed of liquefiable fill are likely to undergo extensive damage as a result of a moderate to large earthquake in the region.
- The median probabilities of failure for classes with no liquefiable foundation sand and no liquefiable levee fill increase with peat thickness under the levee. When peat is absent, generally the probabilities of failure are small (less than 22 percent) for the largest ground motions of 0.5g. However, the probabilities of failure at the locations of the thickest peat (more than 25 feet) range from 30 percent to 60 percent for a PGA of 0.5g.
- Levees founded on liquefiable foundations are expected to experience large deformations (in excess of 10 feet) under a moderate to large earthquake in the region.

Flooding Risk

A major earthquake can cause extensive damage to large sections of levees on multiple islands at the same time. As a result, many islands could be flooded simultaneously. For example, the DRMS report indicated that there is a 40 percent probability of a major earthquake causing 27 or more islands to flood at the same time in the 25-year period from 2005 to 2030. It is not specified which islands in Sacramento County would be included in this flooding.

The duration and cost of levee repairs increases with the number of islands that are flooded due to an earthquake, as shown in Table G-5. This is not only due to the extensive amount of repairs required, but also to the availability of labor and materials to make the repairs. These numbers from the DRMS report are applicable to Sacramento County.

Table G-5 Duration and Cost of Repairs for Earthquake-Induced Levee Failures

Number of flooded islands	Estimated range of cost of repair and dewatering	Estimated range of time to repair breaches and dewater [days]
1	$43,000,000 – $240,000,000	136 – 276
3	$204,000,000 – $490,000,000	270 – 466
10	$620,000,000 – $1,260,000,000	460 – 700
20	$1,400,000,000 – $2,300,000,000	750 – 1,020
30	$3,000,000,000 – $4,200,000,000	1,240 – 1,660

Source: DRMS Risk Report [URS/JBA 2008c], Table 13-9

In addition to dewatering costs, the Delta contains improved parcels at risk to flooding. More information about the Delta and its risk may be found in the Delta annex to this plan.

Water Quality Risk

Earthquake damage to levees and to the islands they protect could take years to repair following a major earthquake. One significant impact of levee failures would be to the state's water supply. For example, if 20 islands were flooded as a result of a major earthquake, the export of fresh water from the Delta could

be interrupted for about a year and a half. Water supply losses of up to 8 million acre-feet would be incurred by State and federal water contractors and local water districts.

If subsided Delta islands are flooded due to levee breaches, significant amounts of dissolved organic carbon [DOC] would be released into Delta waters from the highly organic peat soils on these islands. Disinfectants used during the drinking water treatment process react with DOC to produce disinfection byproducts in treated water. Many of these chemical byproducts can increase cancer risks or cause other health effects.

Other water quality problems resulting from island flooding include increased algae blooms. Algae blooms can complicate drinking water treatment processes and can adversely affect some aquatic species.

Some soils in the Delta Region contain moderate levels of mercury due, among other things, to historical gold mining activities that occurred upstream of the Delta during the Gold Rush. Mercury in soils can, under certain circumstances, be converted to the highly toxic methylated form when islands are flooded. Methylated mercury can accumulate in the food chain potentially affecting fish. Humans and animals that consume fish contaminated with methylated mercury are at risk of poisoning.

Natural Resources at Risk

In all seismic levee failure scenarios, the area of vegetation impacted increases with the area flooded. The degree of impact depends on the type of vegetation flooded. Results of the DRMS Project indicate potential losses of up to 39 percent of herbaceous wetland, seasonal grasses and low-lying vegetation, 29 percent of non-native trees, and 24 percent of shrub wetland due to an event where multiple islands are flooded. In addition, in Sacramento County, the Delta Area at risk to liquefaction contains highly productive farmland. Should a levee fail, loss of crops would have a large economic impact. Information specific to the losses in Sacramento County were not available.

Population at Risk

The Delta levees most likely to fail due to earthquakes and earthquake liquefaction are generally located in the central-west area of the Delta, some of which is likely to be in the Sacramento County portion of the Delta. Their failure will cause rapid flooding and leave little time for evacuation.

The greatest immediate public safety concern is for the people working and living on Delta islands, and for people traveling through the Delta on various roads and highways. According to the DRMS report, there is a 40 percent probability of 90 or more fatalities in the Delta from levee failures due to a seismic event in the 25-year period from 2005 through 2030. The expected fatalities from earthquake-related island flooding is high due to the lack of warning for earthquakes and because of the rapid rate of flooding likely to occur after an earthquake. It should be noted that these fatality figures are for the Delta as a whole, and not limited to those areas of the Delta lying within Sacramento County.

Future Development

The consequences of a major earthquake in the Delta Region will also increase with time. Because of increasing water demand and the state's growing population and economy, the economic consequences of

an interruption in Delta water supply operations due to an earthquake will increase. Consequences to the Delta Region will also increase due to additional development. According to the DRMS report, total expected economic losses are anticipated to increase by about 200 percent by 2050 and by about 500 percent by 2100. The risk of fatalities is expected to increase, on average, by about 250 percent from 2005 to 2050. It should be noted that these economic figures are for the Delta as a whole, and not limited to those areas of the Delta lying within Sacramento County.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional (100-year), Unlikely (200- and 500-year)
Vulnerability–High

Hazard Profile and Problem Description

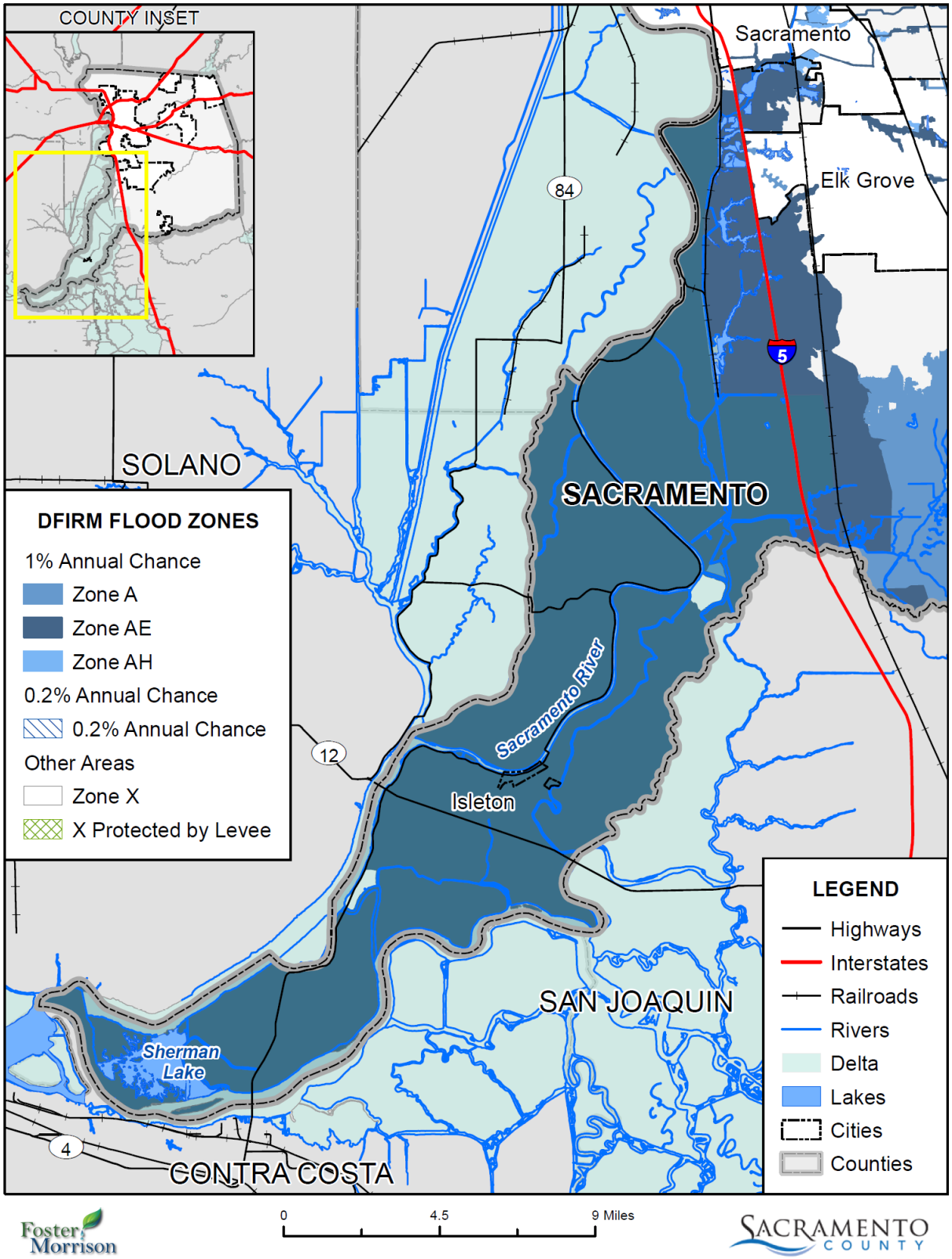
Flooding is the rising and overflowing of a body of water onto normally dry land. History clearly highlights floods as one of the most frequent natural hazards impacting Sacramento County. Floods are among the most costly natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits.

The Delta Region lies within a floodplain and is faced with a major flooding problem because of inadequate levee construction and maintenance, subsidence, seepage, erosion and seismicity. Flooding has occurred in some part of the Delta on the average of once every three and one-half to four years. While construction of upstream reservoirs has reduced the threat of overtopping, Delta levee failures continue to be a serious problem. Since 1950, levee failures have been twice as likely to be caused by foundation or levee instability than by overtopping. The condition of Delta levees had been continually worsening and flooding frequency increasing. Although there are currently efforts to improve, flood protection is generally inadequate except for those areas protected by federally built or "project" levees.

Flood Zones

Most of the Delta falls in Zone AE. This is seen in Figure G-7.

Figure G-7 Sacramento County Delta – FEMA DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Past Occurrences

Due to the levees in the Delta Area, flooding past occurrences are discussed in the Past Occurrence section in the Flood:100-/200/500-year section below.

Vulnerability to Flood

Values at Risk

GIS was used to determine the possible impacts of flooding within the Delta. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table G-6 is a summary table of parcels and values in the Delta Area by flood zone. Table G-7 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a floodplain in the unincorporated Delta. A detail table for the City of Isleton can be found in its Chapter of the Delta Annex.

Table G-6 Sacramento County Delta – Count and Improved Values Summary by Flood Zone

Jurisdiction	Total Parcel Count	Improved Parcel Count	Improved Structure Value
1% Annual Chance			
Isleton	504	325	$27,074,049
Unincorporated Sacramento County Delta	2,356	1,418	$300,508,100
Total	**2,860**	**1,743**	**$327,582,149**
0.2% Annual Chance			
Isleton	0	0	$0
Unincorporated Sacramento County Delta	0	0	$0
Total	**0**	**0**	**$0**
X Protected by Levee			
Isleton	0	0	$0
Unincorporated Sacramento County Delta	257	182	$16,289,485
Total	**257**	**182**	**$16,289,485**
Zone X			
Isleton	21	9	$1,478,655
Unincorporated Sacramento County Delta	5	2	$167,211
Total	**26**	**11**	**$1,645,866**
Delta Area Total	**3,143**	**1,936**	**$345,517,500**

Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

Table G-7 Sacramento County Delta – Count and Improved Value by Property Use and Detailed Flood Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
Zone A					
Agricultural	0	$0	0	$0	$0
Care / Health	0	$0	0	$0	$0
Church / Welfare	0	$0	0	$0	$0
Industrial	0	$0	0	$0	$0
Miscellaneous	0	$0	0	$0	$0
No Data	0	$0	0	$0	$0
Office	0	$0	0	$0	$0
Public / Utilities	9	$0	0	$0	$0
Recreational	0	$0	0	$0	$0
Residential	0	$0	0	$0	$0
Retail / Commercial	0	$0	0	$0	$0
Vacant	0	$0	0	$0	$0
Total	**9**	**$0**	**0**	**$0**	**$0**
Zone AE					
Agricultural	744	$166,841,093	465	$146,574,425	$313,415,518
Care / Health	0	$0	0	$0	$0
Church / Welfare	15	$179,170	12	$1,140,282	$1,319,452
Industrial	39	$3,972,970	29	$6,415,553	$10,388,523
Miscellaneous	130	$223,646	5	$12,426	$236,072
No Data	0	$0	0	$0	$0
Office	9	$617,002	7	$563,318	$1,180,320
Public / Utilities	282	$859,561	1	$30,000	$889,561
Recreational	58	$13,039,646	44	$13,848,008	$26,887,654
Residential	1,124	$94,090,320	1,043	$142,367,731	$236,458,051
Retail / Commercial	105	$4,014,280	101	$11,673,744	$15,688,024
Vacant	345	$15,069,966	36	$4,956,662	$20,026,628
Total	**2,851**	**$298,907,654**	**1,743**	**$327,582,149**	**$626,489,803**
Zone AH					
Agricultural	0	$0	0	$0	$0
Care / Health	0	$0	0	$0	$0
Church / Welfare	0	$0	0	$0	$0
Industrial	0	$0	0	$0	$0

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
Miscellaneous	0	$0	0	$0	$0
No Data	0	$0	0	$0	$0
Office	0	$0	0	$0	$0
Public / Utilities	0	$0	0	$0	$0
Recreational	0	$0	0	$0	$0
Residential	0	$0	0	$0	$0
Retail / Commercial	0	$0	0	$0	$0
Vacant	0	$0	0	$0	$0
Total	**0**	**$0**	**0**	**$0**	**$0**
Zone AO					
Agricultural	0	$0	0	$0	$0
Care / Health	0	$0	0	$0	$0
Church / Welfare	0	$0	0	$0	$0
Industrial	0	$0	0	$0	$0
Miscellaneous	0	$0	0	$0	$0
No Data	0	$0	0	$0	$0
Office	0	$0	0	$0	$0
Public / Utilities	0	$0	0	$0	$0
Recreational	0	$0	0	$0	$0
Residential	0	$0	0	$0	$0
Retail / Commercial	0	$0	0	$0	$0
Vacant	0	$0	0	$0	$0
Total	**0**	**$0**	**0**	**$0**	**$0**
Zone A99					
Agricultural	0	$0	0	$0	$0
Care / Health	0	$0	0	$0	$0
Church / Welfare	0	$0	0	$0	$0
Industrial	0	$0	0	$0	$0
Miscellaneous	0	$0	0	$0	$0
No Data	0	$0	0	$0	$0
Office	0	$0	0	$0	$0
Public / Utilities	0	$0	0	$0	$0
Recreational	0	$0	0	$0	$0
Residential	0	$0	0	$0	$0

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
Retail / Commercial	0	$0	0	$0	$0
Vacant	0	$0	0	$0	$0
Total	**0**	**$0**	**0**	**$0**	**$0**
Total 1% Annual Chance	**2,851**	**$298,907,654**	**1,743**	**$327,582,149**	**$626,489,803**
0.2% Annual Chance					
Agricultural	0	$0	0	$0	$0
Care / Health	0	$0	0	$0	$0
Church / Welfare	0	$0	0	$0	$0
Industrial	0	$0	0	$0	$0
Miscellaneous	0	$0	0	$0	$0
No Data	0	$0	0	$0	$0
Office	0	$0	0	$0	$0
Public / Utilities	0	$0	0	$0	$0
Recreational	0	$0	0	$0	$0
Residential	0	$0	0	$0	$0
Retail / Commercial	0	$0	0	$0	$0
Vacant	0	$0	0	$0	$0
Total	**0**	**$0**	**0**	**$0**	**$0**
X Protected by Levee					
Agricultural	4	$904,221	4	$651,423	$1,555,644
Care / Health	2	$777	0	$0	$777
Church / Welfare	2	$41,705	2	$17,678	$59,383
Industrial	9	$664,692	8	$945,575	$1,610,267
Miscellaneous	6	$13,277	0	$0	$13,277
No Data	0	$0	0	$0	$0
Office	12	$866,549	11	$1,822,030	$2,688,579
Public / Utilities	18	$0	0	$0	$0
Recreational	4	$862,806	2	$653,913	$1,516,719
Residential	126	$3,868,513	120	$8,870,284	$12,738,797
Retail / Commercial	32	$1,772,985	31	$3,314,588	$5,087,573
Vacant	42	$1,882,980	4	$13,994	$1,896,974
Total	**257**	**$10,878,505**	**182**	**$16,289,485**	**$27,167,990**

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
Zone X					
Agricultural	0	$0	0	$0	$0
Care / Health	0	$0	0	$0	$0
Church / Welfare	0	$0	0	$0	$0
Industrial	1	$54,286	1	$227,796	$282,082
Miscellaneous	1	$61	0	$0	$61
No Data	0	$0	0	$0	$0
Office	2	$325,117	2	$389,269	$714,386
Public / Utilities	7	$29,687	0	$0	$29,687
Recreational	0	$0	0	$0	$0
Residential	5	$516,777	4	$834,189	$1,350,966
Retail / Commercial	4	$206,668	4	$194,612	$401,280
Vacant	6	$322,078	0	$0	$322,078
Total	**26**	**$1,454,674**	**11**	**$1,645,866**	**$3,100,540**

Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

Table G-8 summarizes Table G-7 above and shows Delta loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones.

Table G-8 Sacramento County Delta – Flood Loss Summary

Flood Zone	Improved Parcel Count	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
1% Annual Chance	1,743	$327,582,149	$254,649,398	$582,231,547	$116,446,309.40	12.59%
0.2% Annual Chance	0	$0	$0	$0	$0	0.00%

Source: FEMA DFIRM, Sacramento County 2015 Parcel/Assessor's Data

According to Table G-7 and Table G-8, the Delta has 1,743 improved parcels and structures and contents valued at roughly $582 million in the 1% annual chance floodplain. Applying the 20 percent damage factor as previously described in Section 4.3.10 of the Base Plan, there is a 1% chance in any given year of a flood event causing roughly $116.4 million in damage in the Delta. A loss ratio of 12.59% indicates that losses in the Delta to flood would be relatively major, as an eighth of the total values in the Delta would be damaged by the 1% annual chance floods.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for the Delta. According to this analysis, there is a total population of 2,827 residents of the Delta at risk to flooding, all in the 1% annual chance floodplains, respectively. This is shown in Table G-9.

Table G-9 Sacramento Delta – Count of Improved Residential Parcels and Population by Flood Zone

	1% Annual Chance		0.2% Annual Chance	
Jurisdiction	**Improved Residential Parcels**	**Population***	**Improved Residential Parcels**	**Population***
Isleton	244	593	0	0
Unincorporated Delta	876	2,374	0	0
Total	**1,120**	**2,967**	**0**	**4,087**

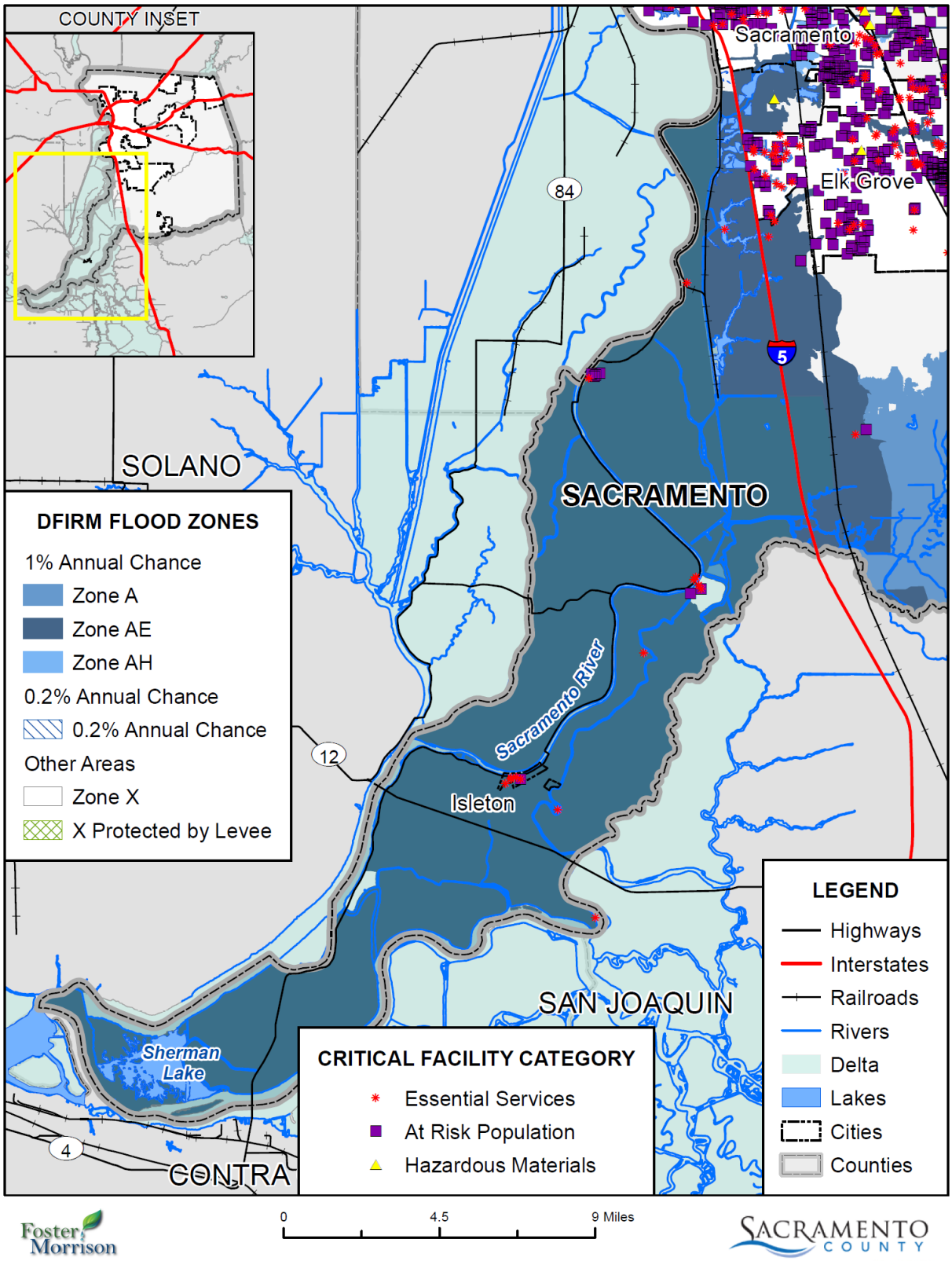
Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data, US Census Bureau

* Average household populations from the 2010 US Census were used: Delta – 2.71, Isleton – 2.43

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in the Delta in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersects a DFIRM flood hazard areas, and if so, which zone it intersects. Critical facilities in the floodplain in the Delta are shown in Figure G-8. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure G-8 Sacramento Delta – Critical Facilities



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Natural Resources at Risk

If a levee failure due to flooding were to occur within the Delta it would cause flooding inside the levees. All natural resources would be at risk.

Historic and Cultural Resources at Risk

If a levee failure due to flooding were to occur within the Delta it would cause flooding inside the levees. All historical buildings would be at risk.

Future Development

The County enforces the floodplain ordinance in the unincorporated County. The City of Isleton enforces their floodplain ordinance. If development is to occur in the floodplain, it is required to conform to the standards of these floodplain ordinances.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Localized flooding occurs at various times throughout the year and there are several areas of concern unique to the Delta. Historically, the Delta Area has been at risk of flooding primarily during severe weather storms when the waterway systems swell with heavy rainfall. This may produce localized flooding due to high water in the drainage systems of Isleton and each reclamation district.

Past Occurrences

Past occurrences to localized flooding varies by area. Specific past occurrences for Isleton and the reclamation districts can be found in their Chapters to this annex.

Vulnerability to Localized Flooding

Vulnerability to localized flooding varies by area. Specific vulnerabilities for Isleton and the reclamation districts can be found in their Chapters to this annex.

Future Development

The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized flooding. Mitigating the causes of the localized stormwater flooding will reduce future risks of losses.

Levee Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Extremely High

Hazard Profile and Problem Description

Floods can threaten the Delta from several sources. Usually, the possibility of flooding can be anticipated from 8 to 20 hours before the "Emergency Period" is reached. However, as demonstrated in nearby Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse can occur very quickly with relatively little warning. Such a failure could occur where a levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

Approximately 1,115 miles of levees in the Delta and 230 miles of levees in Suisun Marsh define the configuration of the waterways and landforms of the area. Most of these levees hold back water (i.e., prevent water from flowing onto the adjacent land) for 365 days per year, not just during floods. Over the years, many state and federal agencies and stakeholders have voiced concern over the condition of the Delta and Suisun Marsh levees and the consequences should they fail.

Past Occurrences

There have been two FEMA disaster declarations in Sacramento County related to levee failure. Both were federal and state declared disasters.

- 1980 Delta Levee Break (Disaster EM-3078 declared on 1/23/1980)
- 1972 Andrus Island Levee Break (Disaster DR-342 declared on 6/21/1972)

The FIS reported the following regarding levee failure flooding.

Past flooding in the City of Isleton area has been due to levee failures caused by the separate or coincidental occurrence of very high tides and high stream outflow through the delta region, or from unexplained levee failures apparently not related from high tides and/or high stream outflow can reasonably be expected, such failures cannot be reliably predicted. A detailed field inspection of levees protecting Andrus, Brannan and Twitchell Islands, was made to determine levee conditions insofar as it is possible to do so without subsurface exploration. The report on the inspection identifies problem areas susceptible to failure and requires exploratory borings and testing of core materials to definitively

determine levee stability (USACE, 1976). Because 2-percent annual chance flooding would overtop levees, stability analysis was deemed unnecessary, and this study is concerned only with levee overtopping and disintegration of levee sections subsequent to overtoppings.

The Delta has a long history of flooding, but little definitive data on specific flood events are available. Andrus, Brannan and Twitchell Islands, have all experienced historical floods. Large areas of the delta were inundated during floods, and it is probable that the City of Isleton was damaged or seriously threatened.

The 1950 and 1955 floods were outstanding in peak outflows through the delta and several islands were flooded. The City of Isleton, however, was not affected. In December 1965 and January 1965, the coincidental occurrence of very high tides and heavy inflow resulted in unusually high stages on all delta waterways. Concurrent strong onshore winds generated high waves that created very perilous conditions for many islands. Levees protecting Twitchell Island were seriously threatened by erosion and overtopping, but a massive flood fighting effort prevented overflow, destruction of levees and inundation of the City of Isleton.Several hundred acres were flooded and damages, mainly flood fighting and repair of levees and levee roads, were a little less than $1 million. In January and February 1969, high tides and adverse wave action in the delta, combined with large river inflow and rain-soaked levees, caused the flooding of several islands and the endangerment of many other islands. Approximately 11,400 acres were inundated and flood damages amounted to about $9.2 million. The levee separating Andrus Island and the San Joaquin River failed from unknown causes in June 1972, resulting in the flooding of Andrus and Brannan Islands (including the City of Isleton). High winds had occurred prior to the break, but there had been no antecedent rainfall and the tidal cycle was not on the higher side. About 15,000 acres were inundated and flood damages for the event approximated $30 million.

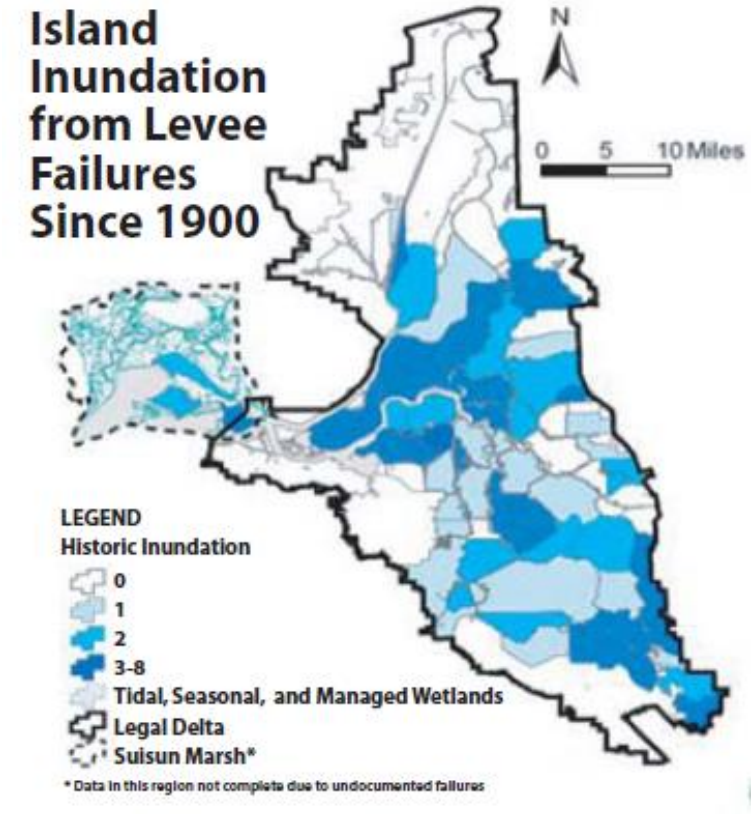
The most devastating and recent flooding of the City of Isleton resulted from failure of a levee at the southern end of Andrus Island. The levee failed from unknown causes during the night of June 21, 1972. There had not been any antecedent rainfall and the tidal cycle was not on the higher side, but high winds had been occurring prior to the break. Approximately 200,000 acre-feet of water from the San Joaquin River inundated Andrus and Brannan Islands. Activities to fight floods to protect the City of Isleton proved to be a losing battle, and almost all of the city was flooded. The entire population was evacuated, with some residents not being able to return to their homes for 4 months. Approximately one-half of the housing units in the city were damaged or destroyed. Damage from the flood event on the islands and in the City of Isleton totaled approximately $30 million.

Due to the size of the delta region, and the complexity of its stream and tidal regimen, flood frequency varies from location to location. In general, the 1950, 1955 and 1964 tidal stages in the central delta, had frequencies of 10, 30 and 5 years, respectively. Stage during the 1955 and 1964 flood periods was strongly influenced by onshore winds. The 1972 flood event cannot be assigned a frequency because the levee failure that caused the flooding cannot be attributed to tidal stage or streamflow conditions.

There have been about 100 levee failures and 163 levee breaches since the early 1900. However, most of these failures occurred in the Delta Area and are not specific to portions of the Delta located inside of Sacramento County. Due to overall improvements in the levee systems throughout the Delta, only 14

failures and 17 breaches occurred since 1990.. These historic numbers are not representative of future occurrences within the County. Figure G-9 shows the levee failures since 1900.

Figure G-9 Island Inundation from Levee Failures from 1900-Present



Source: DRMS

Some islands have been flooded and recovered multiple times. A few islands, such as Franks Tract in San Joaquin County, have never been recovered. Some of the more major levee breaks in Sacramento County are detailed below.

June 21, 1972 – A levee in the Brannan-Andrus Levee Maintenance District broke. 35% of the City of Isleton was inundated. A national disaster was declared June 27, and the breach was closed on July 26. Estimated damages in 2011 dollars were $234 million. The USACE repaired the break.

February 19, 1986 – Heavy rains and flooding affected Sacramento County and the surrounding area. 6 months of precipitation fell in 10 days in mid-February. High water content caused multiple levee failures. Two levee breaks in the same general area occurred on the 8,800 acre Tyler Island in Sacramento County. These two levee breaks were approximately 300 feet in length (see Figure G-10). A FEMA disaster declaration was declared on February 21. The approximate cost to repair the breaks was $6 million in 2011 dollars. Details on damages to structures and crops on the islands was not available.

Figure G-10 1986 Tyler Island Levee Breach

Source: California Department of Water Resources

December 1996 was one of the wettest Decembers on Record. Watersheds in the Sierra Nevada were already saturated by the time three subtropical storms added more than 30 inches of rain in late December 1996 and Early January 1997. The third and most severe of these storms lasted from December 31, 1996 through January 2, 1997. Rain in the Sierra Nevada caused record flows that stressed the flood management system to capacity in the Sacramento River Basin and overwhelmed the system in the San Joaquin River Basin. Levee failures due to breaks or overtopping in the Sacramento River Basin resulted in extensive damages. In the San Joaquin River Basin, dozens of levees failed throughout the river system and produced widespread flooding. The Sacramento-San Joaquin River Delta also experienced several levee breaks and levee overtopping. Affected Delta islands within Sacramento County included McCormack-Williamson Tract, Dead Horse Island and Glanville Tract.

Vulnerability to Levee Failure

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee

overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters. On the Sacramento River system, depending on which dams are releasing the flows, advance warning of river stages may be as much as 24 hours.

Values at Risk

GIS was used to determine the possible impacts of flooding within the Delta. The methodology described in Section 4.3.12 of the Base Plan was followed in determining structures and values at risk to parcels in the X Protected by Levee zone. Table G-10 is a summary table of parcels and values in the Delta Area by flood zone. Table G-11 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a X Protected by Levee Zone in the unincorporated Delta. A detail table for the City of Isleton can be found in its Chapter of the Delta Annex.

Table G-10 Sacramento County Delta – Count and Improved Values Summary by X Protected by Levee Flood Zone

Jurisdiction	Total Parcel Count	Improved Parcel Count	Improved Structure Value
Isleton	0	0	$0
Unincorporated Sacramento County Delta	257	182	$16,289,485
Total	**257**	**182**	**$16,289,485**

Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

Table G-11 Sacramento County Delta – Count and Improved Values by Property Use and X Protected by LeveeFlood Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value*
Agricultural	4	$904,221	4	$651,423	$1,555,644
Care / Health	2	$777	0	$0	$777
Church / Welfare	2	$41,705	2	$17,678	$59,383
Industrial	9	$664,692	8	$945,575	$1,610,267
Miscellaneous	6	$13,277	0	$0	$13,277
No Data	0	$0	0	$0	$0
Office	12	$866,549	11	$1,822,030	$2,688,579
Public / Utilities	18	$0	0	$0	$0
Recreational	4	$862,806	2	$653,913	$1,516,719
Residential	126	$3,868,513	120	$8,870,284	$12,738,797
Retail / Commercial	32	$1,772,985	31	$3,314,588	$5,087,573
Vacant	42	$1,882,980	4	$13,994	$1,896,974
Total	**257**	**$10,878,505**	**182**	**$16,289,485**	**$27,167,990**

Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

Population at Risk

The DFIRM X Protected by Levee flood zones was overlayed on the parcel layer. Those residential parcel centroids that intersect the identified zone was counted and multiplied by the 2010 Census Bureau average household factors for the Delta. According to this analysis, there is a total population of 341 residents of the Delta in an X Protected by Levee zone.

Table G-12 Sacramento Delta – Count of Improved Residential Parcels and Population in X Protected by Levee Zone

Jurisdiction	Improved Residential Parcels	Population*
Isleton	0	0
Unincorporated Delta	126	341
Total	**126**	**341**

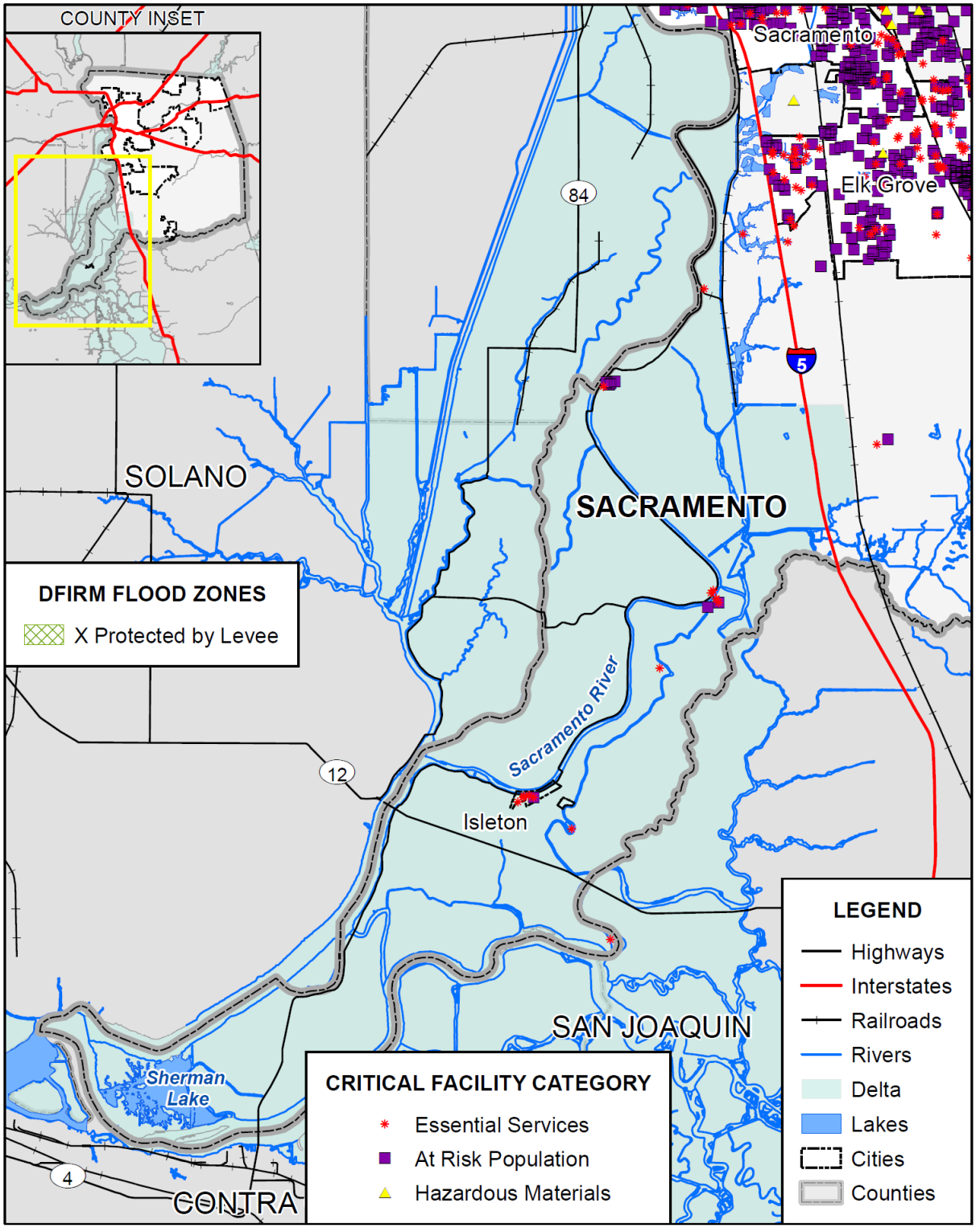
Source: FEMA 4/16/2016 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

* Average household populations from the 2010 US Census were used: Delta – 2.71, Isleton – 2.43

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in the Delta in identified FEMA DFIRM X Protected by Levee Zone. GIS was used to determine whether the facility locations intersects the X Protected by Levee Zone. Critical facilities in the X Protected by Levee Flood Zone in the Delta are shown in Figure G-11. Details of critical facility definition, type, name and address and jurisdiction are listed in Appendix E.

Figure G-11 Sacramento County Delta – Critical Facilities in X Protected by Levee Zone



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Natural Resources at Risk

If a levee failure were to occur within the Delta it would cause flooding inside the levees. All natural resources would be at risk.

Historic and Cultural Resources at Risk

If a levee failure were to occur within the Delta it would cause flooding inside the levees. All historical buildings would be at risk.

Future Development

Planned developments should take levee failure areas into account during the construction of new homes and commercial properties. The County will continue to enforce the zoning, subdivision, and development ordinances in the unincorporated Delta Area. The City of Isleton will also enforce the development ordinances that exist in the City.

River/Creek/Stream Bank Erosion

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion, including levee erosion, is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. Stream bank erosion processes, although complex, are driven by two major components in the Delta: stream bank characteristics (erodibility) and hydraulic/gravitational forces. Many land use activities can affect both of these components and lead to accelerated bank erosion. The vegetation rooting characteristics can protect banks from fluvial entrainment and collapse, and also provide internal bank strength. When riparian vegetation is changed from woody species to annual grasses and/or forbs, the internal strength is weakened, causing acceleration of mass wasting processes. Stream bank aggradation or degradation is often a response to stream channel instability. Since bank erosion is often a symptom of a larger, more complex problem, the long-term solutions often involve much more than just bank stabilization. Numerous studies have demonstrated that stream bank erosion contributes a large portion of the annual sediment yield.

Past Occurrences

Stream bank and levee erosion occurs annually at different levels throughout the Delta. Information on specific past occurrences of erosion in the City of Isleton or the reclamation districts can be found in their respective Chapters to this Annex.

Vulnerability to Erosion

Levees in the Delta are at risk to erosion, due to the channelization due to narrow river channels, high water levels, and wave action from boating. The annual costs of repairs to the banks of rivers and levees varies. Information on specific vulnerabilities and costs from erosion in the City of Isleton or the reclamation districts can be found in their respective Chapters to this Annex.

Future Development

Planned developments should take erosion risk areas into account during the construction of new homes and commercial properties. Enforcement of leveed setback areas may also prevent erosion due to encroachment activities. The County will continue to enforce the zoning, subdivision, and development ordinances in the unincorporated Delta Area. The City of Isleton will also enforce the development ordinances that exist in the City.

Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail/Lightning)

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Storms in the Delta are generally characterized by heavy rain often accompanied by strong winds and sometimes lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado. Heavy precipitation in the Sacramento County Delta Area falls mainly in the fall, winter, and spring months.

Past Occurrences

Heavy rains and storms often occur over large areas. As such, events that affected the County have affected the Delta. Past occurrences for the County are detailed in Section 4.2.5 of the Base Plan. Events that had larger effects on individual Delta Reclamation Districts can be found in their respective Chapters of this Delta Annex.

Vulnerability to Heavy Rains and Storms

According to historical hazard data, severe weather is an annual occurrence in the Sacramento County Delta. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrences in the Delta. Wind and lightning often accompany these storms and have caused damage in the past. However, actual damage associated with the primary effects of severe weather has been limited. It is the secondary hazards caused by weather, such as floods, fire, and agricultural losses that have had the greatest impact on the Delta.

Future Development

New critical facilities should be built to withstand heavy rains, hail damage, and lightning. While minimal damages have occurred to critical facilities in the past due to lightning, hail, or heavy rains, there still remains future risk. With development occurring in the region, future losses to new development may occur.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

High winds, often accompanying severe thunderstorms, can cause significant property and crop damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Winds also cause wave action, which is discussed in the vulnerability section below. Tornadoes are not a wind hazard that the Delta is generally at risk of.

The Delta Breeze is the local name for a wind coming from the southwest, off of the Delta of the Sacramento River and San Joaquin River. This wind carries with it cooler, more humid air from off of the Pacific Ocean. The effects of this wind are very noticeable during the summer, as this seabreeze can cool the air by more than 10°F. According to the National Weather Service, the wind is primarily driven by a sea breeze circulation, which can often become coupled with a mountain breeze to form one large (mesoscale) circulation of air from the Farallon Islands up into the Sierra Nevada.

Past Occurrences

Winds events, especially those accompanying severe thunderstorms, are generally larger events. As such, events that affected the County have affected the Delta. Past occurrences for the County are detailed in Section 4.2.6 of the Base Plan. Often the issue related to high winds within the Delta are related to increase wave action on the levees. Events that had larger effects on individual Delta Reclamation Districts and the City of Isleton can be found in their respective Chapters of this Delta Annex.

Vulnerability to Wind and Tornadoes

In the Delta, levees are vulnerable to wave action from both thunderstorm winds and from the Delta Breeze that causes excess erosion, and can threaten the levee integrity in each Reclamation District. Wind action, especially when coupled with high water events, leads to scour and high bank erosion, which creates wave induced erosion at the levee toe.

Future Development

New critical facilities should be built to withstand thunderstorm winds. While minimal damages have occurred to critical facilities in the past due to high winds and tornadoes, there still remains future risk. With development occurring in the region, future losses to new development may occur. Reclamation

Districts will need to continue to armor levees against wind induced wave action that causes excess erosion.

Subsidence

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Subsidence is the gradual settling or sinking of the earth's surface over manmade or natural underground voids with little or no horizontal motion. Subsidence occurs naturally and also through man-driven or technologically exacerbated circumstances. In Sacramento County, the Delta in the southeast portion of the County is highly at risk to subsidence. In the Delta, subsidence affects the islands as well as the levees.

Past Occurrences

Past occurrences for subsidence in Isleton or the reclamation districts are detailed in their respective Chapters to this Annex.

Vulnerability to Subsidence

The costs of levee construction and maintenance are generally borne by the State of California and the Federal government, as well as by local reclamation districts. These costs also increase as subsidence progresses, forcing levees to be built higher and stronger. In 1981 to 1986 the total amount spent on emergency levee repairs related to flooding was about $97 million, and in 1981 to 1991 the amount spent on routine levee maintenance was about $63 million. Thus the annual cost of repair and maintenance of Delta levees in the 1980s, from subsidence and other factors, averaged about $20 million per year. Note that these costs reflect the larger Delta Area. Repair and maintenance costs for the Delta Area located in Sacramento County would be proportionately less.

Much larger costs might be incurred if land subsidence indirectly affects the north-to-south water-transfer system, which is predicated on acceptable water quality in the southern Delta. The western Delta islands, in particular, are believed to effectively inhibit the inland migration of the salinity interface between Bay and Delta. If these are flooded, the water available to the massive pumping facilities near the Clifton Court Forebay might become too saline to use.

The statewide water-transfer system in California is so interdependent that decreased water quality in the Delta might lead to accelerated subsidence in areas discussed elsewhere in this document. Both the Santa Clara and San Joaquin Valleys rely, in part, on imported water from the Delta to augment local supplies and thereby reduce local ground-water pumpage and arrest or slow subsidence. Degradation of the Delta source water could well lead to increased ground-water use, and renewed subsidence, in these and other areas in California.

The management issues raised by land subsidence range in scale from those faced by individual farmers to the possible global-scale issue posed by the carbon-dioxide flux, with its possible link to climate change. At the most local level, individual farmers or reclamation districts must maintain drainage networks on the islands and pump the agricultural drainage back into waterways. These costs increase gradually as subsidence progresses.

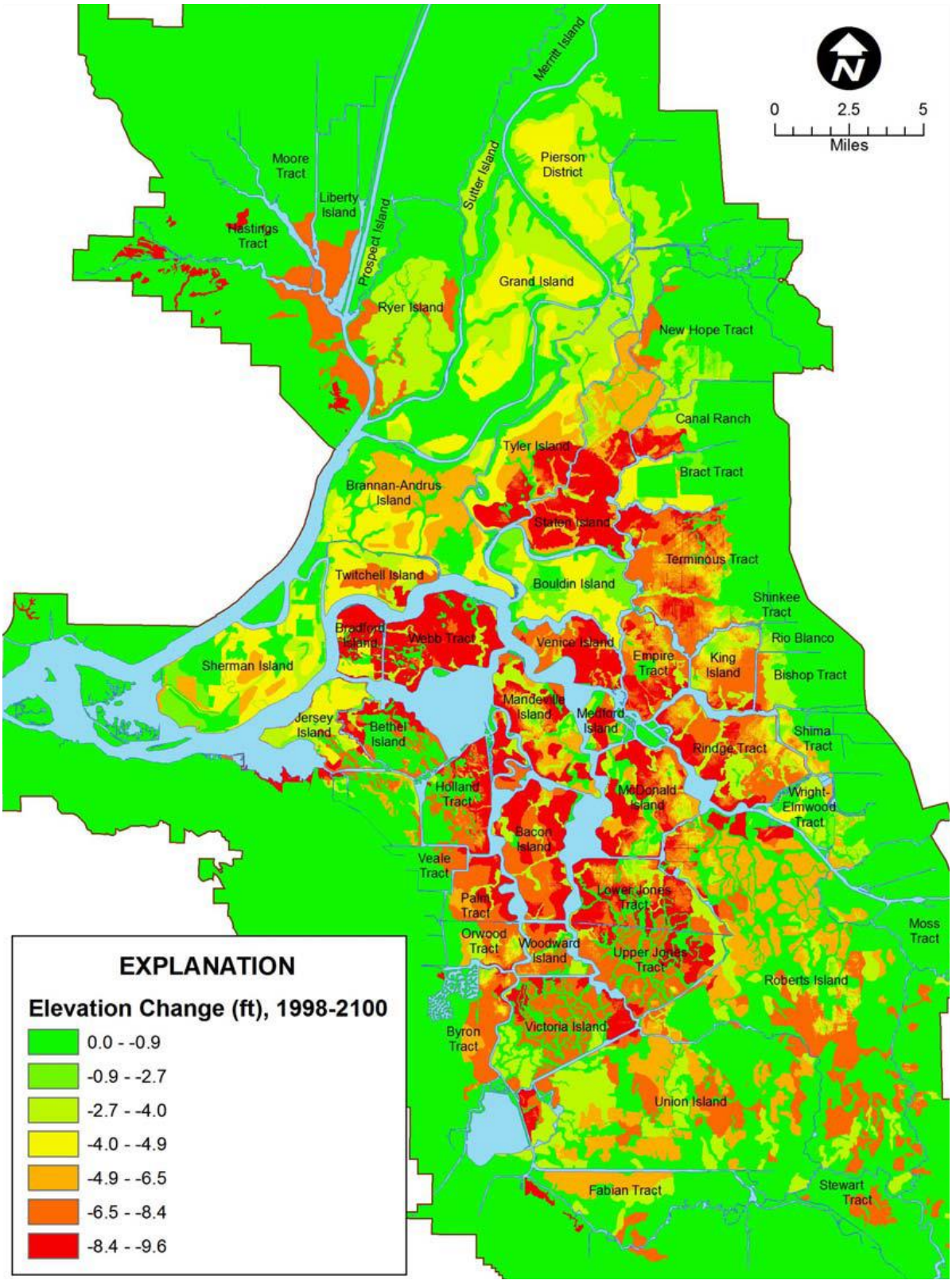
Members of the HMPC did note that although tremendous subsidence of islands has occurred since their original reclamation, recent LiDAR survey data indicates that very few areas of the Delta are actively subsiding. In addition, surveys and geotechnical evaluations show that subsidence rarely occurs close enough to a levee to cause instability. In the few areas that this may be a problem, the "toe berm" design, used to meet the Federal PL 84-99 and State Bulletin 192-82, caps the peat and effectively stops subsidence.

Local farmers have changed farming practices to help limit and mitigate the issues related to subsidence. This is especially true in the Delta Area.

Future Development

As subsidence progresses (see Figure G-12), the levee system will likely become increasingly vulnerable to catastrophic failure during floods and earthquakes. Areas for future development will become more limited. The interrelated issues of Delta land subsidence, water quality, and wildlife habitat will continue to pose a major dilemma for California water managers.

Figure G-12 Additional Expected Subsidence from 1998 to 2100



Source: Delta Risk Management Strategy, 2009

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Low

Hazard Profile and Problem Description

The threat of wildfire to the Delta is generally considered to be low. All of the Delta is located in a zone that CAL FIRE considers to be of little or no threat of wildfire. However, many of the reclamation districts within the Delta consider wildfire to be a significant concern to the area, should an out of control wildfire occur in the area. Because of this and its significance in the State of California, wildfire vulnerability is profiled here.

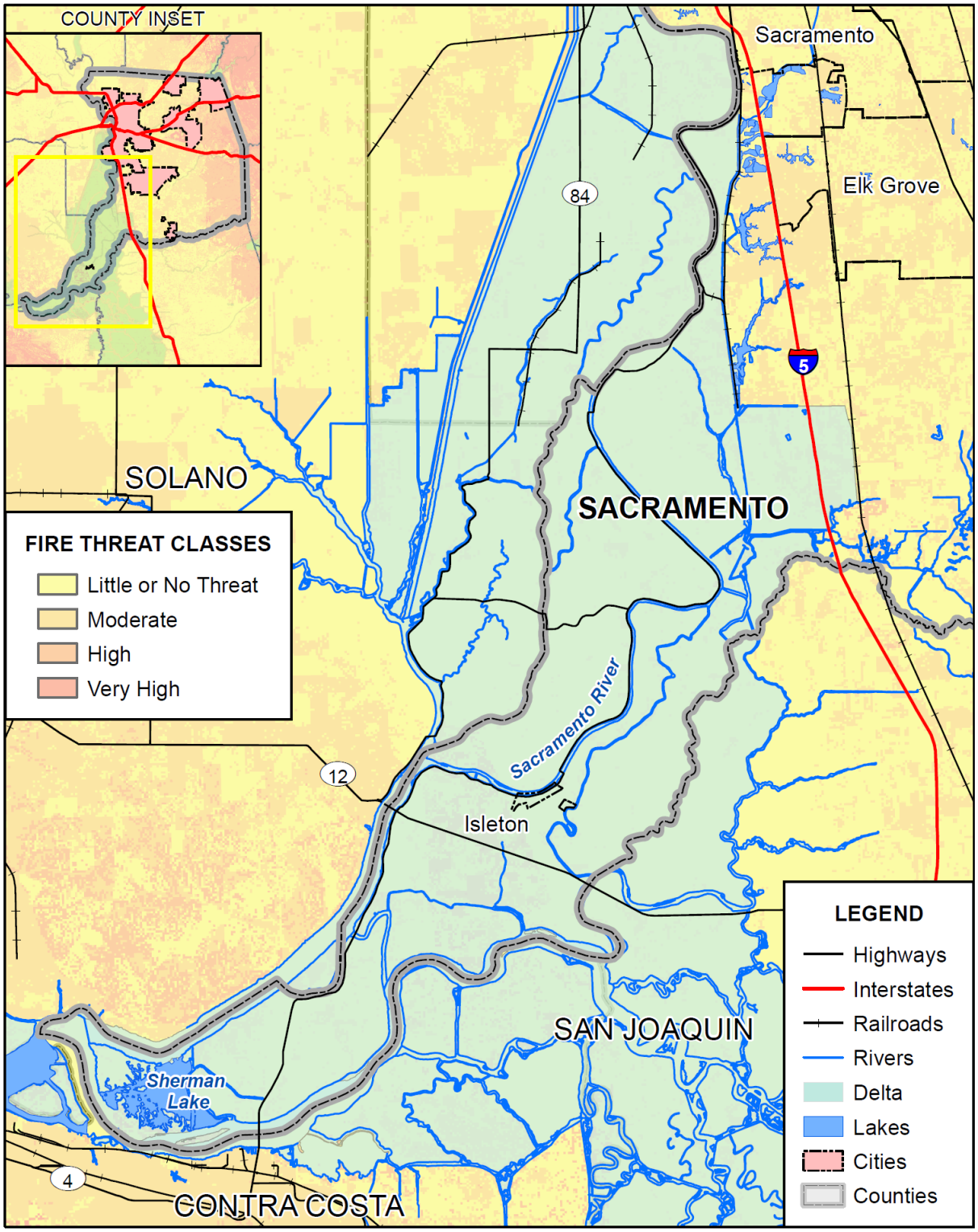
Past Occurrences

Past occurrences for wildfire in Isleton or the reclamation districts are detailed in their respective Chapters to this Annex.

Vulnerability to Wildfire

Following the methodology described in Section 4.3.17, a wildfire map for the Delta was created (see Figure G-13).

Figure G-13 Sacramento Delta's Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Values at Risk

all properties in the Delta as shown in Table G-1 in the Total Assets at Risk discussion would have little or no risk to wildfire, according to Cal Fire's data.

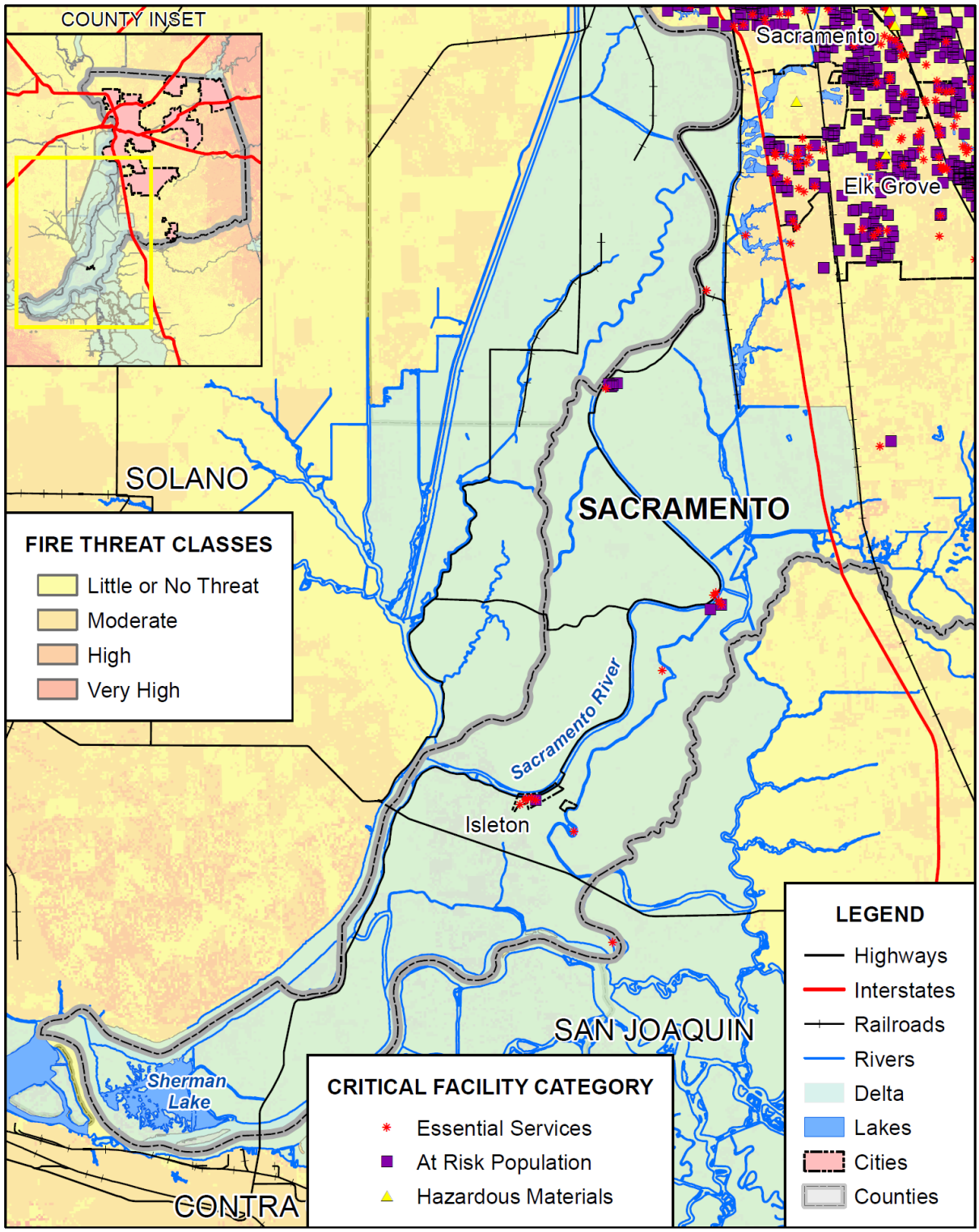
Population at Risk

The Fire Threat Zone dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for the Delta. According to this analysis, there is are no residents of the Delta at risk to moderate or higher wildfire risk.

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in the Sacramento County Delta. This is shown on Figure G-14. Details of critical facility definition, type, name, address, and jurisdiction by fire threat zone are listed in Appendix E.

Figure G-14 Sacramento County Delta – Critical Facilities in Fire Threat Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Natural Resources at Risk

The Planning Team noted no natural resources in the Delta at risk to wildfire.

Historic and Cultural Resources at Risk

The Planning Team noted no historic or cultural resources in the Delta Area at risk to wildfire.

Future Development

Development may occur in the Delta, as it is in a little or no threat wildfire threat. Existing building codes further lower the risk of future development to wildfire.

G.6 Delta Annex Chapters

G.6.1. Introduction

This Delta Annex contains separate Chapters that presents data specifically related to each Delta Area entity – the City of Isleton or each reclamation district that is a participating jurisdiction to this LHMP Update. Each Delta Annex Chapter is structured with the same format. The intent of the Chapters is to demonstrate how the risk varies across the Delta and specific to each participating jurisdiction, beyond that provided above in this umbrella Delta Annex. The following is an explanation of the format and what each data set represents.

District or City Planning Committee

This section begins with a list of the jurisdictions that participated in the planning process. A table of names, positions, and how each person participated are included in each Chapter.

Community Profile

A general description, overview, background, and history for each Delta Area jurisdiction. Maps of each jurisdiction's location in the Delta are included, if available.

Hazard Identification and Summary

Each Planning Team identified the hazards that affect the City/Reclamation District and summarized their geographic extent. frequency of occurrence, special extent, and significance specific to Isleton or the Reclamation District. This information is presented in a table in each Chapter.

Hazard Profile and Vulnerability Assessment

The intent of this section is to assess each entity's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 4.3 Vulnerability Assessment in the main plan and also within this Delta Annex. This vulnerability assessment analyzes the population, property, and other

assets at risk to hazards ranked of medium or high significance that may vary from other parts of the planning area. Each hazard contains the following items, to the extent data is available:

- Past Occurrences
- Assets at Risk
- Populations at Risk (in mapped hazard areas)
- Critical Facilities at Risk (in mapped hazard areas)
- Natural Resources at Risk (in mapped hazard areas)
- Historic and Cultural Resources at Risk (in mapped hazard areas)
- Future Development

Capability Assessment

The purpose of this section of the planning process is to determine what policies, programs, regulations, and other mechanisms Isleton or the reclamation districts, already have in place that either contribute to, or hinder the ability to mitigate the effects of natural hazards.

Mitigation Strategy and Actions

The final section of each Chapter acknowledges concurrence with the overall 2016 LHMP Goals and Objectives and puts forth the recommended actions of all participating Delta jurisdictions: Isleton and Reclamation Districts.

Delta Annex Chapter 1 City of Isleton

1.1 Introduction

This chapter of the Delta Annex details the hazard mitigation planning elements specific to the City of Isleton, a new participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the City. This chapter of the Delta Annex provides additional information specific to the City of Isleton, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this community.

1.2 Planning Process

As described above, the City of Isleton followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC) and Steering Committee, the City formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 1-1. Additional details on plan participation and City representatives are included in Appendix A.

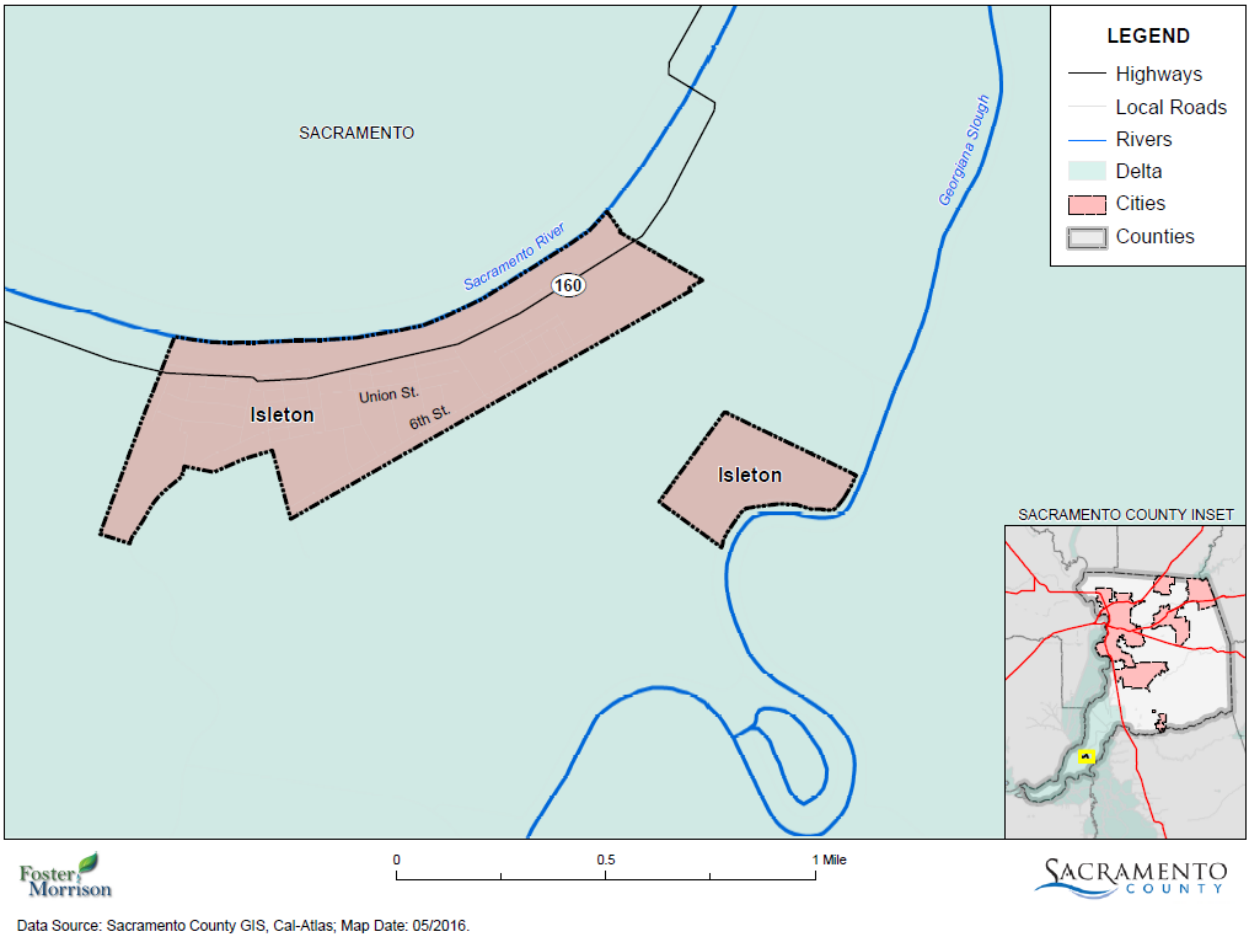
Table 1-1 City of Isleton Planning Team

Name	Position/Title	How Participated
Romi Balbini	Director of Public Works	Attended meetings and provided all the information supplied within this annex
Sandra Rutledge	Assistant City Manager	Coordination of data

1.3 Community Profile

The community profile for the City of Isleton is detailed in the following sections. Figure 1-1 displays a map and the location of the City of Isleton within Sacramento County.

Figure 1-1 City of Isleton



1.3.1. Geography and Climate

According to the United States Census Bureau, the city has a total area of 0.5 square miles, of which, 0.4 square miles of it is land and 0.05 square miles of it is water. According to the Köppen Climate Classification system, Isleton has a warm-summer Mediterranean climate.

1.3.2. History

The small town on Isleton is located in southern Sacramento County in the Delta Region along the banks of the Sacramento River. The Delta is a land of rivers, agriculture, boating, fishing, and rich history. Isleton was once referred to as the "Little Paris on the Delta."

Josiah Pool founded Isleton in 1874. Isleton, like many other communities in Sacramento County, benefited from gold fever. Its location on the river brought commerce and trade since the river was the primary source of transport. Improving the waterways for deeper channels that would permit year round travel brought about levee construction. The levees remain though the town has since dwindled from its boom days

Isleton's resident population is currently 820. The town hosts several festivals, including the Spam Contest, which originated as a direct result of the floods of 1996. Displaced families during the flood were given shelter at the Hotel Del Rio, owned by Ralph and Charli Hand. When people visited their homes, they remarked that the labels on the Spam cans were the only labels that survived. Charli decided to make some fun of it and the Spam Contest was created. Contestants cook Spam, carve Spam, dress Spam up in costumes and even appoint a "Captain Spam."

1.3.3. Economy and Tax Base

US Census estimates show economic characteristics for the City of Isleton. These are shown in Table 1-2 and Table 1-3. Mean household income in the City was $49,704. Median household income in the City was $30,900. Major employers in the vicinity are shown below the tables.

Table 1-2 City of Isleton Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	24	8.3%
Construction	60	20.8%
Manufacturing	13	4.5%
Wholesale trade	6	2.1%
Retail trade	18	6.2%
Transportation and warehousing, and utilities	11	3.8%
Information	0	0.0%
Finance and insurance, and real estate and rental and leasing	0	0.0%
Professional, scientific, and management, and administrative and waste management services	51	17.6%
Educational services, and health care and social assistance	44	15.2%
Arts, entertainment, and recreation, and accommodation and food services	49	17.0%
Other services, except public administration	7	2.4%
Public administration	6	2.1%

Source: US Census Bureau American Community Survey 2010-2014 Estimates

Table 1-3 City of Isleton Income and Benefits

Income Bracket	Population	Percent
>$10,000	30	9.8%
$10,000 – $14,999	45	14.7%
$15,000 - $24,9999	57	18.6%
$25,000 – $34,999	38	12.4%
$35,000 – $49,999	32	10.5%
$50,000 – $74,999	57	18.6%

Income Bracket	Population	Percent
$75,000 – $99,999	22	7.2%
$100,000 – $149,999	7	2.3%
$150,000 – $199,999	18	5.9%
$200,000 or more	0	0.0%

Source: US Census Bureau, 2010

The City has a wide and varied tax base. Tax base information is tracked and maintained by the Sacramento County Assessor's Office. The following tables show the tax base for the City. Table 1-4 shows the secured real property value for Isleton. Table 1-5 breaks out the City by land use.

Table 1-4 City of Isleton – Tax Roll Totals by Jurisdiction

Jurisdiction	2015-16 Value ($)	2016-17 Value ($)	Current Year Change	Percent of Current Roll*
Isleton	50,114,828	50,790,458	1%	0

Source: Sacramento County Assessor's Office
*Percentages rounded to the nearest whole number

Table 1-5 City of Isleton – Summary of Property Types

Jurisdiction	Single Family with HEX*	Single Family Without HEX*	Multi-Family Residential	Vacant Land	Commercial	Agricultural	Mobile Homes	Other	Total
Isleton	82	143	19	155	83	1	44	39	566

Source: Sacramento County Assessor's Office
*Homeowners' Exemption

1.3.4. Population

The California Department of Finance estimated the January 1, 2015 total population for the City of Isleton was 820.

Select demographic information from the 2014 US Census American Community Survey (the most recent data available) is shown in Table 1-6.

Table 1-6 City of Isleton Demographic Information

Demographic Characteristic	Number	Percent
Race		
White	327	41.3%
Black or African American	8	1.0%
American Indian or Alaska Native	3	0.4%
Asian	58	7.3%

Demographic Characteristic	Number	Percent
Hawaiian or Pacific Islander	391	48.6%
Two or more races	5	0.6%
Total Households	331	–
Average Household Size	2.43	–

Source: US Census Bureau American Community Survey 2010-2014 Estimates; *US Census Bureau, 2010

1.4 Hazard Identification

Isleton's planning team identified the hazards that affect the City and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to Isleton (see Table 1-7).

Table 1-7 City of Isleton—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards				
Bird Strike				
Climate Change	Significant	Likely	Limited	Medium
Dam Failure				
Drought and Water Shortage	Extensive	Likely	Limited	High
Earthquake				
Earthquake: Liquefaction				
Flood: 100/200/500-year	Significant	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Limited	Highly Likely	Limited	Medium
Landslides				
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion				
Severe Weather: Extreme Temperatures – Cold/Freeze				
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Limited	Medium
Severe Weather: Fog	Extensive	Highly Likely	Critical	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Significant	Highly Likely	Critical	Medium
Severe Weather: Wind and Tornadoes				
Subsidence	Significant	Highly Likely	Limited	Low
Volcano	Limited	Unlikely	Limited	Low
Wildfire:(Burn Area/Smoke)	Limited	Unlikely	Limited	Low

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

1.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Isleton's hazards and assess the City's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 Hazard Profiles and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the City of Isleton is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the City of Isleton and also includes a vulnerability assessment to the three primary hazards to the State of California: earthquake, flood, and wildfire. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

1.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 1.5.3, includes a description as to how the hazard affects the City and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

1.5.2. Vulnerability Assessment and Assets at Risk

This section presents the vulnerability assessment for the City and identifies Isleton's total assets at risk, including values at risk, critical facilities and infrastructure, natural resources, and historic and cultural resources. Growth and development trends are also presented for the community. This data is not hazard specific, but is representative of total assets at risk within the community.

Assets at Risk

The following data from the Sacramento County Assessor's Office is based on the 2015 Assessor's data. The methodology used to derive property values is the same as in Section 4.3.1 of theBase Plan. This data should only be used as a guideline to overall values in the County, as the information has some limitations. The most significant limitation is created by Proposition 13. Instead of adjusting property values annually, the values are not adjusted or assessed at fair market value until a property transfer occurs. As a result, overall value information is most likely low and does not reflect current market value of properties within the County. It is also important to note, in the event of a disaster, it is generally the value of the infrastructure or improvements to the land that is of concern or at risk. Generally, the land itself is not a loss. Table 1-8 shows the 2015 Assessor's values (e.g., the values at risk) broken down by property type for the City of Isleton.

Table 1-8 City of Isleton – Total Assets at Risk by Property Use

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Agricultural	1	0	$10,642	$0	$10,642
Care / Health	0	0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Total Value
Church / Welfare	8	8	$126,424	$725,325	$851,749
Industrial	8	7	$648,069	$872,264	$1,520,333
Miscellaneous	14	0	$8,417	$0	$8,417
Office	5	4	$375,240	$592,391	$967,631
Public / Utilities	35	1	$832,422	$30,000	$862,422
Recreational	0	0	$0	$0	$0
Residential	251	247	$8,765,278	$20,390,509	$29,155,787
Retail / Commercial	63	61	$2,093,003	$5,909,252	$8,002,255
Vacant	140	6	$4,013,846	$32,963	$4,046,809
No Data	0	0	$0	$0	$0
Total	**525**	**334**	**$16,873,341**	**$28,552,704**	**$45,426,045**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Critical Facilities and Infrastructure

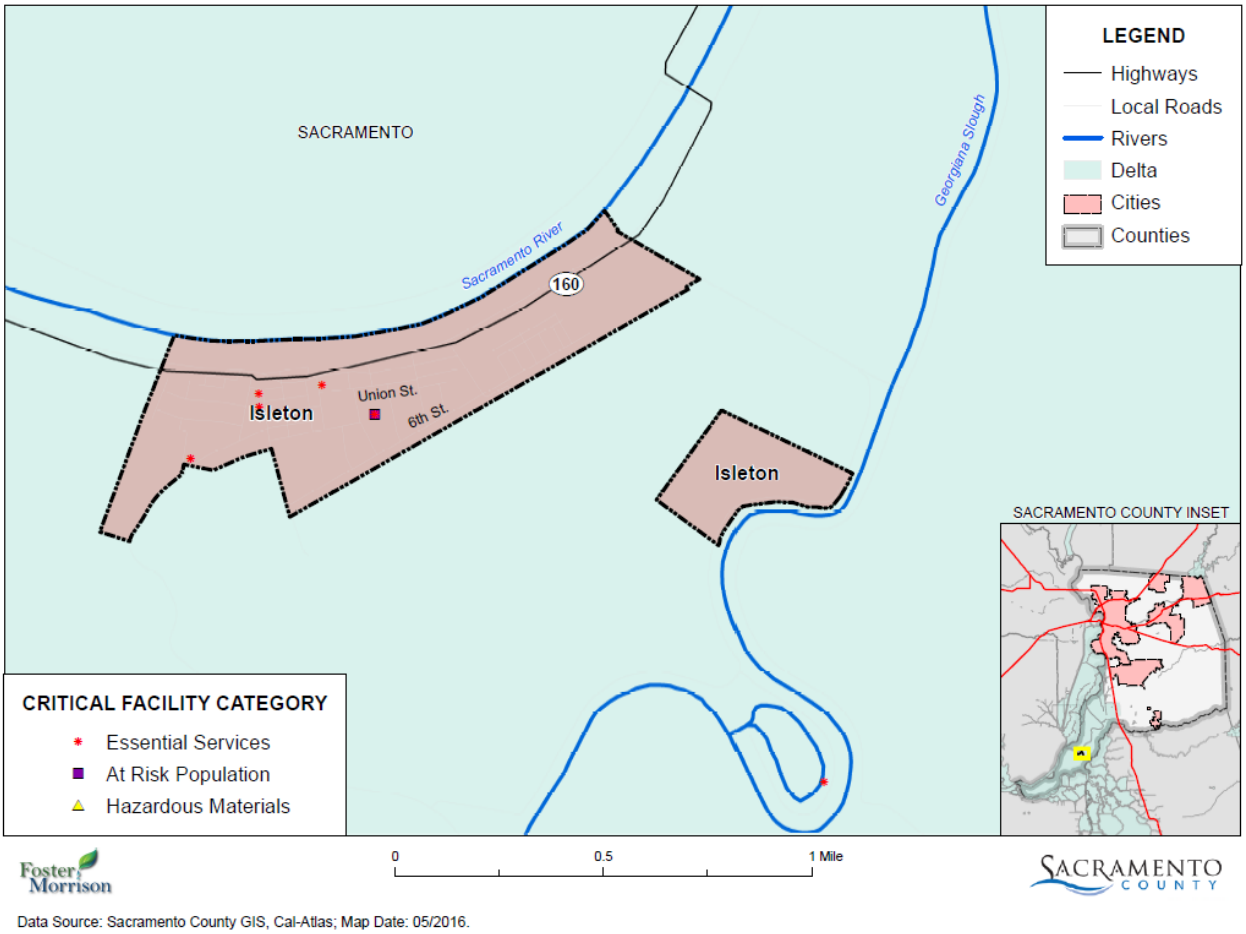
For purposes of this plan, a critical facility is defined as:

> *Any facility, including without limitation, a structure, infrastructure, property, equipment or service, that if adversely affected during a hazard event may result in severe consequences to public health and safety or interrupt essential services and operations for the community at any time before, during and after the hazard event.*

This definition was refined by separating out three classes of critical facilities, that include Essential Services Facilities, At Risk Population Facilities, and Hazardous Materials Facilities, as further described in Section 4.3.1 of the Base Plan.

An inventory of critical facilities in the City of Isleton from Sacramento County GIS is shown on Figure 1-2 and detailed in Table 1-9. Details of critical facility definition, type, name, address, and jurisdiction by hazard zone are listed in Appendix E.

Figure 1-2 City of Isleton – Critical Facilities



Data Source: Sacramento County GIS, Cal-Atlas; Map Date: 05/2016.

Table 1-9 City of Isleton – Critical Facilities Inventory

Critical Facility Category	Facility Type	Facility Count
Essential Services Facilities	At Risk Populations	0
	Communications	0
	Emergency Response	2
	Gathering Areas	0
	Government Operations	2
	Hazardous Material	0
	Health and Care	0
	Public Safety	1
	Transportation	0
	Utilities	0
	Total	**5**
At Risk Population Facilities	At Risk Populations	0

Critical Facility Category	Facility Type	Facility Count
	Communications	0
	Emergency Response	0
	Gathering Areas	1
	Government Operations	0
	Hazardous Material	0
	Health and Care	0
	Public Safety	0
	Transportation	0
	Utilities	0
	Total	**1**
Hazardous Materials Facilities	At Risk Populations	0
	Communications	0
	Emergency Response	0
	Gathering Areas	0
	Government Operations	0
	Hazardous Material	0
	Health and Care	0
	Public Safety	0
	Transportation	0
	Utilities	0
	Total	**0**
Grand Total		**6**

Source: Sacramento County GIS

Natural Resources

There are ample natural resources in and around the City of Isleton.

Vegetation occurring throughout the urban areas includes nonnative annual grasses such as Italian ryegrass, Ripgut brome, and Bermuda grass. Nonnative herbaceous species such as Yellow star-thistle, Wild radish, Field mustard, Peppergrass, and Pampas grass are also present. Stands of Northern California black walnut are located along Hwy. 160, on the east side of the Sacramento River.

A number of irrigation canals occur within the agricultural lands and are vegetated with species adapted to wet habitats (e.g. Cattail, Bulrush, Cocklebur, and Waterpepper).

Riparian woodland vegetation occurs along the Sacramento River. The riparian corridors are dominated by Valley and Coast live oaks, Narrow-leaved willow, Fremont cottonwood, California buckeye, and Himalayan blackberry. Jackson Slough serves as an agricultural drainage canal within the Plan area. Vegetation along the slough includes Narrow-leaved willow, Valley and Coast live oak, Himalayan

blackberry, Giant reed, and emergent vegetation such as cattails. Several clumps of Blue elderberry shrubs were observed on the banks of the slough on the east side of Jackson Slough Road.

Wildlife habitats in the Plan area provide foraging and/or breeding habitat for wildlife species including amphibians, reptiles, birds, and mammals. Amphibian species that could occur in the City include bullfrog, Pacific treefrog, and Western toad. Reptile species that may occur in the study area include Western terrestrial garter snake *(Thamnophis elegans*), Western fence lizard (*Sceloporus occidentalis*), and Western pond turtle (*Clemmys mannorata mannorata*). Habitat for Giant garter snakes (Thamnophis gigas) occurs in Jackson Slough.

The riparian habitats along the Sacramento River and Jackson Slough provide nesting and foraging habitat for numerous bird species. The agricultural lands provide foraging habitat for bird species such as Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), killdeer (*Charadrius vociferus*), and Western meadowlark (*Sturnella neglecta*). Raptors (birds of prey) known to forage in the vicinity of the Plan area include blackshouldered kite, Northern hanier (*Circus cyaneus*), and Swainson's hawk (*Buteo swainsoni*). Birds species that could forage in agricultural ditches and sloughs include American coot (*Fulica americana*), mallard (*Anas platyrhynchos*), and red-winged blackbird (*Agelaius phoeniceus*).

Small terrestrial mammals that could inhabit the Plan area include Botta' s pocket gopher (*Thomomys bottae*) and various species of mice, rats, and squirrels. Larger terrestrial mammals that could inhabit or transit through the Plan area include Beaver, Opossum, Skunk, Raccoon, and River otter. Several species of bats could occur within the Plan area. These species forage on insects over open fields, above tree canopies, and over open water. Bats could use man-made structures and spaces under bark of large trees for day roosts.

Invertebrate species of concern in the plan area include the Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus*). The Valley elderberry longhorn beetle is a federally listed threatened species dependent on elderberry shrubs for its life cycle. Blue elderberry shrubs were observed along Jackson Slough near Jackson Slough Road. The Antioch dunes anthicid beetle and the Sacramento anthicid beetle require loose, sandy soils. Potential habitat for anthicid beetles in the plan area is very marginal and limited to small patches of sandy soils along the Sacramento River levee.

The Sacramento River supports important sport and commercial fisheries. Warmwater game fish found in the Sacramento River include channel *(Ictalurus punctatus*) and white catfish *(lctalurus catus*); largemouth, smallmouth, and spotted bass (*Micropterus salmonides, Micropterus dolomieui,* and *Micropterus punctulatus*); carp and various sunfishes (*Centrarchidae*). Native freshwater fish occurring in the Sacramento River include Sacramento perch, Sacramento roach, River lamprey, etc., as well as special-status species such as Delta smelt, Longfin smelt, Sacramento splittail, chinook salmon, and green sturgeon. The Delta smelt is a resident fish in the Delta around the City as well.

Historic and Cultural Resources

The City has registered federal historic sites, State landmarks and points of interest. These are shown in Table 1-10.

Table 1-10 Registered Historic Sites in the City of Isleton

Name (Landmark Plaque Number)	National Register	State Landmark	California Register	Point of Interest	Date Listed
Isleton Chinese And Japanese Commercial Districts (N1674)	X				3/14/1991

Source: California Office of Historical Preservation

The National Park Service administers two programs that recognize the importance of historic resources, specifically those pertaining to architecture and engineering. While inclusion in these programs does not give these structures any sort of protection, they are valuable historic assets.

The Historic American Buildings Survey (HABS) and Historic American Engineering Record (HAER) document America's architectural and engineering heritage. The HABS and HAER structure in the City are listed below:

- Sacramento River Bridge, Spanning Sacramento River South of Locke, Isleton, Sacramento, CA

Growth and Development Trends

Past populations for the City of Isleton are shown in Table 1-11.

Table 1-11 Population History for City of Isleton

Year	Population	Increase	% Change From Prior Year
1970	909	–	–
1980	910	1	0.1%
1990	850	-60	-6.6%
2000	828	-22	-2.6%
2010	804	-24	-2.9%

Source: California Department of Finance

Land Use

The environmental setting of the Isleton Planning Area is dominated by the Sacramento River on the north, Georgiana Slough on the south and agricultural lands which border the City on the south, east, and west. The primary land use (108.6 acres) in the City is developed (urban and residential) land in the City of Isleton. Urban land covers most of the City. Urban habitat is concentrated along Tyler Island Bridge Road. Agricultural lands exist within the western part of the community immediately south of the City limits, and between the community and Georgiana Slough to the southeast and State Route 12 to the south and southwest. The first location involves approximately 37 acres all north of the extended westerly alignment of 6th Street. The second location involves several thousand acres outside of the City in productive

agricultural use and with much of the acreage under Williamson Act contracts with Sacramento County. Riparian woodland vegetation occurs along the Sacramento River.

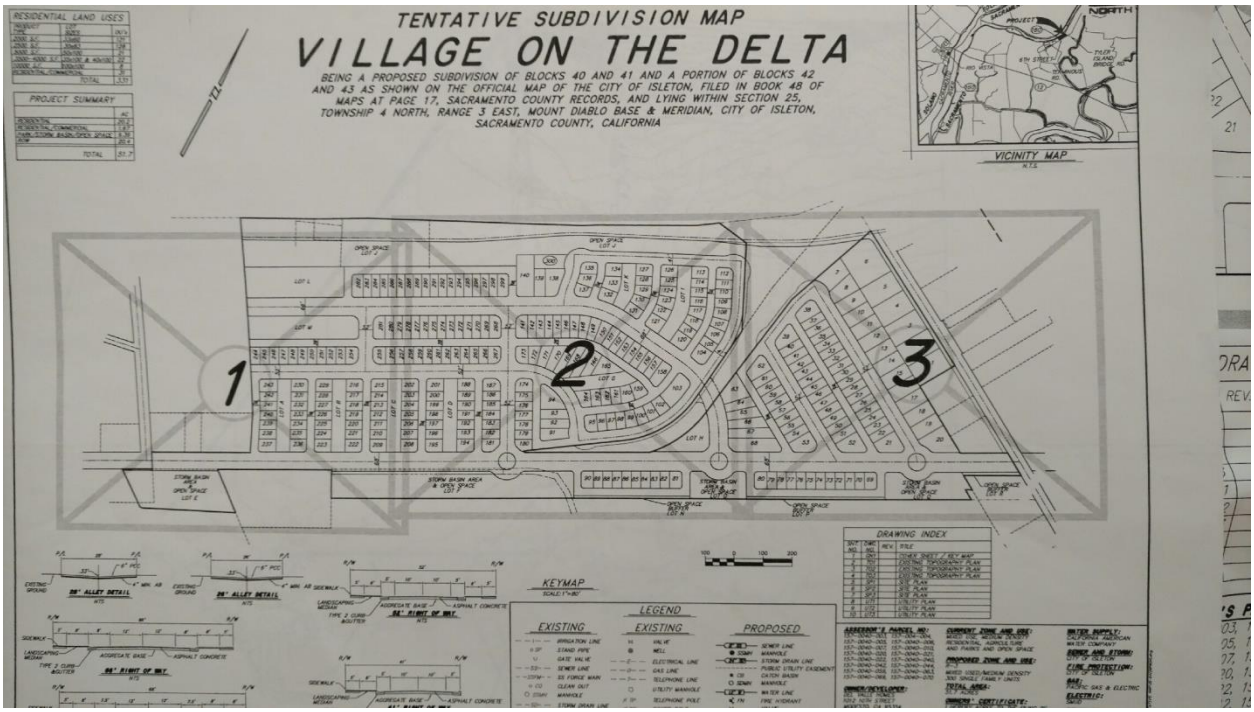
Isleton is a historical community, founded in 1874 by John Poole and Incorporated May 23, 1923. Many of the buildings within the City's old town are on the National Historical register, but are in need of repair. A new housing development area began construction in 2009, but has not been completed due to the recession and change of ownership hands. There are currently two city parks, a Central Park in old town and a softball complex and park on the Northwest side of town, both are in need of repair. There is an elementary school in Isleton. After elementary school, the children of Isleton are bussed to Walnut Grove. A privately owned trailer park within the city limits primarily houses elderly and very low-income persons. Agriculture, blue-collar service workers and food service are the primary industry; however, tourism is a significant economic driver for the community due to the location on the Delta loop and proximity to the waterways between Sacramento and the Pacific Ocean. There are many artists, writers and musicians within the community Isleton.

Future Development

The Sacramento Council on Governments (SACOG) modeled population projections for the City of Isleton and other areas of the region in 2012 for a Metropolitan Transportation Plan/Sustainable Communities Strategy report. This forecast uses a 2008 base year estimate with projections to 2020 and 2035 for population, housing units, households and employment. SACOG estimated the City population in 2020 and 2035 to be 730 and 894 respectively.

There is a new development that has been in the works since 2005. This development is called Village on the Delta. There is a proposed mixed used/medium density 300 single family units. The total area of the project is 51.7 acres.

Figure 1-3 Village on the Delta Subdivision Map



Source: City of Isleton

1.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 1-7 as high or medium significance hazards and primary hazards in the State of California. Impacts of past events and vulnerability of the City to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the Base Plan. In general, the most vulnerable structures are those located within the flood risk areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of the City to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Climate Change

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Climate change will require the City of Isleton to prepare for warmer and more extreme temperatures, decreased water supply, drought, flooding, increasing energy and water demand, and public health risks. In California average temperatures are projected to rise as much as 9 degrees Fahrenheit by 2100.

Past Occurrences

- 1973-47: La Nina
- 1975-76: La Nina
- 1982-83: El Nino
- 1988-89: La Nina
- 1997-98: El Nino
- 2006: California Heat Wave
- 2012-15: North American Drought
- 2015-16: El Nino

Vulnerability to Climate Change

The City's population, resources, and economy are vulnerable to climate change impacts, particularly those associated with flooding and extreme heat. Without reduction strategies in place, county-wide greenhouse gases (GHG) emissions are anticipated to increase based on the Planning Area's anticipated growth.

Future Development

The City of Isleton is committed to meeting State standards for the reduction of greenhouse gas emissions to achieve sustainable land use. The places we live, the methods used to construct our homes, and where we work dictate how far and by what means we travel and how much energy we use. The City will evaluate the use of sustainable land use and growth principals when considering future development.

Drought and Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends. Water districts normally require at least a 10 year planning horizon to implement a multiagency improvement project to mitigate the effects of a drought and water supply shortage.

Past Occurrences

The past occurrences of drought to the City are the same as those of the County. A list of past occurrences can be found in Section 4.2.11 of the Base Plan.

Vulnerability to Drought and Water Shortage

The City of Isleton receives its drinking water from a well. With the drought and water shortage there is the likelihood of shortages of drinking water to the City's residents if groundwater tables lower beyond the depth of the well.

The main asset at risk due to water shortage would be the cities' Wastewater Treatment Plant. Water is the conveyance method used to expel the waste from the cities' sewer system. During a water shortage or drought restrictions could be put in place that would not supply the adequate water supply necessary to keep the waste suspended long enough to reach the wastewater plant. If the solids fall out of the stream waste could possibly build up in the sewer lines causing a plug. This could lead to backups into homes onto the streets and create a health hazard.

Critical Facilities at Risk

Drought typically does not affect structures, therefore no critical facilities are at risk to drought and water shortage.

Future Development

As the population in the area continues to grow, so will the demand for water. Water shortages in the future may be worsened by drought, as the City relies on surface water for its water source. Increased planning will be needed to account for population growth and increased water demands.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–Very High

Hazard Profile and Problem Description

General rain floods emanating from the Sacramento and San Joaquin River basins results from prolonged heavy rainfall over tributary areas, and is characterized by high peak flows of moderate duration and by a large volume of runoff. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions, when the ground in tributary areas is frozen and infiltration is minimal, or when rain or snow in the high elevations adds snowmelt to rain-flood runoff.

Snowmelt floods on the Sacramento and the San Joaquin Rivers and their higher elevation tributaries can be expected to occur during the period from April through June. Although snowmelt flooding is of much larger volume and longer duration than flooding from rain, it does not have the high peak flows characteristic of floods from rain. Snowmelt flood runoff is sometimes augmented by late spring rains on the snowfields or lower elevation tributary watersheds.

More information on flooding in the City can be found in the Levee Failure section below.

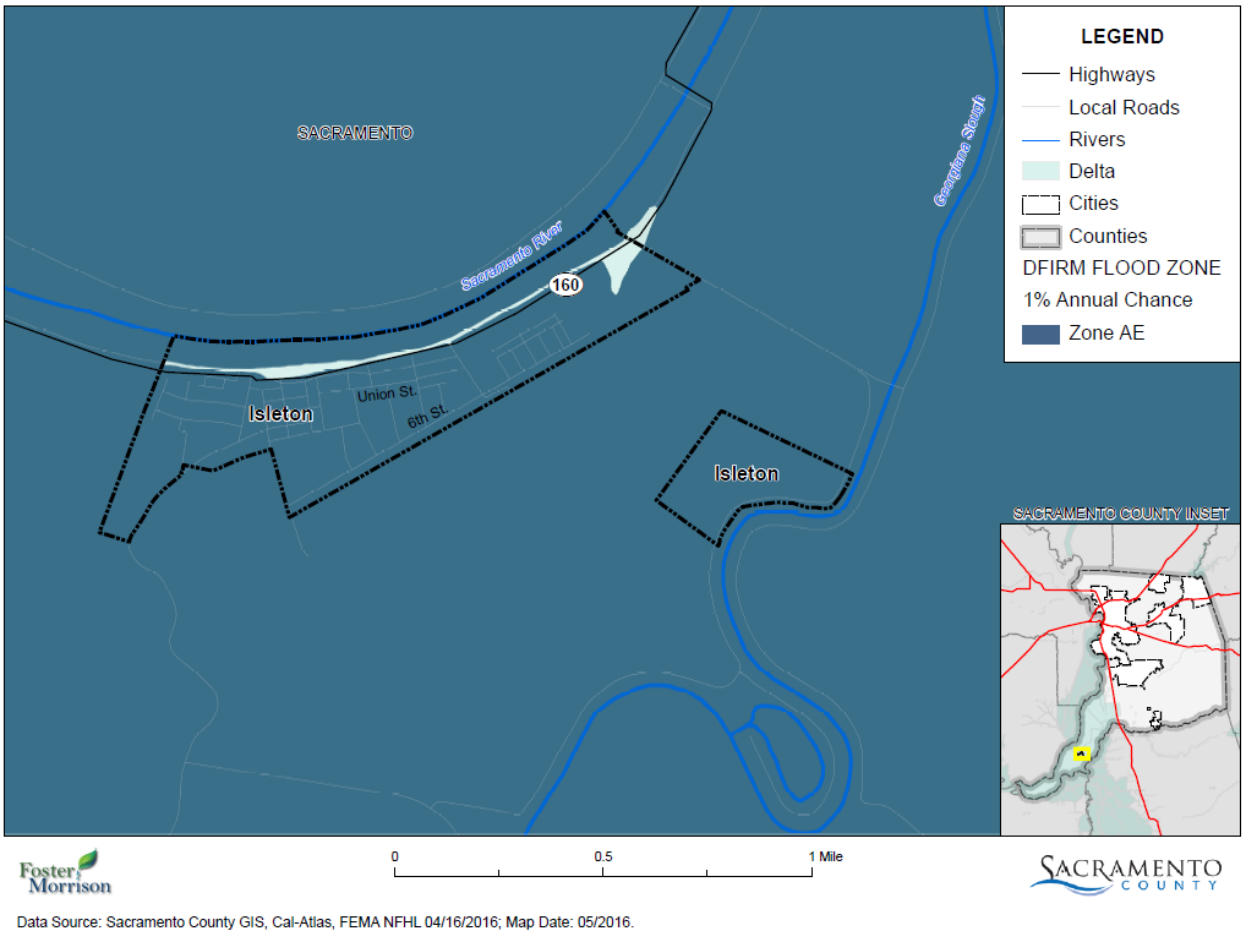
Past Occurrences

Past flooding in the City of Isleton area has been due to levee failures caused by the separate or coincidental occurrence of very high tides and high stream outflow through the delta region, or from unexplained levee failures apparently not related to these phenomena. As such, the past occurrences of flood in the City of Isleton can be found in the Levee Failure section below.

Flood Zones

The City is almost entirely located in an AE Zone (1% annual chance). A small area of the City is located outside designated flood zones in the X Zone. This is seen in Figure 1-4.

Figure 1-4 City of Isleton – FEMA DFIRM Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Vulnerability to Flood

The lower reaches of the Sacramento and San Joaquin Rivers and the entire Delta area are under the influence of the tides. The most severe flood conditions in the City of Isleton area would result when very high tide and large volume of stream outflow occur coincidentally, and strong onshore winds generate wave action.

Values at Risk

GIS was used to determine the possible impacts of flooding within the City of Isleton. The methodology described in Section 4.3.10 of the Base Plan was followed in determining structures and values at risk to the 1% (100-year) and 0.2% (500-year) annual chance flood event. Table 1-12 shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a floodplain in the City.

Table 1-12 City of Isleton – Count and Improved Values by Property Use and Detailed Flood Zone

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Zone A						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone AE						
Agricultural	1	0	$10,642	$0	$10,642	$21,284
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	8	8	$126,424	$725,325	$126,424	$978,173
Industrial	7	6	$593,783	$644,468	$890,675	$2,128,926
Miscellaneous	13	0	$8,356	$0	$8,356	$16,712
NO DATA	0	0	$0	$0	$0	$0
Office	4	3	$138,956	$302,405	$138,956	$580,317
Public / Utilities	30	1	$802,735	$30,000	$802,735	$1,635,470
Recreational	0	0	$0	$0	$0	$0
Residential	248	244	$8,348,129	$19,624,248	$4,174,065	$32,146,442
Retail / Commercial	59	57	$1,886,335	$5,714,640	$1,886,335	$9,487,310
Vacant	134	6	$3,691,768	$32,963	$0	$3,724,731
Total	**504**	**325**	**$15,607,128**	**$27,074,049**	**$8,038,187**	**$50,719,364**
Zone AH						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone AO						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone A99						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Total 1%	**504**	**325**	**$15,607,128**	**$27,074,049**	**$17,551,196**	**$60,232,373**
0.2% Annual Chance Flood Zone*						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
X Protected by Levee Zone						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
NO DATA	0	0	$0	$0	$0	$0
Office	0	0	$0	$0	$0	$0
Public / Utilities	0	0	$0	$0	$0	$0
Recreational	0	0	$0	$0	$0	$0

Property Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Residential	0	0	$0	$0	$0	$0
Retail / Commercial	0	0	$0	$0	$0	$0
Vacant	0	0	$0	$0	$0	$0
Total	**0**	**0**	**$0**	**$0**	**$0**	**$0**
Zone X						
Agricultural	0	0	$0	$0	$0	$0
Care / Health	0	0	$0	$0	$0	$0
Church / Welfare	0	0	$0	$0	$0	$0
Industrial	1	1	$54,286	$227,796	$81,429	$363,511
Miscellaneous	1	0	$61	$0	$61	$122
NO DATA	0	0	$0	$0	$0	$0
Office	1	1	$236,284	$289,986	$236,284	$762,554
Public / Utilities	5	0	$29,687	$0	$29,687	$59,374
Recreational	0	0	$0	$0	$0	$0
Residential	3	3	$417,149	$766,261	$208,575	$1,391,985
Retail / Commercial	4	4	$206,668	$194,612	$206,668	$607,948
Vacant	6	0	$322,078	$0	$0	$322,078
Total	**21**	**9**	**$1,266,213**	**$1,478,655**	**$762,704**	**$3,507,572**

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Table 1-13 summarizes Table 1-12 above and shows City of Isleton loss estimates and shows improved values at risk by FEMA 1% and 0.2% annual chance flood zones. As shown in this table, there is no 500-year flood risk in the City.

Table 1-13 City of Isleton – Flood Loss Summary

Flood Zone	Improved Parcel Count	Total Improved Value	Estimated Contents Value	Total Improved/ Contents Value	Loss Estimate	Loss Ratio
1% Annual Chance	325	$27,074,049	$17,551,196	$44,625,245.00	$8,925,049	13.90%
0.2% Annual Chance *	0	$0	$0	$0	$0	0.0%

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

According to Table 1-12 and Table 1-13, the City of Isleton has 325 improved parcels and $60,232,373 of structure and contents value in the 1% annual chance floodplain. These values can be refined a step further. Applying the 20 percent damage factor as previously described in Section 4.3.7 of the Base Plan, there is a 1% chance in any given year of a flood event causing roughly $8,925,049 in damage in the City of Isleton. A loss ratio of 13.9% indicates that losses in Isleton to flood would be relatively major, as almost a seventh of the total values in the City would be damaged.

Flooded Acres

Also of interest is the land area affected by the various flood zones. The following is an analysis of flooded acres in the City in comparison to total area within the City limits. The same methodology, as discussed in Section 4.3.7 of the Base Plan, was used for the City of Isleton as well as for the County as a whole. Table 1-14 represents a detailed and summary analysis of total acres for each FEMA DFIRM flood zone in the City.

Table 1-14 City of Isleton – Flooded Acres

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
A	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
AE	Agricultural	2.56	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	2.20	2.20	3.83%
	Industrial	10.57	10.18	17.71%
	Miscellaneous	8.02	0	0.00%
	No Data	0	0	0.00%
	Office	0.56	0.43	0.74%
	Public / Utilities	77.26	0.08	0.13%
	Recreational	0	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Residential	35.18	35.00	60.92%
	Retail / Commercial	6.72	6.30	10.97%
	Vacant	72.52	3.27	5.70%
	Total	**215.58**	**57.46**	**100.00%**
AH	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
AO	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
A99	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
Total 1%		**215.58**	**57.46**	**100.00%**
Shaded X (0.2% Annual Chance)*	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
Total 0.2%		**0**	**0**	**0.00%**
X Protected by Levee	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0	0	0.00%
	Miscellaneous	0	0	0.00%
	No Data	0	0	0.00%
	Office	0	0	0.00%
	Public / Utilities	0	0	0.00%
	Recreational	0	0	0.00%
	Residential	0	0	0.00%

Flood Zone	Property Use	Total Flooded Acres	Improved Flooded Acres	% of Improved Flooded Acres
	Retail / Commercial	0	0	0.00%
	Vacant	0	0	0.00%
	Total	**0**	**0**	**0.00%**
X	Agricultural	0	0	0.00%
	Care / Health	0	0	0.00%
	Church / Welfare	0	0	0.00%
	Industrial	0.36	0.36	12.55%
	Miscellaneous	0.13	0	0.00%
	No Data	0	0	0.00%
	Office	0.19	0.19	6.54%
	Public / Utilities	1.06	0	0.00%
	Recreational	0	0	0.00%
	Residential	0.90	0.90	31.33%
	Retail / Commercial	1.43	1.43	49.58%
	Vacant	2.08	0	0.00%
	Total	**6.16**	**2.88**	**100.00%**

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data

*This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the severity zones were counted and multiplied by the 2010 Census Bureau average household factors for Isleton. According to this analysis, there is a total population of 593 residents of the City at risk to flooding, all in the 1% annual chance floodplain. This is shown in Table 1-15.

Table 1-15 City of Isleton – Count of Improved Residential Parcels and Population by Flood Zone

Flood Zone	Improved Residential Parcels	Population*
AE (1% Annual Chance)	244	593
Shaded X (0.2% Annual Chance)*	0	0

Source: FEMA 6/16/2015 DFIRM, Sacramento County 2016 Parcel/2015 Assessor's Data, 2010 US Census Bureau

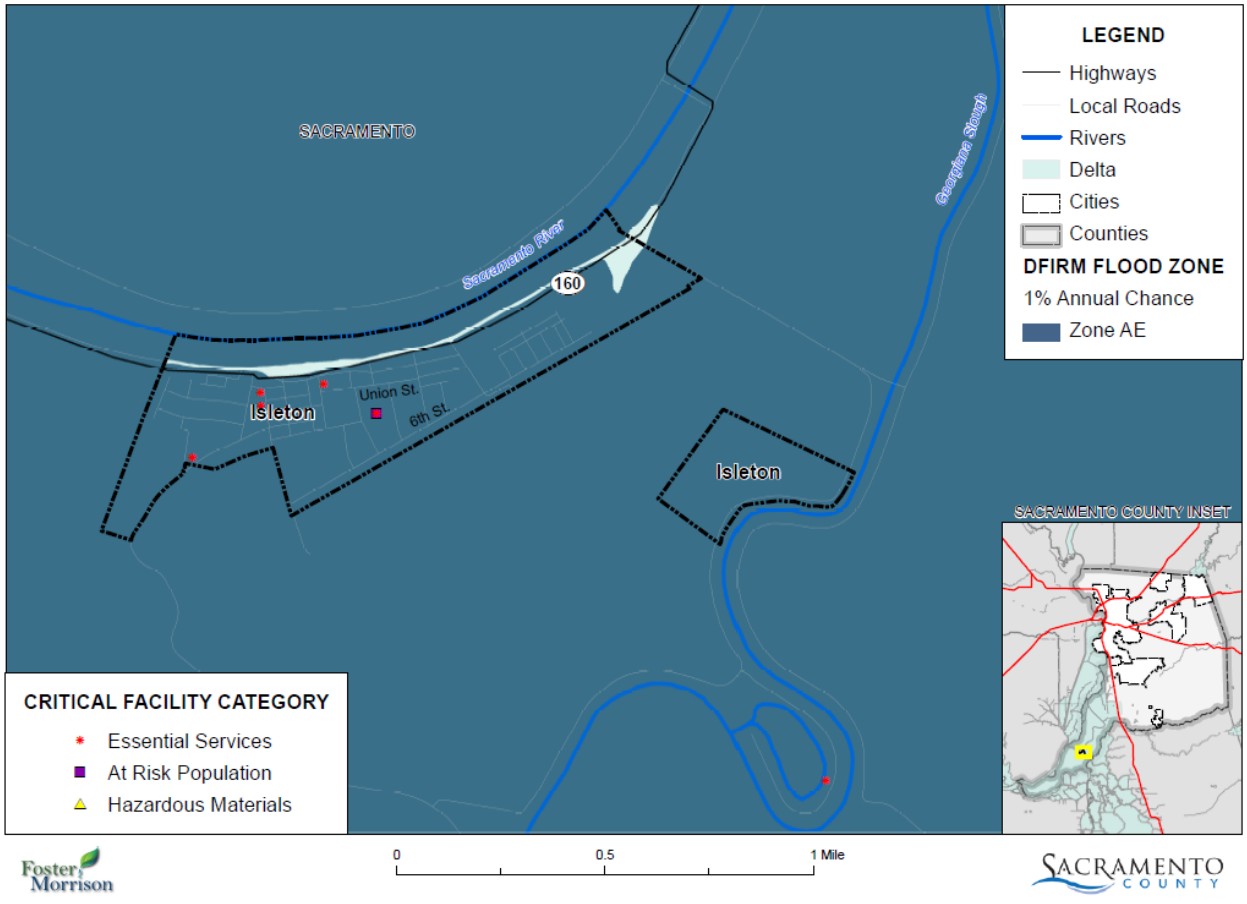
* Average household populations from the 2010 US Census were used: Isleton– 2.43.

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all parcels in the 1% annual chance floodplain.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Isleton in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersects a DFIRM flood hazard areas, and if so, which zone it intersects. Details of critical facilities in the floodplain in the City of Isleton are shown in Figure 1-5 and Table 1-16. As shown on the table and figure, Isleton has 6 critical facilities located in 1% annual chance and no critical facilities in the 0.2% annual chance DFIRM flood zones. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Figure 1-5 City of Isleton – Critical Facilities and Flood Zones



Data Source: Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table 1-16 City of Isleton – Critical Facilities and Flood Zones

Flood Zone	Critical Facility Definition	Facility Count
A	Essential Services Facilities	0
	At Risk Population Facilities	0
	Hazardous Materials Facilities	0
	Total	**0**
A99	Essential Services Facilities	0

Flood Zone	Critical Facility Definition	Facility Count
	At Risk Population Facilities	0
	Hazardous Materials Facilities	0
	Total	**0**
AE	Essential Services Facilities	5
	At Risk Population Facilities	1
	Hazardous Materials Facilities	0
	Total	**6**
AH	Essential Services Facilities	0
	At Risk Population Facilities	0
	Hazardous Materials Facilities	0
	Total	**0**
0.2% Annual Chance*	Essential Services Facilities	0
	At Risk Population Facilities	0
	Hazardous Materials Facilities	0
	Total	**0**
X	Essential Services Facilities	0
	At Risk Population Facilities	0
	Hazardous Materials Facilities	0
	Total	**0**
X Protected by Levee	Essential Services Facilities	0
	At Risk Population Facilities	0
	Hazardous Materials Facilities	0
	Total	**0**
Grand Total		**166**

Source: FEMA 6/16/2015 DFIRM, Sacramento County GIS

*This count only includes those critical facilities in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood will also include all critical facilities in the 1% annual chance floodplain.

Insurance Coverage, Claims Paid, and Repetitive Losses

The City of Isleton joined the National Flood Insurance Program (NFIP) on December 1, 1978. The City does not participate in the CRS program. NFIP data indicates that as of February 19, 2016, there were 124 flood insurance policies in force in the City with $23,489,300 of coverage. Of the 124 policies, 117 were residential (single-family homes) and 7 was non-residential; 122 of the policies were in A zones (the remaining 2 were in B, C, and X zones). The GIS parcel analysis detailed above identified 325 parcels in

the 100-year flood zone. 122 policies for 325 parcels in the 100-year floodplain equates to insurance coverage of 37.5 percent. There have been 13 historical claims for flood losses in the City, totaling $457,108.20 in losses. 10 of these losses were pre-FIRM, 2 were post-FIRM, and 1 was unknown. 6 of these losses were considered substantial damage claims. There are no repetitive loss or severe repetitive loss buildings in the City.

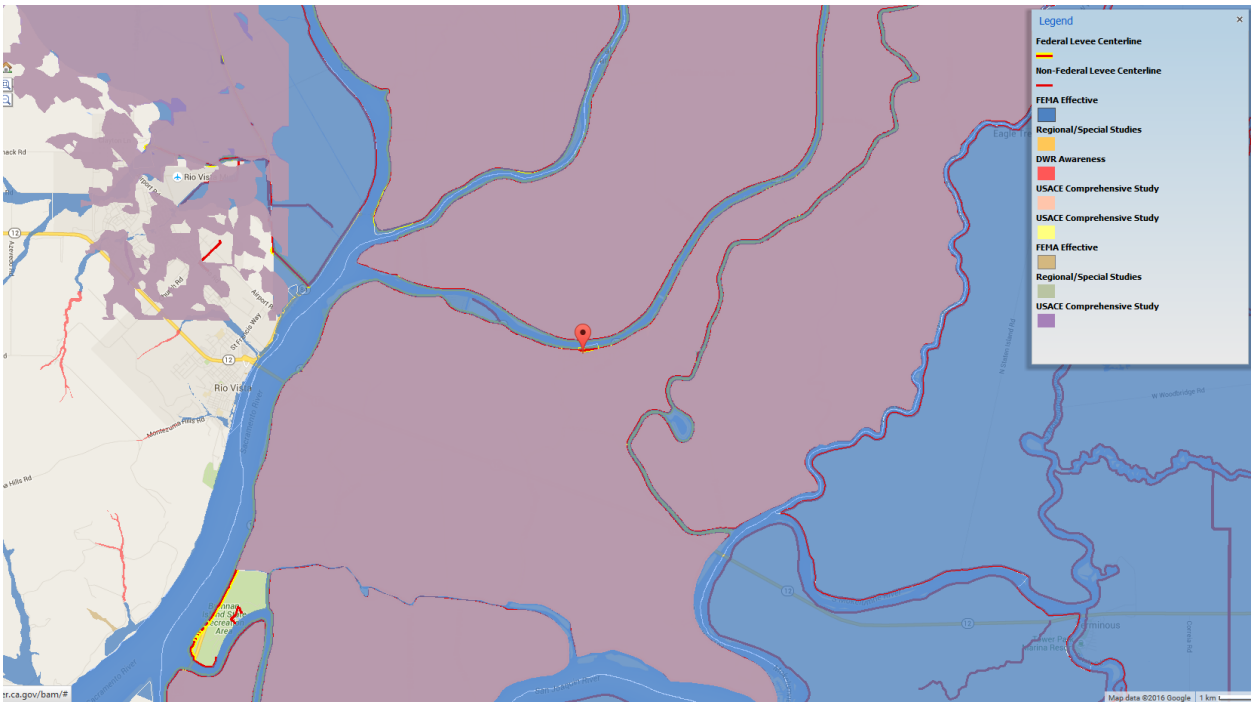
California Department of Water Resources Best Available Maps (BAM)

The FEMA regulatory maps provide just one perspective on flood risks in Sacramento County. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. SB 5 requires that these maps contain the best available information on flood hazards and be provided to cities and counties in the SAC-SJ Valley watershed. This effort was completed by DWR in 2008. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and reflect only the 100-year event risk, the BAMs are provided for informational purposes and are intended to reflect current 100-, 200-, and 500-year event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100-, 200-, and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency, however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance. The BAM map for Isleton is shown in Figure 1-6.

Figure 1-6 City of Isleton Best Available Map



Source: California DWR

Legend explanation: Blue - FEMA 100-Year, Orange – Local 100-Year (developed from local agencies), Red – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), Pink – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), Yellow – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), Tan – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), Purple – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Natural Resources at Risk

Due to the expected nature of the flooding that could occur in the City, all natural resources are at risk to flood.

Historic and Cultural Resources at Risk

Due to the expected nature of the flooding that could occur in the City, all historic and cultural resources are at risk to flood.

Future Development

The City enforces the floodplain ordinance. If any development is to occur in the floodplain, it would have to conform to the elevation standards of the floodplain ordinance. Village on the Delta is a 51.7 acre planned subdivision that was started in 2004. There is a total of 51.7 acres with 20.2 acres designated residential 1.67 acres designated residential/commercial 9.39 acres designated park/storm basin/open space and 20.4 acres designated R.O.W. The subdivision conforms to the floodplain ordinance.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Localized flooding occurs at various times throughout the year and there are several areas of concern unique to the City. Historically, the City has been at risk of flooding primarily during the spring months when the waterway/creek systems swell with heavy rainfall. This may produce local street flooding due to high water in the waterway/creek systems causing outfalls to back-up into the drainage inlets.

To some extent, drainage from roofs and private properties has in the past been allowed to be funneled into the sewage collection system, adding to problems of sewage treatment during wet weather. Fortunately, much of the latter problem has been corrected by City inspection and notice to owners.

Past Occurrences

The East Isleton area/rural region has localized flooding which is widespread but generally minor; the flat land causes floodwaters to spread out reducing threats to life. These areas of potential concern are included in Table 1-17. In this area, roadside ditches and culverts lack capacity and are prone to blockages from debris.

During heavy rainfall, Isleton has three areas of concern. At Jackson and 4th, there is a drainage inlet that gets overwhelmed with runoff and causes ponding that reaches into the intersection. At Highway 160 and A St. there is another drainage inlet that gets overwhelmed with rain water that causes 160 to flood. On Union St. between D St and E St the City has problems with ponding due to excessive runoff.

Vulnerability to Localized Flooding

Assets at Risk

Table 1-17 identifies known and past occurrences of such areas and the associated problems encountered. This list is an initial inventory of key problem areas and is not intended to be a complete inventory of all problems and locations associated with severe weather events and localized flooding in the City of Isleton.

Table 1-17 City of Isleton's Road List of Localized Flooding Problem Areas

Road Name	Flooding	Pavement Deterioration	Washout	High Water	Landslide/ Mudslide	Debris	Downed Trees
Jackson Blvd	X			X			
Hwy 160	X	X		X			
Union St	X	X		X			

Source: City of Isleton

Future Development

Future development in the City will add more impervious surfaces and need to drain those waters. The City will need to be proactive to ensure that increased development has proper siting and drainage for stormwaters. The risk of localized flooding to future development can also be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater flooding will reduce future risks of losses.

The City of Isleton has taken measures to prevent storm water flooding by doing the following:

- Replaced damaged and crushed culvert pipes to help the flow of storm water to the reclamation ditches
- Removed and cleared all debris from storm water drainage ditches.

On an annual basis we bring in a vacuum truck and clean out all storm water collection basins throughout the city. We have replaced or repaired the drainage basins grates to help prevent debris clogs. During the fall the city employees temp help to sweep leaves and all other debris from gutters to prevent this material from causing drain blockages.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–Very High

Hazard Profile and Problem Description

Floods can threaten the City from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

The City has participated in FEMA's Map Modernization Project and the requirements of Title 44 of the Federal Code of Regulations (CFR), Section 65.10 of the National Flood Insurance Program (NFIP) regulations to certify the Laguna West levee system. The Laguna West levee system meets the design, operation and maintenance criteria set forth 44 CFR Section 65.10.

The City's implements levee operation and maintenance activities which provide maintenance recommendations and requirements for specific levee inspections and maintenance operations. Levee inspections and maintenance activities include vegetation control, rutting/depressions, erosion control, slope stability, cracking, rodent control, encroachments/excavation, riprap revetments/banks, closure structures, underseepage relief wells/toe drainage system, seepage/sand boils, debris removal, roadway crown, utilities, minor structures, and mosquito abatement.

Past Occurrences

The 1950 and 1955 floods were outstanding in peak outflows through the delta and several islands were flooded. The City of Isleton, however, was not affected. In December 1965 and January 1965, the coincidental occurrence of very high tides and heavy inflow resulted in unusually high stages on all delta waterways. Concurrent strong onshore winds generated high waves that created very perilous conditions for many islands. Levees protecting Twitchell Island were seriously threatened by erosion and overtopping, but a massive flood fighting effort prevented overflow, destruction of levees and inundation of the City of Isleton.

The HMPC noted that in 1972, a levee break flooded areas of the City. The levee separating Andrus Island and the San Joaquin River failed from unknown causes in June 1972, resulting in the flooding of Andrus and Brannan Islands (including the City of Isleton). High winds had occurred prior to the break, but there had been no antecedent rainfall and the tidal cycle was not on the higher side. Approximately 200,000 acre-feet of water from the San Joaquin River inundated Andrus and Brannan Islands. Activities to fight floods to protect the City of Isleton proved to be a losing battle, and almost all of the city was flooded. The entire population was evacuated, with some residents not being able to return to their homes for 4 months. Approximately one-half of the housing units in the city were damaged or destroyed. About 15,000 acres were inundated and flood damages for the event approximated $30 million. Specific damages values for the City were unavailable.

Vulnerability to Levee Failure

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters. On the Sacramento River system, depending on which dams are releasing the flows, advance warning of river stages may be as much as 24 hours.

Due to the low-lying tidal nature of the delta and low elevation of the City of Isleton (just above 5 feet), the entire community must be considered to be in a floodplain. Flood conditions in the City of Isleton are influenced by Pacific Ocean tides and strong onshore winds, as well as high outflow from streams originating in the foothills or higher areas of the Sierra Nevada. Specifically, the City of Isleton may flood when the levees protecting Andrus, Brannan and Twitchell Islands, are either overtopped or fail, as a result of the separate or coincidental occurrence of higher high tides and high outflow through the delta. The waterways surrounding the islands are the Mokelumne, Sacramento and San Joaquin Rivers, and

Georgiana, Sevenmile and Threemile Sloughs. The levees within the City of Isleton are maintained by the levee district.

Values at Risk

GIS was used to determine the possible impacts of levee failure flooding within the City of Isleton. The methodology described in Section 4.3.12 of the Base Plan was followed in determining structures and values at risk to a levee failure. **Error! Reference source not found.** shows the property use, improved parcel count, improved values, estimated contents, total values and estimated loss of parcels that fall in a X Protected by Levee Flood Zone in the City. It should be noted that there are levees that protect the City, but these levees have not been accredited by FEMA as providing 100-year levels of flood protection.

Population at Risk

The DFIRM flood zones were overlayed on the parcel layer. Those residential parcel centroids that intersect the X Protected by Levee Zone was counted and multiplied by the 2010 Census Bureau average household factors for Isleton. According to this analysis, there is a total population of 0 residents of the City in an X Protected by Levee zone. This number reflects the decertification of the levees in the area.

Critical Facilities at Risk

An analysis was performed on the critical facility inventory in Isleton in identified FEMA DFIRMs. GIS was used to determine whether the facility locations intersects a DFIRM X Protected by Levee area. Due to levee decertification, there are no critical facilities in X Protected by Levee Areas. Details of critical facility definition, type, name and address and jurisdiction by flood zone are listed in Appendix E.

Natural Resources at Risk

There are no natural resources at risk.

Historic and Cultural Resources at Risk

There are no historic and cultural resources at risk.

Future Development

Until the levees are recertified, no development will happen in X Protected by Levee zones, as these zones will not exist until the levees are recertified.

Severe Weather: Extreme Temperatures – Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations. Heat waves do not cause damage or elicit the immediate response of floods, fires, earthquakes, or other more "typical" disaster scenarios. While heat waves are obviously less dramatic, they are potentially more deadly. According to the 2013 California State Hazard Mitigation Plan, the worst single heat wave event in California occurred in Southern California in 1955, when an eight-day heat wave resulted in 946 deaths.

Past Occurrences

Past occurrences of extreme heat were shown in Section 4.2.3 of the Base Plan. Those instances affected the whole County, including Isleton.

Vulnerability to Heavy Rains and Storms

Extreme heat happens in Sacramento County each year. Limited data on temperature extreme impacts per County was available during the development of this hazard's profile. Extreme heat normally does not impact structures as there may be a limited number of days where the temperatures stay high which gives the structure periodic relief between hot and cool temperature cycles. Areas prone to excessively high temperatures are identified normally on a nation-wide assessment scale, which doesn't allow detailed results on specific structures.

Critical Facilities at Risk

Extreme heat does not often affect structures, so no critical facilities are considered to be at risk to extreme heat.

Future Development

As the City shifts in demographics, more residents will become senior citizens. The residents of nursing homes and elder care facilities are especially vulnerable to extreme temperature events. It is encouraged that such facilities have emergency plans or backup power to address power failure during times of extreme heat.

Severe Weather: Fog

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The Sacramento Valley can produce some extremely dangerous fogs in the winter and early spring months. These are a type of radiation fog called "tule fog." Tule fog forms on cold and clear nights, when the ground is moist and there is very little wind. Under such conditions the ground cools quickly and thus cools the air above it as well. The moisture in this cooled air condenses and can create extremely dense fog. Since the air may be stagnant and there is little evaporative effect from the sun in winter months, tule fogs can last for several days and, in some instances, over a week. Under these conditions, visibility is often reduced to 600 feet, but can drop to less than 10 feet.

Past Occurrences

Since tule fog often covers large areas of the County, past occurrences of fog in the City are considered to be the same as the past occurrences of fog for the County listed in Section 4.2.4 of the Base Plan.

Vulnerability to Fog

When tule fog forms, a severe risk is posed to traffic with the potential for multi-car pileups, especially on highways such as Highway 160. This may have an economic impact on the City due to delays in transportation times or even the shutting-down of the highway. This poses a problem during emergencies where residents with medical issues have difficulty leaving the City. The same dense and lingering fog can also produce adverse health effects in those with respiratory ailments.

Critical Facilities at Risk

Fog does not often affect structures, so no critical facilities are considered to be at risk to fog.

Future Development

Fog is unlikely to affect future development in the City of Isleton.

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the City. Damage related to severe weather has occurred and will continue to occur in the future. Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the City. Wind and lightning often accompany these storms and have caused damage in the past.

Past Occurrences

Every year the City experiences a few storms that rolls through causing localized flooding by overwhelming the City of Isleton's storm water runoff system. Also during heavy storms, the City's wastewater treatment plants inflows triple due to infiltration.

Vulnerability to Heavy Rains and Storms

The vulnerability is high due to the outdated and aging stormwater runoff system. The stormwater drainage was put in many years ago. In the years since, the City has covered more land with impermeable surfaces such as asphalt and concrete. During heavy rain the storm water drainage system gets overwhelmed very quickly. With the City's new development and infiltration increases during heavy storms there is a possibility of overwhelming the City's wastewater facility.

Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees. Table 1-17 presented above provides details of those areas within the City that are most often affected during these heavy storm events and have localized flooding issues.

Critical Facilities at Risk

The City of Isleton's Wastewater Treatment Plant, and City Hall are at risk. All of the City's operations are based out of these buildings. These storms also cause increases of infiltration that triples the inflow to the wastewater treatment plant. With the new development, Village on the Delta, these storms could cause amounts of water to be treated to exceed the amount of daily flow the wastewater plant can handle.

Future Development

The City enforces the state building code and other ordinances, which regulate construction techniques that minimize damage from heavy storms and rain. Future development in the City is subject to these building codes. New critical facilities such as communications towers should be built to withstand hail damage, lightning, and heavy rains.

Wildfire

Likelihood of Future Occurrence–Unlikely
Vulnerability–Low

Hazard Profile and Problem Description

Although a low risk hazard, due to its significance in the County and the State of California, wildfire is profiled here.

Past Occurrences

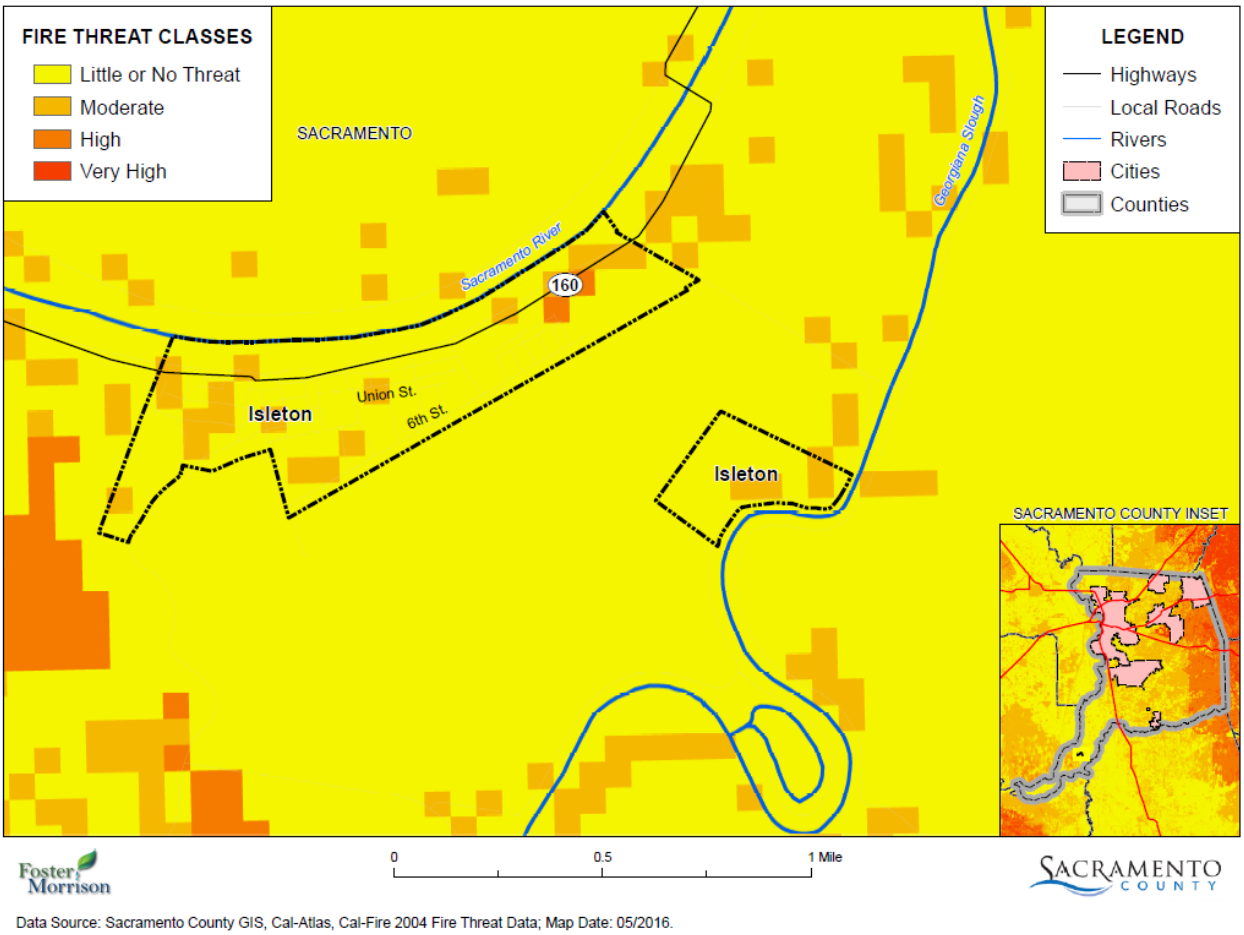
There have been no past occurrences of wildfire in the City.

Vulnerability to Wildfire

Values at Risk

Following the methodology described in Section 4.3.2 Vulnerability of Sacramento County to specific hazards, a wildfire map for the City of Isleton was created (see Figure 1-7). Wildfire threat within the City ranges from low to high.

Figure 1-7 City of Isleton's Fire Severity Zones



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Assets at Risk

Analysis results for Isleton are shown in Table 1-18, which summarizes total parcel counts, improved parcel counts and their structure values by occupancy type of parcels affected by fire.

Table 1-18 City of Isleton – Count and Value of Parcels by Property Use and Fire Threat Zone

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Little or No Threat					

Property Use	Total Parcel Count	Total Land Value	Improved Parcel Count	Improved Structure Value	Total Value
Agricultural	1	$10,642	0	$0	$10,642
Church / Welfare	6	$117,506	6	$662,538	$780,044
Industrial	8	$648,069	7	$872,264	$1,520,333
Miscellaneous	11	$363	0	$0	$363
Office	5	$375,240	4	$592,391	$967,631
Public / Utilities	31	$832,422	1	$30,000	$862,422
Residential	174	$6,151,691	171	$14,431,650	$20,583,341
Retail / Commercial	55	$1,861,475	53	$5,644,870	$7,506,345
Vacant	121	$2,693,917	6	$32,963	$2,726,880
Total	**412**	**$12,691,325**	**248**	**$22,266,676**	**$34,958,001**
Moderate					
Church / Welfare	2	$8,918	2	$62,787	$71,705
Miscellaneous	3	$8,054	0	$0	$8,054
Public / Utilities	4	$0	0	$0	$0
Residential	77	$2,613,587	76	$5,958,859	$8,572,446
Retail / Commercial	8	$231,528	8	$264,382	$495,910
Vacant	17	$1,109,886	0	$0	$1,109,886
Total	**111**	**$3,971,973**	**86**	**$6,286,028**	**$10,258,001**
High					
Vacant	2	$210,043	0	$0	$210,043
High Total	**2**	**$210,043**	**0**	**$0**	**$210,043**
Grand Total	**525**	**$16,873,341**	**334**	**$28,552,704**	**$45,426,045**

Source: Sacramento County 2016 Parcel/2015 Assessor's Data, CAL FIRE
*Land and structure values

Population at Risk

The Fire Threat Zone dataset was overlayed on the parcel layer. Those residential parcel centroids that intersect the fire threat zones were counted and multiplied by the 2010 Census Bureau average household factors for the City. According to this analysis, there is a total population of 185 residents of Isleton at risk to moderate or higher wildfire risk. This is shown in Table 1-19.

Table 1-19 City of Isleton – Count of Improved Residential Parcels and Population by Fire Threat Zone

Fire Severity Zone	Improved Residential Parcels	Population*
Little or No Threat	171	415
Moderate	76	185
High	0	0
Very High	0	0
Total	**247**	**600**

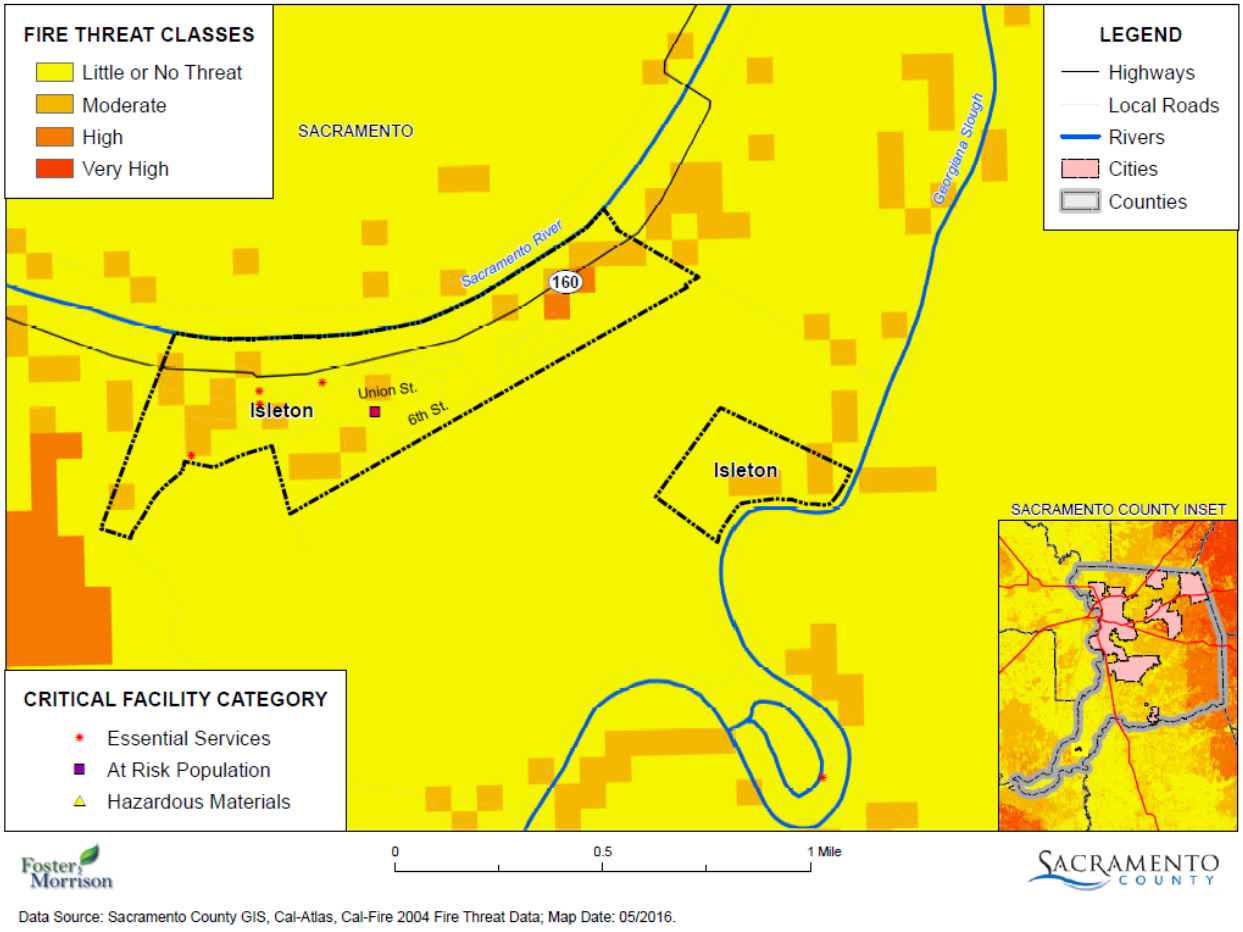
Source: Sacramento County 2015 Parcel/Assessor's Data, CAL FIRE

* Average household populations for Isleton (2.43) from the 2010 US Census were used

Critical Facilities at Risk

Wildfire analysis was performed on the critical facility inventory in Sacramento County and all jurisdictions. GIS was used to determine whether the facility locations intersect a fire threat zone provided by CAL FIRE, and if so, which zone it intersects. There is one facility in the moderate or higher fire threat zone in the City. This is shown in Figure 1-8 and detailed in Table 1-20. Details of critical facility definition, type, name and address and jurisdiction by fire threat zone are listed in Appendix E.

Figure 1-8 City of Isleton – Critical Facilities in the Fire Threat Zone



Data Source: Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table 1-20 City of Isleton – Critical Facilities in the Fire Threat Zones

Fire Threat Zone	Critical Facility Definition	Facility Count
Little or No Threat	Essential Services Facilities	4
	At Risk Population Facilities	1
	Hazardous Materials Facilities	0
	Total	**5**
Moderate	Essential Services Facilities	1
	At Risk Population Facilities	0
	Hazardous Materials Facilities	0
	Total	**1**
High	Essential Services Facilities	0
	At Risk Population Facilities	0

Fire Threat Zone	Critical Facility Definition	Facility Count
	Hazardous Materials Facilities	0
	Total	**0**
Very High	Essential Services Facilities	0
	At Risk Population Facilities	0
	Hazardous Materials Facilities	0
	Total	**0**
Grand Total		**166**

Source: CAL FIRE, Sacramento County GIS

Natural Resources at Risk

Depending on the nature and extent of any wildfire, natural resources in the area are potentially at risk.

Historic and Cultural Resources at Risk

Depending on the nature and extent of any wildfire, any historic and cultural resources in the area are potentially at risk.

Future Development

Population growth and development in the City has been relatively minor and is predicted to remain so in the future. Additional growth and development within the moderate or higher fire threat areas of the City would place additional assets at risk to wildfire.

1.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

1.6.1. Regulatory Mitigation Capabilities

Table 1-21 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City of Isleton.

Table 1-21 City of Isleton's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y 2000	Yes it address hazards and mitigation measures to address such hazards. Yes it may be implemented
Capital Improvements Plan	Y In process	The capital improvement plan is in development
Economic Development Plan	Y In Process	Yes to all aspects of the questions above
Local Emergency Operations Plan	Yes	The City of Isleton follows the State of California's Plan
Continuity of Operations Plan	No	
Transportation Plan	Yes	Only identifies mitigation strategy and actions
Stormwater Management Plan/Program	Y In Process	It will address all aspects of above requirements
Engineering Studies for Streams	N	No streams inside city limits
Community Wildfire Protection Plan	No	City's fire dept doesn't cover any SRA or wildland coverage
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: 2015 IBC
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	Y	Rating: 5/9 (urban/rural)
Site plan review requirements	Y	Through the building official.
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Yes through the planning commission and building official
Subdivision ordinance	Y	
Floodplain ordinance	Y	Yes through the building dept
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Yes through the building dept
Flood insurance rate maps	Y	Yes
Elevation Certificates	Y	Yes
Acquisition of land for open space and public recreation uses	Y	Yes through the planning commission

Erosion or sediment control program	N
Other	
How can these capabilities be expanded and improved to reduce risk?	
With education incentives for employees and furthering education we can make sure that we improve in all aspects concerning the above departments. The planning commission is now fully appointed; they have started working with staff to improve in these fields.	

Source: City of Isleton

City of Isleton General Plan (2000)

Under the body of statutory and case law which has evolved in California, including Guidelines issued by the State Office of Planning and Research, the General Plan for Isleton functions as a "constitution" in much the same way as a state or national constitution. The Plan reflects the City's long-range aspirations of physical form and amenity and provides guidance to the substance of development regulations such as zoning and subdivision ordinances, and to other programs approved by the City, such as the Redevelopment Program, which combine as the package of tools necessary to carry out the General Plan over time.

Mitigation related goals and policies from the General Plan are:

- Inventory all buildings which are unsound under conditions of "moderate" seismic activity; buildings having questionable structural resistance ·should be considered for either rehabilitation or demolition. Structures determined by the City's Building Official to be structurally unsound are to be reported to the owner and recorded with the County Recorder to ensure that future owners are made aware of hazardous conditions and risks.
- All new building construction shall conform to the latest seismic requirements of the Uniform. Building Code as a minimum standard. A building height limit of 50 feet shall be maintained, with a maximum of four stories.
- Soil compaction tests, and geotechnical analysis of soil conditions and behavior under seismic conditions shall be required of all subdivisions and of all commercial, industrial and institutional structures over 6,000 square feet in area (or in the case of institutional structures, those which hold 100 or more people).
- The City should adopt an Earthquake Disaster Plan in coordination with Sacramento County and local special districts (school, levee maintenance, reclamation and irrigation). The Plan should identify hazards that may occur as the result of an earthquake of major magnitude, and should designate evacuation routes and means to coordinate all local government agencies in assisting local residents in the event of a major earthquake, fire or explosion, or hazardous chemical spill or release of hazardous air-borne gas.
- All lines which are part of the domestic water distribution system should be looped to assure adequate pressure in the event of major fire, earthquake, or explosion. Emergency standby power generation capability should be available at all water wells to assure water availability in the event of a major power failure.
- The City will continue to give high priority to the support of police protection, and to fire suppression and prevention functions of the Isleton Fire Department.
- The City will work to maintain a fire flow standard of 3,000 gpm for all commercial and industrial areas of the community, and 1,000 gpm for residential areas, to assure the capability to suppress urban fires.
- The City will maintain a street system which is capable of providing access to any fires that may develop within the urban area, and which is capable of providing for the adequate evacuation of residents in the event of an emergency condition of magnitude.

- In the event that any part of the levee system protecting Isleton was to fail, the most expedient evacuation routes would be east and north along the Sacramento River levee roads toward Walnut Grove, and then east toward Interstate 5.

City of Isleton Municipal Codes and Policies

The City has many Municipal Codes and policies related to mitigation. These codes and policies can be primarily or secondarily focused on mitigation.

- Zoning Ordinance (Title 12)
- Subdivision Ordinance (Title 11)
- Flood Damage Prevention Ordinance (Title 5, Chapter 5.52)
- Building and Construction Ordinances (Title 10)

1.6.2. Administrative/Technical Mitigation Capabilities

Isleton is governed by a Strong City-Manager form of government. There are 4 council members elected at large who serve 2 year terms. The Mayor is the 5th member of the governing body and also serves for a 2-year term. The Mayor presides at all Council meetings and retains the power of veto, however, the Mayor votes only to break ties. The Isleton Planning and Zoning Committee consist of five members. Their purpose is to regulate land use; play an advisory role for plan approval; and be an advisory board to the City Council. Table 1-22 identifies the City department(s) responsible for activities related to mitigation and loss prevention in Isleton.

Table 1-22 City of Isleton's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	Y	Effective
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Effective, through measure A funds and HUT funds work is done to reduce these risks
Mutual aid agreements	N	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	PT	Yes
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	
Civil Engineer	Y/PT	Yes
GIS Coordinator	Y/PT	
Other	N	

Technical	
Warning systems/services (Reverse 911, outdoor warning signals)	N
Hazard data and information	Y
Grant writing	N
Hazus analysis	N
Other	
How can these capabilities be expanded and improved to reduce risk?	
With new people filling these positions we will ensure that we do everything possible within budgetary means to reduce all risks posed to the public within our jurisdiction. By working in conjunction with county services we can expand our capabilities to provide the best coverage.	

Source: City of Isleton

1.6.3. Fiscal Mitigation Capabilities

Table 1-23 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table 1-23 City of Isleton's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Measure A and HUT funds are used on a regular basis to mitigate all hazards posed to the City of Isleton
Authority to levy taxes for specific purposes	Y	Yes a special tax was just passed 2015 to buy new equipment for the fire dept. Yes
Fees for water, sewer, gas, or electric services	Y	Sewer income is used to mitigate hazards and can be used to fund future actions but is not adequate to cover all costs.
Impact fees for new development	Y	Very little impact fees are paid to the city due to limited building being done inside city limits
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	General Bonds were used to improve the sewer system. Due to the high costs and low revenue
Incur debt through private activities	N	
Community Development Block Grant	Y	No possibly could be used for mitigation actions
Other federal funding programs	Y	Depends on what funding was dispersed
State funding programs	Y	Depends on what funding was dispersed
Other		

Source: City of Isleton

1.6.4. Mitigation Education, Outreach, and Partnerships

Table 1-24 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information. More information can be found below the table.

Table 1-24 City of Isleton's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	This is handled through Cal_Am water and the cities fire dept. Yes could be possibly used to mitigate activities
Natural disaster or safety related school programs	Y	River Delta Unified School District
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		

1.6.5. Other Mitigation Efforts

The City has performed numerous mitigation projects citywide. One is the change out of old storm water grates that were causing localized flooding during heavy rain due to foliage clogging them. The City has also taken steps yearly to bring a vac truck to clean out the catch basins in the storm water drainage inlets to keep them from clogging the drainage pipes. The City has also taken steps to remove the brush from all stormwater drainage ditches that lead to the reclamation ditch in an effort to keep the flow unobstructed. Isleton has a leaf and branch collection program to prevent the clogging of drains.

1.7 Mitigation Strategy

1.7.1. Mitigation Goals and Objectives

The City of Isleton adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

1.7.2. NFIP Mitigation Strategy

As a participant of the National Flood Insurance Program (NFIP), the City of Isleton has administered floodplain management regulations that meet the minimum requirements of the NFIP. The management program objective is to protect people and property within the City. The City of Isleton will continue to comply with the requirements of the NFIP in the future.

The City's regulatory activities apply to existing and new development areas of the City; implementing flood protection measures for existing structures and maintaining drainage systems. The goal of the program is to enhance public safety, and reduce impacts and loses while protecting the environment.

The City of Isleton General Services Department provides public outreach activities which include map information services, public awareness, public hazard disclosure, and flood protection information. This information is readily available to the public and consists of current and accurate flood mapping. In addition, the General Services Department provides information about our stormwater management program and up-to-date information related to the maintenance of our drainage system.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS which are to reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. The City of Isleton is currently evaluating joining the CRS.

More information about the floodplain administration in the City of Isleton can be found in Table 1-25.

Table 1-25 City of Isleton Compliance with NFIP

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	124 $220,188 $23,489,3000
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	13 $457,108.20 6
How many structures are exposed to flood risk within the community?	325
Describe any areas of flood risk with limited NFIP policy coverage	
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	No
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Due to budgetary shortfalls, there is no staff for NFIP coordination.
What are the barriers to running an effective NFIP program in the community, if any?	Budgets for staff.
Compliance History	

NFIP Topic	Comments
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	5/13/2010
Is a CAV or CAC scheduled or needed?	
Regulation	
When did the community enter the NFIP?	December 1, 1978
Are the FIRMs digital or paper?	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	The cities standards meet FEMA and state standards by applying all regulations in the permitting process.
Provide an explanation of the permitting process.	
Community Rating System	
Does the community participate in CRS?	No
What is the community's CRS Class Ranking?	N/A
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

1.7.3. Mitigation Actions

The planning team for the City of Isleton identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: All hazards

Goals Addressed: 1, 2, 3, 4

Issue/Background: Local jurisdictional reimbursement for mitigation projects and cost recovery after a disaster is guided by Government Code Section 8685.9 (AB 2140). Specifically, this section requires that each jurisdiction adopt a local hazard mitigation plan (LHMP) in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office: City of Isleton Planning Department

Priority (H, M, L): High

Cost Estimate: Jurisdictional board/staff time

Potential Funding: Local budgets

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Schedule: As soon as possible

Action 2. Storm Water Runoff Rehabilitation Project

Hazards Addressed: Localized Storm water flooding due to inadequate drainage on aging storm water drainage system

Goals Addressed: 1, 2, 3, 4

Issue/Background: City of Isleton has several locations where the storm water causes ponding in the streets and along hwy 160. The drainage system we have drains on one side of the street and bubbles up across the street and drains down the gutter. These gutters get overwhelmed which causes debris from yards and streets to clog up downstream drains.

Project Description: To change the flow of the storm water from running down gutters along the street to creating drains that take the flow under the streets to the reclamation ditch.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: Stormwater program

Responsible Office/Partners: City of Isleton Department of Public Works

Project Priority: High priority

Cost Estimate: To be determined

Benefits (Losses Avoided): The potential of car accidents due to heavy storm water ponding. The potential of flooding homes due to nowhere for the storm water to go.

Potential Funding: FEMA grants, Measure "A", or other grants

Timeline: As soon as funding is available

Action 3. Wastewater Treatment Plant Pond Levee Elevation Raise to 200-year Flood Standard

Hazards Addressed: The possible spillover of wastewater from the sewer ponds due to levee elevation under 200-year flood standard

Goals Addressed: 1, 2, 3, 4

Issue/Background: There is a possibility that if the City has a 200-year flood event that the levees around the wastewater treatment plant ponds will not be sufficient, due to the fact they were made to protect against a 100-year flood.

Project Description: Levee elevation increase around wastewater treatment plant ponds

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital Improvement Projects for the City of Isleton Wastewater treatment plant

Responsible Office/Partners: City of Isleton Department of Public Works

Project Priority: High Priority

Cost Estimate: To be determined

Benefits (Losses Avoided): The benefit would be that if a flood happened there would be adequate protection to keep wastewater from contaminating drinking water and the public's health and safety

Potential Funding: FEMA grants, other grants, and impact fees from new homes built within the City of Isleton

Timeline: 0-1 years

Delta Annex Chapter 2 Brannan Andrus Levee Maintenance District; Reclamation Districts 317, 407, 2067

2.1 Introduction

This chapter of the Delta Annex details the hazard mitigation planning elements specific to the Brannan-Andrus Levee Maintenance District (BALMD) and Reclamation Districts (RD) 317, 407, and 2067, all new participating jurisdictions to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the BALMD. This chapter of the Delta Annex provides additional information specific to BALMD and RDs 317, 407, and 2067, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for these Districts.

2.2 Planning Process

As described above, the Districts followed the planning process detailed in Section 4 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), BALMD and RDs 317, 407, and 2067 formulated their own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 2-1. Additional details on plan participation and representatives from each District are included in Appendix A.

Table 2-1 BALMD and RDs 317, 407, and 2067 Planning Team

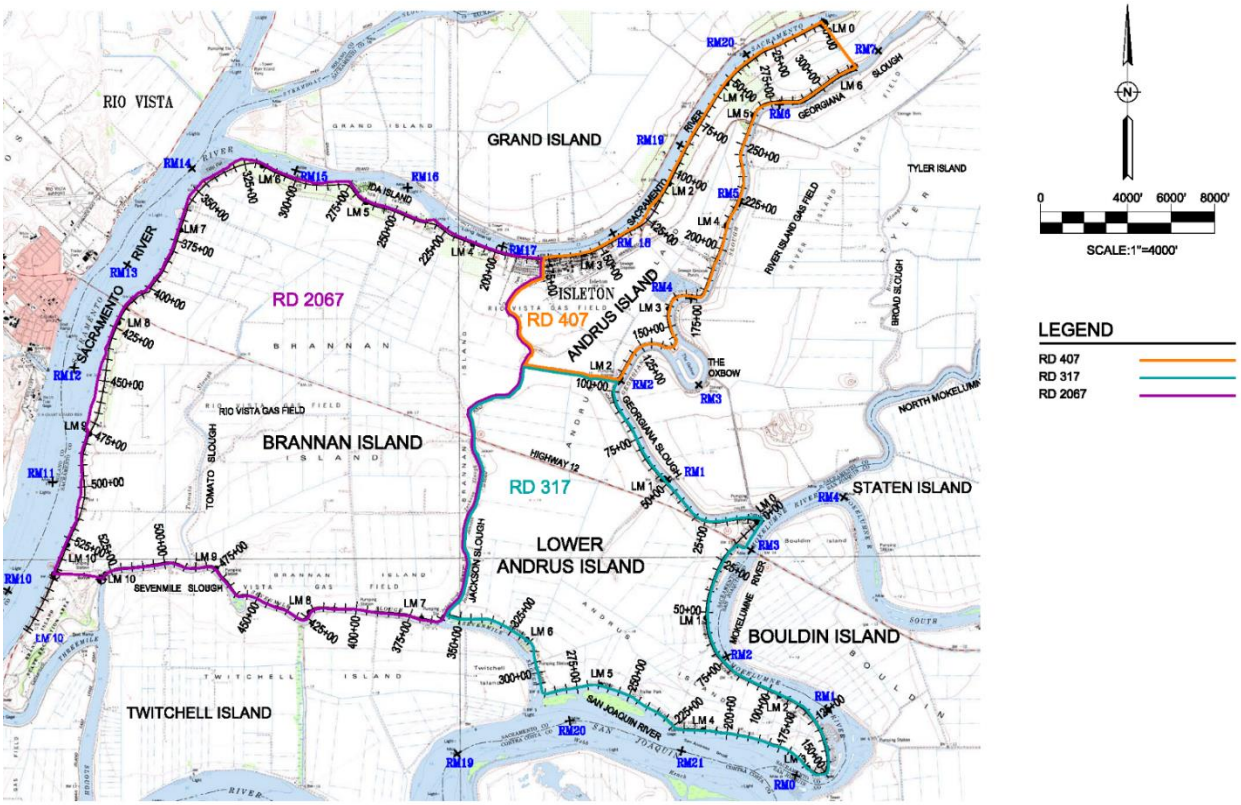
Name	Position/Title	How Participated
Emily Pappalardo	Project Manager	Attended meetings, collected data, drafted text, reviewed draft docs
Gilbert Labrie	District Engineer	Collected data, reviewed draft docs

Source: BALMD

2.3 Community Profile

The community profile for BALMD and RDs 317, 407, and 2067 is detailed in the following sections. Figure 2-1 displays a map and the location of BALMD boundaries within Sacramento County.

Figure 2-1 BALMD and RDs 307, 407, and 2067 Map



Source: BALMD

2.3.1. BALMD and RDs 317, 407, and 2067 Overview, Background, and History

Brannan-Andrus Island is surrounded by 26.2 miles of levee, excluding the Brannan Island State Park, that protects about 13,000 acres of land, which is primarily in agricultural/rural use. It is bordered by the Sacramento River, Georgiana Slough, Mokelumne River, San Joaquin River, and Sevenmile Slough. The levees along the Sacramento River and Georgiana Slough are designated as project levees (16.2 miles). The remaining levees along the Mokelumne River, San Joaquin River and Sevenmile Slough are considered non-project levees (10.0 miles). Out of the 10 miles of non-project levee, 3.3 miles border the non-tidal, controlled section of Sevenmile Slough.

The BALMD monitors and maintains the levees on the island. Reclamation Districts 317, 407, and 2067 and maintain and control the operations of the seven pumping stations to keep the island dry. Five pumping stations are located along Sevenmile Slough, another is on Georgiana Slough, and a lift station is located on the main drainage canal in the northern part of the island.

The BALMD levee system protects an island population of approximately 1,837. This figure includes a major recreation contingent and the City of Isleton, with close to 900 residents. Approximately 379 acres are urbanized, with about 187 acres incorporated by the City of Isleton.

2.4 Hazard Identification

BALMD and RDs 317, 407, and 2067's planning team identified the hazards that affect the Districts and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to BALMD and RDs 317, 407, and 2067 (see Table 2-2).

Table 2-2 BALMD, RDs 317, 407, and 2067—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Significant	Occasional	Critical	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Limited	Occasional	Negligible	Low
Dam Failure	Extensive	Unlikely	Catastrophic	Medium
Drought and Water Shortage	Significant	Likely	Critical	Medium
Earthquake	Limited	Occasional	Limited	Low
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Limited	Highly Likely	Limited	High
Landslides	Limited	Unlikely	Limited	Low
Levee Failure	Limited	Occasional	Critical	High
River/Stream/Creek Bank Erosion	Limited	Highly Likely	Negligible	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Limited	Low
Severe Weather: Fog	Extensive	Highly Likely	Limited	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Critical	Medium
Severe Weather: Wind and Tornadoes	Extensive	Highly Likely	Limited	Medium
Subsidence	Significant	Likely	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 5540 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

2.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile BALMD and RDs 317, 407, and 2067's hazards and assess the Districts' vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.554 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to BALMD is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

2.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 2.5.3, includes a description as to how the hazard affects the BALMD and RDs 317, 407, and 2067 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

2.5.2. Vulnerability Assessment

This section identifies BALMD, RD 317, RD 407, and RD 2067's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the Districts' assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 2-3 lists critical facilities and other District assets identified by the BALMD and RDs 317, 407, and 2067's planning team as important to protect in the event of a disaster. BALMD, RD 317, RD 407, and RD 2067's physical assets, valued at over $244 million, consist of the buildings and infrastructure to support the BALMD, RD 317, RD 407, and RD 2067 operations.

Table 2-3 BALMD's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
District Levees	Infrastructure	n/a	$235,000,000	
Cross Levee	Infrastructure	n/a	$5,000,000	

Source: BALMD

Table 2-4 RD 317's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address (coordinates)	Replacement Value	Hazard Info
150 HP Pump	Infrastructure	38.111931, -121.613444	$500,000	
50 HP Pump	Infrastructure	38.111931, -121.613444	$250,000	
75 HP Pump	Infrastructure	38.111931, -121.613444	$250,000	

Source: RD 317

Table 2-5 RD 407's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address (coordinates)	Replacement Value	Hazard Info
60 HP Pump Station	Infrastructure	38.14775, -121.600867	$250,000	
60 HP Pump Station	Infrastructure	38.14775, -121.600883	$250,000	

Source: RD 407

Table 2-6 RD 2067's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address (coordinates)	Replacement Value	Hazard Info
100 HP Pump	Infrastructure	38.123272, -121.663794	$500,000	
60 HP Pump	Infrastructure	38.123272, -121.663794	$250,000	
60 HP Pump	Infrastructure	38.123272, -121.663794	$250,000	
60 HP Pump	Infrastructure	38.119219, -121.646192	$250,000	
60 HP Pump	Infrastructure	38.119219, -121.646192	$250,000	
100 HP Pump	Infrastructure	38.11825, -121.629306	$500,000	

Name of Asset	Facility Type	Address (coordinates)	Replacement Value	Hazard Info
75 HP Pump	Infrastructure	38.122444, -121.682978	$250,000	
75 HP Pump	Infrastructure	38.122444, -121.682978	$250,000	

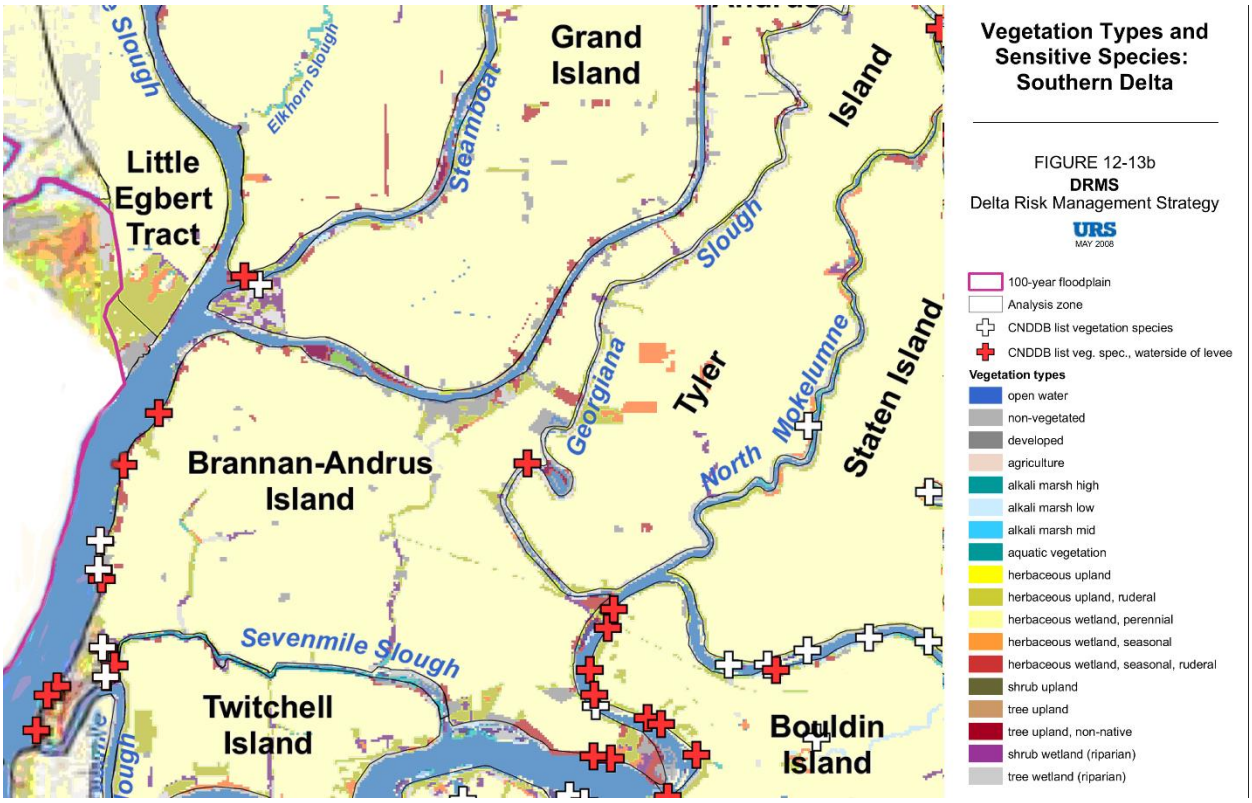
Source: RD 2067

Natural Resources

The 5-Year Plan noted that in terms of natural resources, Brannan-Andrus Island has freshwater wetland, upland, and riparian habitats. Within the freshwater wetland category, there are 12.36 acres of herbaceous perennial wetland and 26.63 acres of herbaceous seasonal/ruderal wetland. Upland habitat consists of 724.74 acres of herbaceous ruderal, 10.13 acres of shrub, 47.61 acres of tree, and 292.56 of non-native tree upland. There is also approximately 142.31 acres of riparian habitat, with 96.88 acres of shrub wetland, and 45.43 acres of tree wetland.

Two small sloughs, Tomato Slough and Jackson Slough, in the interior of the island provide some riparian habitat. Refer to Figure 2-2 for specific habitat areas. According to the California Natural Diversity Database the sensitive species found on Brannan-Andrus Island are: Northern California Black Walnut, Swainson Hawk, Northwestern Pond Turtle, Delta Tule Pea, Suisun Marsh Aster, Mason Lilaeopsis, and Delta Mudwort.

Figure 2-2 BALMD and RDs 317, 407, and 2067 Vegetation Types and Sensitive Species



Source: BALMD 2012 5-Year Plan

Historic and Cultural Resources

The 5-Year Plan noted that BALMD, RD 317, RD 407, and RD 2067 protect the City of Isleton. The City has two nationally registered historic districts, the Isleton Chinese and the Japanese Commercial Districts.

Growth and Development Trends

The BALMD 2012 5-Year Plan noted that the standard island elevation is about -14' with a minimum elevation of -22' and a maximum of +9' per the 2007-2008 DWR Lidar Survey. With the adoption of the Delta Protection Act in 1992, about 40% of Brannan-Andrus Island was designated as a Secondary Zone of the legal Delta, extending from the northern edge of Highway 12 to Tyler Island Bridge Road, east of Isleton. The remainder of the island is in the Primary Zone, which was established to protect the area for agriculture, wildlife habitat, and recreation uses within the Delta. The BALMD levee system protects an island population of approximately 1,837. This figure includes a major recreation contingent and the City of Isleton, with close to 900 residents. Approximately 379 acres are urbanized, with about 187 acres incorporated by the City of Isleton.

Beyond the city limits of Isleton, Sacramento County zoning designates approximately 1,200 acres to recreational use along the southeast corner of Andrus Island. Scattered around Brannan-Andrus Island are a large contingent of the Delta resorts, including RV parks, boat launches, and marinas for local and public use. A majority of these recreational uses are located along the Delta Loop, a 7.2-mile drive with 40

recreational attractions bordering the Mokelumne and San Joaquin Rivers, and Sevenmile Slough. Overall, there are 5 large marinas (over 200 berths), 5 medium marinas (50 to 200 berths), and 8 small marinas (less than 50 berths) that account for a total of 2400 berths and 6 boat launching facilities. Twelve of the resorts also have RV/camping grounds totaling about 800 sites overall. Five of the resorts have cabins (approx. 300 total). About 40 acres total of dry storage is provided at eleven resorts. Four resorts are on their own island that bridges to Brannan-Andrus and may not be inundated by a flood but access could be compromised. Including marinas and resorts, there are approximately 148 businesses on the island.

There was a development of approximately 650 homes that failed in the housing crash of 2008. It is still developable land but many projects to revive the development have also failed. Development of that size is possible in the future given Isleton is in the Secondary Zone of the Delta which allows for some development. One hindrance is the levees are not certified by FEMA to protect against the 100-year flood. Thus homes will have to be elevated to protect from flooding. The failed development had accounted for that and designed the homes to be elevated with garages on the first story.

2.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 2-2 as high or medium significance hazards. Impacts of past events and vulnerability of the BALMD, RD 317, RD 407, and RD 2067 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are similar to those described in Section 4.3.1 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable District assets include the levees and pumping stations that the District owns. There are approximately 10.3 levee miles along the Sacramento River, 5.9 levee miles along Georgiana Slough, 3 levee miles along the Mokelumne River, 2.6 levee miles along the San Joaquin River and 4.6 levee miles along Sevenmile Slough. The levee system is subject to riverine flooding. The most vulnerable levees are those along Georgiana Slough, the San Joaquin River and the tidal areas along Sevenmile Slough due to low landside elevations and waterside bank erosion. However, it is unlikely the levee system will fail due to overtopping. A high water situation could increase the hydraulic gradient within the levee that could result in under or through seepage. Seepage, if left unchecked, can result in levee failure and subsequent flooding. Reclamation Districts 407, 2067 and 317 own numerous pumping stations that are critical for island drainage. If the drainage system becomes compromised the District could experience localized flooding. If the system becomes compromised in a flood situation, damages could be worse than anticipated.

An estimate of the vulnerability of BALMD and RDs 317, 407, and 2067 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.

- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

While unlikely, it is possible that dam failure can create a high water situation in the adjacent channels that could put the levee system at risk of failure from overtopping, under seepage, through seepage or debris impact. Given the distance from the dam system, a dam surge could dissipate prior to reaching this point in the Delta and result in a minor change in water elevation.

Past Occurrences

There are no past occurrences of dam failure.

Vulnerability to Dam Failure

Assets/Critical Facilities at Risk

The levees are at the highest risk to this hazard.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to erosive forces of high flows from dam failure.

Historic and Cultural Resources at Risk

The City has two nationally registered historic districts, the Isleton Chinese and the Japanese Commercial Districts that could be lost in the event of a flood due to dam failure.

Future Development

While future development may occur in the areas protected by levee, the Districts do not control this development. The Districts only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Drought and Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

This hazard could disrupt crop irrigation. Prolonged disruption could result in the loss of a crop that year. In the event that orchards or vineyards experience disruption in irrigation, they could be lost for multiple years until they are replanted and begin producing a crop between 3 to 5 years. Agriculture is the primary industry on the island. Agricultural users pay assessments for levee maintenance and improvements. If agriculture is lost the District will not be able to cover levee maintenance or make any necessary improvements.

Past Occurrences

Although California did recently experience an extended drought, agriculture in this District remained largely unaffected due to senior water rights and riparian water rights. Some farmers voluntarily cut water use by 25% in the Delta in response to the drought in the Summer of 2015.

Vulnerability to Drought and Water Shortage

Assets/Critical Facilities at Risk

The District Planning Team noted no facilities at risk to drought.

Future Development

Drought is not likely to affect future development in the area.

Earthquake: Liquefaction

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

In the event an earthquake is intense enough to result in shaking that could cause the sandy soils to liquefy, the levees could resettle, move off their foundations and possibly fail. Failure could compromise the levee system and result in flooding.

Past Occurrences

According to the Delta Risk Management Strategy, Brannan-Andrus Island levees have an estimated annual frequency of failure rating of 3% from flood risk and 5% from seismic risk. The annual frequency failure for a 100-year levee is 1%. However, there is no record of a levee failure caused by a seismic event in the entire Delta region.

Vulnerability to Liquefaction

Assets/Critical Facilities at Risk

The District Planning Team noted that the levees are at the highest risk to this hazard.

Future Development

While future development may occur in the areas protected by levee, the Districts do not control this development. The Districts only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

A 100/200/500-year flood event could cause flooding within the District. A high water event, depending on the water elevation, could cause failure due to overtopping but more realistically could increase hydraulic gradients within the levee section resulting in landside seepage or boils. Continued seepage, if left unaddressed, could erode the levee and result in failure. Heavy flows could also cause erosion and scour on the waterside bank that could undermine the levee and cause failure.

Past Occurrences

1986 was the closest the District came to experiencing a 100-year flood. The District has not experienced a 200 or 500-yr flood.

Vulnerability to Flood: 100/200/500-year

Assets/Critical Facilities at Risk

The levee system and pumping stations are vulnerable to a 100/200/500-year flood. Higher flows from such events could exceed the capacity of both the levee system and the pumping stations that are needed to drain the island.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to erosive forces of high flows from 100/200/500-year flows.

Historic and Cultural Resources at Risk

The District's two nationally registered historic districts, the Isleton Chinese and the Japanese Commercial Districts could be negatively impacted from inundation due to a 100/200/500-year flood. The marinas along the Delta Loop along Georgiana Slough, Mokelumne River and the San Joaquin River could also be damaged and possibly lost as a result of high flows from a 100/200/500 year flood event.

Future Development

While future development may occur in the areas protected by levee, that if failed, would cause flooding of the area, the Districts do not control this development. The Districts only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Localized stormwater flooding can occur during heavy rains or seepage events that exceed the District's drainage capabilities. Lower areas around the island may be subject to minor flooding.

Past Occurrences

Some form of localized stormwater flooding occurs during most heavy rains. The most likely time this could have occurred in the past was during the wet year in 2006.

Vulnerability to Flood: Localized Stormwater Flooding

Assets/Critical Facilities at Risk

Localized flooding can overtax the Districts pumping system and create a more hazardous situation involving the levee system by limiting the ability for inspection.

Future Development

Future development should not be affected by local drainage issues.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Levee failure could result in inundation of the Districts and could also result in the flooding of Brannan and lower Andrus islands.

Past Occurrences

The 2012 5-Year Plan reported that since the creation of the BALMD in 1967, Brannan-Andrus Island has experienced one flood event on June 22, 1972. The levee failed on the southern end of the island along the San Joaquin River. The levee breach occurred after hours during a construction effort to raise the levee and address an instability problem. The elevation of the levee crown at the time was 10.8 feet. The subsequent water level on the inundated island reached 6.2 feet. To protect the town of Isleton, a bow levee was constructed by the US Army Corps of Engineers and volunteers. The bow levee only held for 36 hours. When it failed, 35% of the Isleton community was inundated.

The flood resulted in a "big gulp" effect, where the salt water from Suisun Bay moved into the central and southern Delta, decreasing the Delta's freshwater outflow. The salt water intrusion degraded water quality for central Delta farms and forced pumping to be cut back at the Central Valley Project pumping plant in Tracy. In order to push back the salinity gradient, a hydraulic barrier was created by increasing water releases from Folsom, Oroville, and Shasta reservoirs. Still, it took those releases several days to reach the affected Delta areas. After releasing over 150,000 acre feet of water, salinity levels were eventually restored to pre-flood levels. It took eight weeks of pumping to dewater the Brannan-Andrus Island.

The USACE spent $1.4 million to repair the breach with another $1.0 million used in federal disaster assistance totaling $2.4 million. In addition, numerous marinas and restaurants suffered from a loss of business and the flood's negative publicity. Crops were lost and intrastate commerce was disrupted. When adding up all of the flood's indirect costs, including the diversion of fresh water destined for CVP customers, it was estimated that the total economic impact of the 1972 Brannan-Andrus flood was approximately $40 million.

The BALMD became concerned about another levee failure during a high water event in 1997, when a section of the landside slope sloughed into a toe ditch along the Georgiana Slough levee. The USACE spent over $1.1 million to stabilize approximately 6,700 lineal feet of levee.

Vulnerability to Levee Failure

As previously stated, BALMD monitors and maintains the levees on the island. Reclamation Districts 407, 2067, and 317 maintain and control the operations of the seven pumping stations to keep the island dry. Five pumping stations are located along Sevenmile Slough, another is on Georgiana Slough, and a lift station is located on the main drainage canal in the northern part of the island.

The 5-Year Plan noted that to repair a levee breach the average cost has been estimated to be approximately $25 million. But the total cost truly depends on the accessibility, size and severity of the breach, the size of the island, volume of water to be pumped out, weather conditions, etc. The $25 million figure assumes costs of $5/yd^3 of on-island replacement fill, $15/yd^3 of off-island fill, 6% per foot of engineering costs, and $5/foot for rip rap. A summer levee breach occurred on Brannan-Andrus in 1972 (discussed above). The Jones Tract failure in 2004, the most recent levee failure, provides insight into determining what a levee breach could cost today. It has been publicized that this 500 foot breach cost approximately $90 million for repair, recovery, and associated damage. However, many knowledgeable locals consider that figure inflated by as much as a factor of two.

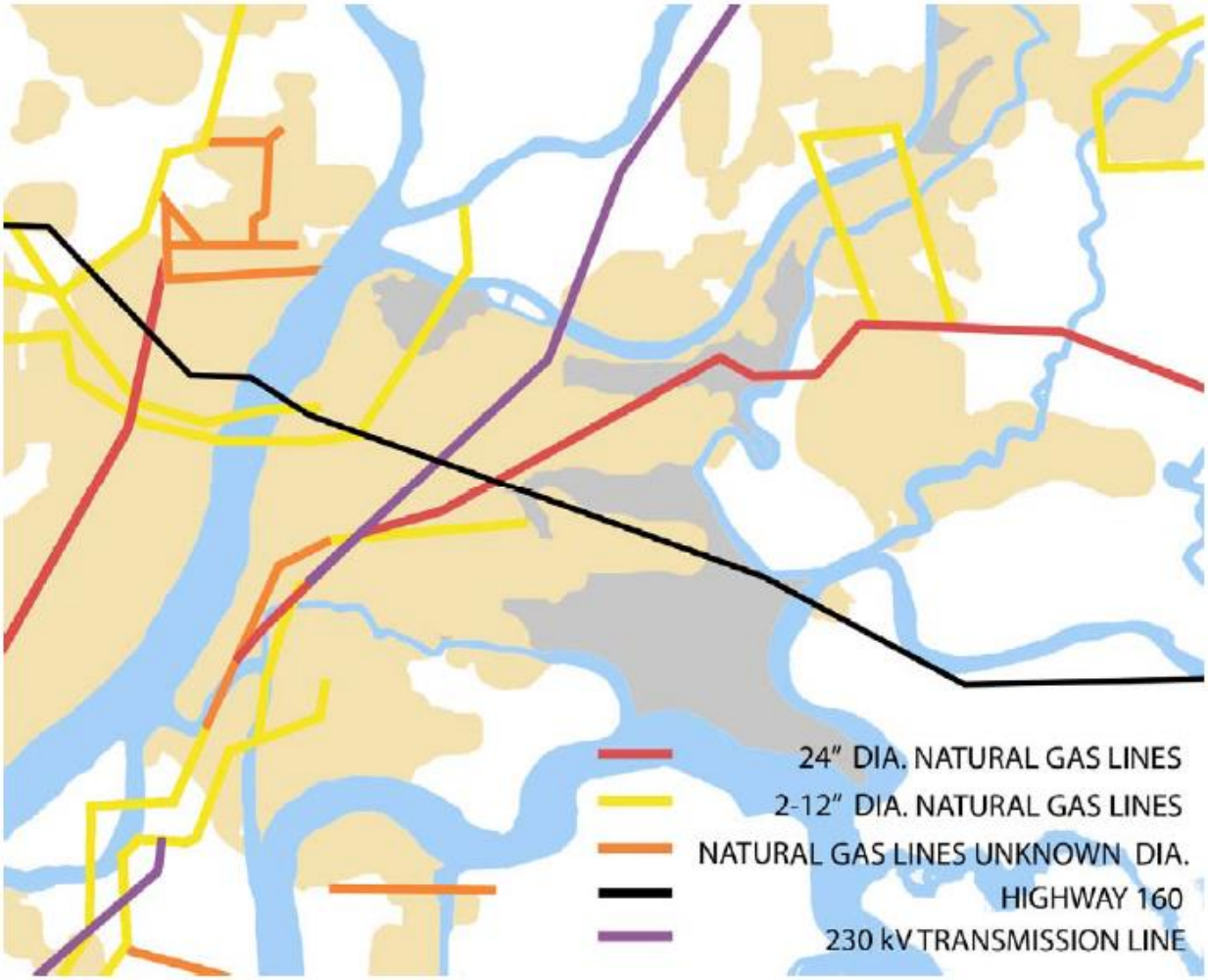
The 5-Year Plan broke down costs by land use type.

- **Residential** – The costs associated with inundation are taken from FEMA's method for estimating displacement. This includes a one-time cost of $500 per flooded household, a cost of $500 per month of inundation per household, and a monthly rental cost of $747. For Brannan-Andrus, it is estimated that there could be a one-time displacement cost of $182,400 for all occupied households along with an additional $15,600 per day to house these residents elsewhere. In addition to the residents, the various resorts on the island generate a transient population. To house this population in emergency shelters it could cost an estimated $85 per person per day. There are no reliable statistics covering that element of the population to determine a total cost per day for emergency housing, since the population fluctuates with the seasons. Flooding threats usually allow sufficient time to evacuate, so the costs to accommodate this unique group of part-time residents may not be significant.
- **Commercial** – Commercial structures will be adversely impacted from the time they are inundated through the time it takes to repair such damage and damage to surrounding infrastructure. For any business that is flooded FEMA assumes a one-time displacement cost of $1000, for a total of $148,000. Upon inundation, the businesses are assumed to have $77,500 of lost output value, $3,900 of lost profit, and $44,000 of lost value added per day on average. "Value added" is the sum of wages and salaries, proprietor's incomes, other property income, and indirect business taxes (URS 67). When a flood occurs, the island businesses could lose $140 million in sales for that year. Four-hundred seventy-one jobs could be lost per day over the duration of inundation. Overall, a flood could cost Brannan-Andrus Island businesses about $125,400 per day. Some businesses may be unable to recover from a flood and could possibly be lost as a result of such an event.
- **Agricultural** – Main crops grown on Brannan-Andrus Island are alfalfa, corn, wheat, pears, apples, cherries, and wine grapes. Brannan-Andrus Island has 10,517 acres of crops. Average cost for rehabilitation and field clean up is $235 per acre. This involves the removal of debris and sediment deposits after floodwaters have receded. Silt and debris can also clog drainage and irrigation ditches adding a variable cost to rehabilitation. The estimated total one-time cost for clean-up and rehabilitation is estimated to be $2.0 million. If inundation lasts longer than 14 days, it is assumed that the crops will be permanently lost. In 1972, it took eight weeks to pump out the island. Using that estimate, essentially all crops could be lost in a similar flood event. Any flood event that occurs between planting and harvest, could completely destroy the crops. Reestablishment of a lost crop dramatically increases economic losses. The inundation period is assumed to be five weeks on lower Tyler Island, meaning all crops on the lower end could potentially be lost in a flood event. However, due to the smaller size of RD 554 and an assumed inundation period of five days, not all crops may be lost. Not including clean-up costs, reestablishment of all crops on the island could total an estimated $23.9 million. In addition to reestablishment costs, a flood could also result in annual crop production losses. Annual crop production losses are incurred from the time of the flood and depend on how long inundation occurs, cleanup and the time required for the crops to produce a harvestable yield. If a flood occurs between planting and harvest, the crop will be lost for the year. Planting on Brannan-Andrus begins in

April and harvest ends by October. This report adds two months onto the planting season since it is estimated to take two months before the soils are dry enough for planting. As a result, the critical flood season for crops really occurs between February and October. If planting cannot occur within the same year as the flood event, annual production losses from orchards and vineyards could amount to about $17 million. If an event occurs between February and October, pushing planting to the following year, annual production losses will be about $26.8 million. Degraded water quality from salinity intrusion can also reduce crop yields.

The Brannan-Andrus Island levee system also protects several critical infrastructure components. There is an approximately 18-mile network of roads that include State Highway 12 (4.21 mi.) and Highway 160 (8 mi.) which provide east-west and north-south links with interstate corridors. A power transmission line, sized at about 230kV runs about 3.6 miles down the center of the island to the south end, through Brannan Island State Park. There are approximately 9,088 acres of underground gas fields and storage areas with a total of 33 natural gas wells and 157 gas/oil wells. The areas in beige represent the natural gas fields. A Lodi Gas' natural gas pipeline (24" diameter) runs west to east across the island feeding two 2-12" diameter pipelines. In total there are about 14.3 miles of PG&E pipeline with natural gas production at about 5,117,858 mcf. These are all shown on Figure 2-3.

Figure 2-3 PG&E Natural Gas Pipelines, Gas Fields, Storage Areas, and Transmission Lines



Source: 2012 5-Year Plan

Assets/Critical Facilities at Risk

Levees and district pumping plant. On island inundation can create an open water situation where a large fetch could develop and erode the interior of other levees within the District. Inundation of the drainage pumps and system can make them inoperable and require replacement. Other critical facilities at risk include two fire departments, Isleton city offices and an elementary school.

Natural Resources at Risk

The 5-Year Plan noted that many western Delta islands (Brannan-Andrus included) are vital for maintaining Delta water quality. If Brannan-Andrus was to flood, it would lower outflows and draw saline water from Suisun Bay into the Delta. The salinity gradient would migrate up to the southwest and southern Delta as it did in the summer flood of 1972. Also similar to 1972, the saline water would force the State Water Project pumps to shut down due to degraded water quality. This would compromise the water supply for the central and southern parts of the state until the salinity barrier is pushed back west. If the event were to

occur between August and December, when there is less fresh water run-off, drinking water treatment costs would increase significantly for jurisdictions that draw water out of the Delta.

According to the PPIC report, intentional permanent flooding of an island or a levee failure would create a "big gulp," bringing salt water in from the bay. This would have long-term effects on Delta water quality and factors in heavily when attempting to determine which islands should be reclaimed after failure.

Historic and Cultural Resources at Risk

The City of Isleton and its historic Chinese and the Japanese Commercial Districts could be devastated if it became flooded. In 1972, part of the town was inundated but due to its higher elevation, areas adjacent to the levees stayed relatively dry. The greatest risk of inundation from a levee break would be from a break along the Sacramento River, which is the strongest levee in the District with the least likelihood of failure.

The marinas along the Delta Loop along Georgiana Slough, Mokelumne River and the San Joaquin River could also be damaged and possibly lost as a result of a levee break.

Future Development

While future development may occur in the areas protected by levee, the Districts do not control this development. The Districts only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

River/stream/creek bank erosion could destabilize the levee slope and, if left unaddressed, cause levee failure through undercutting.

Past Occurrences

Bank erosion is currently occurring on the District levees, particularly Georgiana Slough and Sacramento River and must be remedied.

Vulnerability to Erosion

Assets/Critical Facilities at Risk

The District Planning Team noted that the District's levees are at risk of erosion.

Future Development

While future development may occur in the areas protected by levee, which may be compromised by significant erosion issues, the Districts do not control this development. The Districts only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Severe Weather: Fog

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Fog can make it difficult to perform levee inspections during high water due to lack of visibility.

Past Occurrences

Fog occurs annually but it has not occurred during high water events that require monitoring.

Vulnerability to Fog

Assets/Critical Facilities at Risk

The levees are at risk due to the inability to perform inspections.

Future Development

While future development may occur in the areas protected by levee, the Districts do not control this development. The Districts only can control whether the levees meet certification standards and the ongoing maintenance of these levees. However, fog is unlikely to affect future development of the area.

Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Heavy rains and storms can result in higher flood flows that could increase the hydraulic gradients within the levee section and result in seepage or if great enough, possibly overtopping. They can also increase flows and result in erosion of the waterside bank.

Past Occurrences

There are heavy storms that occur every year. The last heavy rain and storm event that raised river levels the District experienced was in 2006, 1997 and 1986. No significant damages occurred due to these high water events.

Vulnerability to Heavy Rain and Storms

Assets/Critical Facilities at Risk

The Planning Team for the District noted that the District levees and pumping plant are at risk of damage from heavy rains and storms.

Future Development

While future development may occur in the areas protected by levee, which may be compromised by severe storms, the Districts do not control this development. The Districts only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

In the event of high water, wind can create wave action that could cause erosion at the waterside bank of the District's levees.

Past Occurrences

Wind occurs on a regular basis. The hazard comes when high winds are coupled with high water, which happened in the winter of 2006. The District went on levee patrols during this time to monitor waves washing over the levee along the Mokelumne and San Joaquin River from the high winds coupled with high winter flows and high tide. No damages occurred as a result of the event.

Vulnerability to Wind and Tornadoes

Assets/Critical Facilities at Risk

The Planning Team for the District noted that the District levees and pumping plant are at risk of damage from winds and tornadoes.

Future Development

While future development may occur in the areas protected by levee, which may be compromised by high wind events, the Districts do not control this development. The Districts only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

A wildfire could destroy private property and other such structures on the island.

Past Occurrences

The District Planning Team noted no past occurrences.

Vulnerability to Wildfire

Assets/Critical Facilities at Risk

The District's pumping stations could be damaged in a fire. Furthermore the vegetation on the District levees could be burned leaving bare soil that could be subject to erosion.

Natural Resources at Risk

Riparian and shrub scrub vegetation could be lost in a wildfire.

Historic and Cultural Resources at Risk

Wildfire has the potential to irreparably destroy the historic Chinese and the Japanese Commercial Districts.

Future Development

It is unlikely that future development in the Districts will be affected by wildfire.

2.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

2.6.1. Regulatory Mitigation Capabilities

Table 2-7 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the BALMD and RDs 317, 407, and 2067.

Table 2-7 BALMD, RD 317, RD 407, and RD 2067's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	The plan addresses flooding hazards and can be used to implement mitigation actions
Continuity of Operations Plan	Y	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: CBC 2013
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Sacramento County Zoning Code
Subdivision ordinance	N	
Floodplain ordinance	Y	Yes, Sacramento County Floodplain Ordinance restricts development in the floodplain
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	Y	AE Zone
Elevation Certificates	Y	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	Y	5-YEAR PLAN
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

Source: BALMD

2.6.2. Administrative/Technical Mitigation Capabilities

Table 2-8 identifies the department(s) responsible for activities related to mitigation and loss prevention for BALMD and RDs 317, 407, and 2067.

Table 2-8 BALMD, RD 317, RD 407, and RD 2067's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Annual vegetation management
Mutual aid agreements	N	
Other	N	
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	Y	Determined via the Emergency Operations Plan
Emergency Manager	Y	Determined via the Emergency Operations Plan
Community Planner	N	
Civil Engineer	Y, FT	Staff is trained to coordinate with agencies and perform tasks in an emergency situation
GIS Coordinator	N	
Other	N	
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Phone tree, Reverse 911
Hazard data and information	Y	
Grant writing	N	
Hazus analysis	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
BALMD can develop an improved warning system among trustees, public and staff.		

Source: BALMD

2.6.3. Fiscal Mitigation Capabilities

Table 2-9 identifies financial tools or resources that the BALMD and RDs 317, 407, and 2067 could potentially use to help fund mitigation activities.

Table 2-9 BALMD, RD 317, RD 407, and RD 2067's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Delta Levees Subventions program to maintain levee system.
Authority to levy taxes for specific purposes	Y	Proposition 218 provides the District with the ability to raise assessments through a vote
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development		Unknown, would be dictated by Sacramento County
Storm water utility fee	Y	Assessments are developed for drainage
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	Y	Bonds are obtained from the Bank of Rio Vista
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	Y	Delta Levee Subventions Program and Delta Levee Special Projects, Proposition 84 and 1E
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
The involvement of Federal agencies funds would help in reducing risk as well as the removal of the sunset clause on the Delta Levees Subventions Program.		

Source: BALMD

2.6.4. Mitigation Education, Outreach, and Partnerships

Table 2-10 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 2-10 BALMD, RD 317, RD 407, and RD 2067's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

2.6.5. Other Mitigation Efforts

The Districts do annual erosion repair and seepage abatement projects. There are currently two large projects in the planning stages that will address critical erosion sites on the Sacramento River and Georgiana Slough. The Districts are also updating their Five Year Plan with levee repair and enhancement projects to continue to maintain and improve the levee system.

2.7 Mitigation Strategy

2.7.1. Mitigation Goals and Objectives

BALMD and RDs 317, 407, and 2067 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

2.7.2. Mitigation Actions

The planning team for BALMD and RDs 317, 407, and 2067 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Implement Bioengineered Bank Stabilization techniques

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: Scour due to high flows and channel meander has eroded and undercut the waterside bank. Rip rap is just one way to combat erosion but provides no habitat benefits. The use of bioengineered bank stabilization techniques will provide plantable media to provide riparian and Shaded Riverine Aquatic Habitat.

Project Description: The designs include using plantable geotextile bags in the place of rip rap within the tidal zone to protect against erosion and provide habitat.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Directors and District Engineer Gilbert Labrie

Project Priority: Medium

Cost Estimate: Adapted to different projects, difficult to estimate

Benefits (Losses Avoided): Reduction in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program and 2016 Multi Benefit PSP

Timeline: Summer 2018 to Summer 2023

Action 2. Development of Dredge Stockpile Site

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: This area is District owned and can provide an on-island mitigation site to offset impacts from levee improvement projects.

Project Description: Develop habitat for sensitive species such as freshwater marsh, riparian and shrub scrub.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Directors and District Engineer Gilbert Labrie

Project Priority: Medium

Cost Estimate: $500,000

Benefits (Losses Avoided): Ancillary to projects that reduce flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program and Special Projects funding

Timeline: Summer 2020 to Summer 2023

Action 3. Georgiana Slough Waterside Erosion Repair

Hazards Addressed: Dam Failure Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: Scour due to high flows and channel meander has eroded and undercut the waterside bank. If left unaddressed, the slope may fail or result in underseepage that could ultimately cause levee failure and flood.

Project Description: The designs include filling voids at the waterside toe with rip rap and riparian bench will be enhanced with added fill. The levee slopes will be regraded and fill added to accommodate a Bulletin 192-82 critical levee section. Levee slopes will be a minimum of 2:1 landside and 3:1 water side where applicable.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Directors and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: Multi-Year effort, not available (current project in planning progress is 2 million for 0.3 miles)

Benefits (Losses Avoided): Reduction in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program and 2016 Multi Benefit PSP

Timeline: Summer 2018 to Summer 2023

Action 4. Hydrographic surveys and data collection

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: In order to reveal heavily eroded areas, hydrographic survey data must be obtained to inform repair and maintenance activities. It can also be used to develop designs and estimate costs to repair the levee system.

Project Description: Hydrographic surveys will be performed along Georgiana Slough, Mokelumne River, San Joaquin River, Sevenmile Slough, and potentially the Sacramento River to reveal deep waterside bank erosion.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Directors and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: $300,000

Benefits (Losses Avoided): Aides in providing information for projects that will reduce in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: 2018 to 2025

Action 5. Mokelumne River Crown Raising

Hazards Addressed: Dam Failure Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: Crown deficiencies have reduced the levees freeboard above the 100-year flood and has increased the levees vulnerability to flooding during a high water event.

Project Description: Crown raising will occur from District stations 115+00 to 127+00 and 135+00 to 145+00 to repair Bulletin 192-82 deficiencies

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Directors and District Engineer Gilbert Labrie

Cost Estimate: $500,000

Benefits (Losses Avoided): Reduction in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program and Special Projects funding

Timeline: Summer 2020 to Summer 2023

Project Priority: High

Action 6. San Joaquin River Waterside Erosion Repair

Hazards Addressed: Dam Failure Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: Scour due to high flows and channel meander has eroded and undercut the waterside bank. If left unaddressed, the slope may fail or result in underseepage that could ultimately cause levee failure and flood.

Project Description: The designs include filling voids at the waterside toe with rip rap and riparian bench will be enhanced with added fill. The levee slopes will be regraded and fill added to accommodate a Bulletin 192-82 critical levee section. Levee slopes will be a minimum of 2:1 landside and 3:1 water side where applicable.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Directors and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: Multi-year effort, not available

Benefits (Losses Avoided): Reduction in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program and Special Projects funding

Timeline: Summer 2020 to Summer 2023

Action 7. Sevenmile Slough French Drain and Seepage Berm

Hazards Addressed: Dam Failure Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: Seepage has been an issue at this levee stretch along Sevenmile Slough. This issue must be resolved to improve the levee stability.

Project Description: Project will remove existing toe drain and install a seepage berm and French drain to resolve seepage issues and facilitate proper drainage through the levee

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Directors and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: $1,200,000

Benefits (Losses Avoided): Reduction in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program and Special Projects funding

Timeline: Summer 2020 to Summer 2023

Delta Annex Chapter 3 Reclamation District 3

3.1 Introduction

This chapter of the Delta Annex details the hazard mitigation planning elements specific to the Reclamation District 3 (RD 3), a new participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the RD 3. This chapter of the Delta Annex provides additional information specific to RD 3, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

3.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 3 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 3-1. Additional details on plan participation and RD 3 representatives are included in Appendix A.

Table 3-1 RD 3 Planning Team

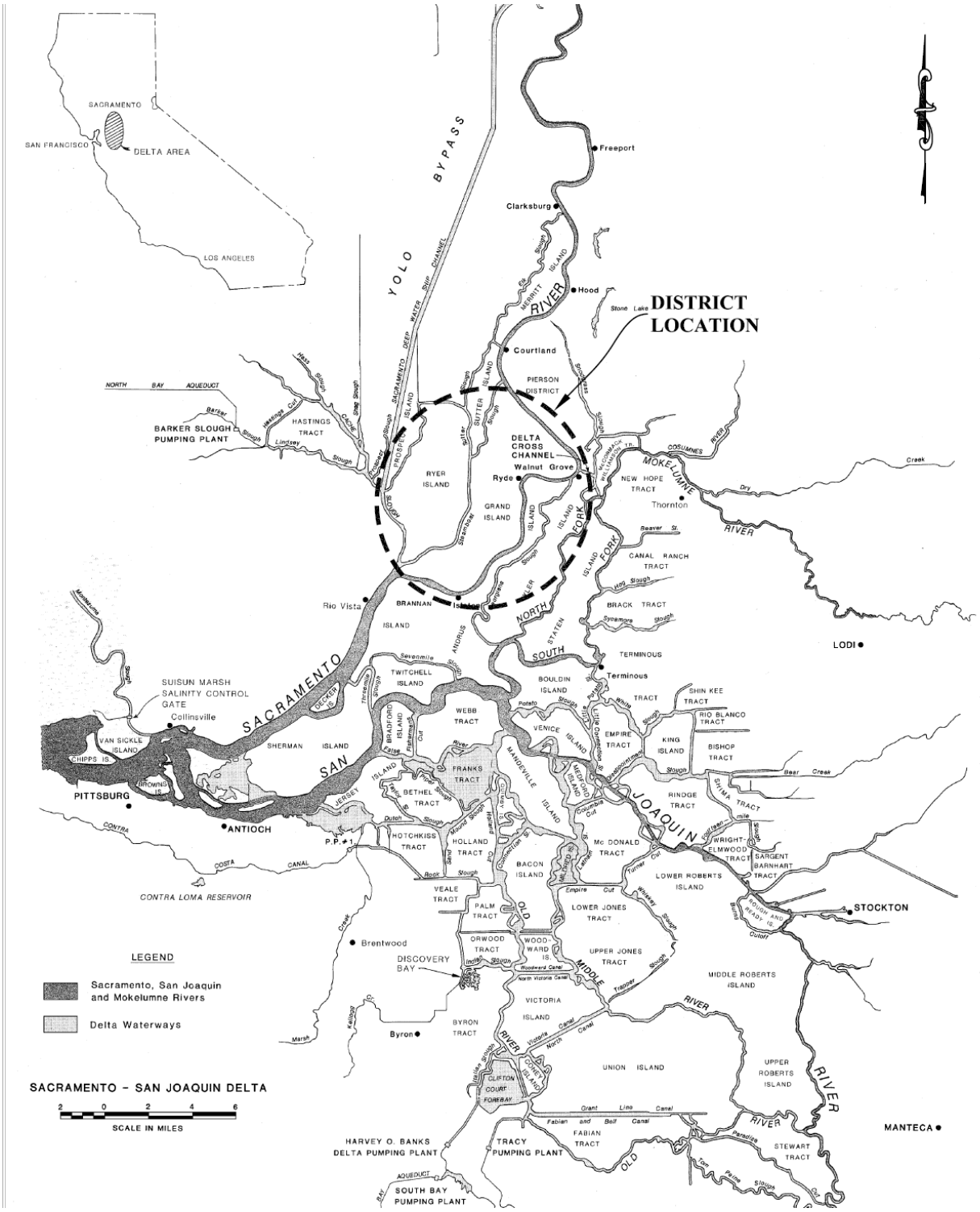
Name	Position/Title	How Participated
Gilbert Cosio	District Engineer	Attended meetings and workshops; reported to the District; compiled data for this annex; review draft documents
David Robinson	District Manager	Briefed in Sacramento County LHMP
Buddy Fonseca	President RD 3	Briefed in Sacramento County LHMP

Source: RD 3

3.3 Community Profile

The community profile for RD 3 is detailed in the following sections. Figure 3-1 displays a map and the location of RD 3 boundaries within Sacramento County.

Figure 3-1 Reclamation District 3 Map



3.3.1. RD 3 Overview, Background, and History

Reclamation District No. 3, Grand Island, is the local public entity that provides flood control and drainage services to the landowners of Grand Island. These functions are provided in the most economical and environmentally sound manner, with the greatest consideration of the areas rich agrarian culture and heritage.

As one of the first reclamation districts formed in 1861, Grand Island was given the number Reclamation District No. 3. The area protected by Reclamation District No. 3 has remained the same for essentially the entire time of its existence. As described in Division of Water Resources, (currently known as Department of Water Resources) Bulletin No. 37, which was published in 1930, the Reclamation District is described as protecting 17,100 gross acres, with a net protected area of 16,245 acres.

The Reclamation District No. 3 levees are part of the Federal Sacramento River Flood Control Project. This federally authorized project reconstructed the levees of Grand Island in the late 1950s. As part of a Federal project, the State of California is the local sponsor with Reclamation District No. 3 acting as the local maintaining agency. In order to verify that the District is maintaining its levees properly, the State inspects the levees two times a year (spring and fall) and Reclamation District No. 3 inspects its levees twice a year (summer and winter). The key inspection is the fall inspection performed by the State of California. This inspection, which occurs just prior to the flood season, is used by the Corps of Engineers to determine whether the levee is being properly maintained in order for Reclamation District No. 3 to qualify for Federal emergency funding through Public Law 84-99.

Reclamation District No. 3 provides flood protection in the form of levee maintenance and rehabilitation. The District also provides interior island flood protection and drainage. The District operates and maintains all the levees that protect the landowners of Grand Island. These 28.8 miles of levees border the Sacramento River and Steamboat Slough. The district also maintains 37.2 miles of ditches and canals, and 3 pumping plants to drain the properties of Grand Island. The protected area includes the communities of Walnut Grove and Ryde.

3.4 Hazard Identification

RD 3's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 3 (see Table 3-2).

Table 3-2 RD 3—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Extensive	Occasional	Limited	Low
Bird Strike				
Climate Change	Extensive	Occasional	Limited	Low
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Extensive	Occasional	Critical	Low
Earthquake	Extensive	Occasional	Limited	Low
Earthquake: Liquefaction	Significant	Occasional	Limited	Low
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Significant	Likely	Critical	High
Landslides				
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Significant	Highly Likely	Catastrophic	High
Severe Weather: Extreme Temperatures – Cold/Freeze				
Severe Weather: Extreme Temperatures – Heat				
Severe Weather: Fog				
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Significant	Likely	Critical	Medium
Severe Weather: Wind and Tornadoes				
Subsidence	Significant	Likely	Limited	Low
Volcano				
Wildfire:(Burn Area/Smoke)				

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area
Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid
Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

3.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 3's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 3 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

3.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 3.5.3, includes a description as to how the hazard affects the RD 3 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

3.5.2. Vulnerability Assessment

This section identifies RD 3's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 3-3 lists critical facilities and other District assets identified by the RD 3's planning team as important to protect in the event of a disaster. RD 3's physical assets, valued at over $8 million, consist of the buildings and infrastructure to support the RD 3 operations. In addition, other assets protected by RD 3 have an estimated value of over $250,000,000.

Table 3-3 RD 3's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Pumping Plant – Sac. River	Drain Pump		$2,000,000	

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Pump Plant – Steamboat Sl (old)	Pump Plant		$2,000,000	
Pump Plant –Steamboat Sl (new)	Pump Plant		$2,000,000	
District owned Facilities	Home, Buildings & Equipment		$2,000,000	

Source: RD 3

Natural Resources

In the past, RD 3 has protected a number of natural gas wells. Currently, there are no wells in operation on Grand Island. RD 3's levees support vegetation that provide fish and wildlife habitat. Agricultural ground and ditches also support wildlife.

Historic and Cultural Resources

Since the land has been settled for over 150 years, there are many historic structures on Grand Island. These include the Ryde Hotel, the Grand Island Mansion and the Beaver Union School.

Growth and Trends

Grand Island is within the Primary Zone of the Delta. Therefore, in addition to Sacramento County, development is controlled by a State agency, the Delta Protection Commission. Therefore, there is little, if any, potential for growth beyond that allowed by agricultural zoning.

3.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 3-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 3 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable structures are those located within the floodplain or within levee inundation areas, older facilities that may be constructed with unreinforced masonry and buildings built prior to the introduction of modern building codes. Buildings that contain electronic or electrically operated equipment are also vulnerable to flood inundation.

In general, the most vulnerable District assets include the levees and supporting structures that the District owns. As stated, above, the RD 3 levees provide protection to over $250,000,000 in assets as estimate by the Delta Risk Management Strategy.

An estimate of the vulnerability of RD 3 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on

past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Flood: 100/200/500 Year

Likelihood of Future Occurrence–Occasional
Vulnerability–Extremely High

Hazard Profile and Problem Description

Flooding on the Sacramento River has threatened the levees of RD 3 in the past. Flooding inside the leveed area would occur as a result of levee failure or overtopping. The flood elevations around Grand Island exceed the elevation of almost every acre of ground protected by RD 3 levees. Therefore, a levee breach under flood conditions would be catastrophic to the landowners. In addition, the Grand Island levees are not certified to protect against the 100-year flood.

Past Occurrences

Past river floods have damaged the RD 3 levees in the form of erosion. Some of this erosion was repaired by RD 3 under flood fight conditions. Restoration erosion repair has typically been performed by the Corps of Engineers as authorized under PL 84-99. Repair work under PL 84-99 was performed by the Corps of Engineers on Grand Island levees following the recent floods of 1986, 1997, 1998, and 2006. Erosion experienced in other years was repaired by RD 3.

Past floods have also required flood fighting by RD 3. This flooding fighting has consisted of seepage control and emergency erosion repair. Seepage control is critical in levee breach prevention. The levees and levee foundations of Grand Island are very porous and subject to flood water seeping through, and under, the levee. If left uncontrolled, this seepage could accelerate to the point that it has the force to move levee material. This phenomenon is called piping, or internal erosion of the levee. Once enough material is moved out of the levee section, a levee breach occurs.

Vulnerability to Flood

Assets/Critical Facilities at Risk

Flooding of Delta islands has the potential to negatively impact water quality both locally and statewide. The largest of California's drinking water sources is the Sacramento-San Joaquin Delta and its tributaries. The Delta provides water throughout the state via the State and Federal water projects. During a flood, there is a higher potential for the waters in the Delta to be exposed to chemicals, fuel, oil, and multiple other constituents of concern that can quickly degrade water quality. Flooding can also disturb soil and soil-borne materials such as mercury and organic matter that can degrade water quality. If the flood water rushing into a Grand Island levee breach is large enough in volume, the surge of water into the island will call saltwater to be pull from San Francisco Bay and into the Delta, thus impacting the water quality of the Delta and water users who export water out of the Delta.

Should a flood breach the levees, the entirety of the assets of RD 3 would be at risk. These assets include the small communities of Ryde and Walnut Grove. All of the RD 3 drain pumps would be flooded and therefore, RD 3 could not drain the flooded areas with their existing pumps; auxiliary pumps would have to be brought in.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

During high rainfall events, the drainage system is not capable to evacuate water from the interior of Grand Island without flooding some low lying properties. On properties that farm annual row crops, this is not a problem since crops are not normally planted until after the rainy season. However, winter wheat, perennial, or multi-year crops are susceptible to damage when water overflows the banks of the drain canals.

Past Occurrences

Stormwater flooding occurs every few years. In most years, it is not significant enough to be a problem. For the most part, past flooding has damaged alfalfa and winter wheat. However, in 2006 overbank flooding came very near to flooding homes along Highway 220 in Ryde. In addition, many acres of vineyards and orchards have been planted in the past few years, so it is anticipated that these recently planted permanent crops may be damaged by future canal bank flooding.

Vulnerability to Flood

Assets/Critical Facilities at Risk

As stated above, stormwater flooding has the potential to result in significant damage due to the increased acreage of permanent crops. In addition, residences in the lower elevations of Walnut Grove and Ryde are at risk.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, and possibly coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters

Past Occurrences

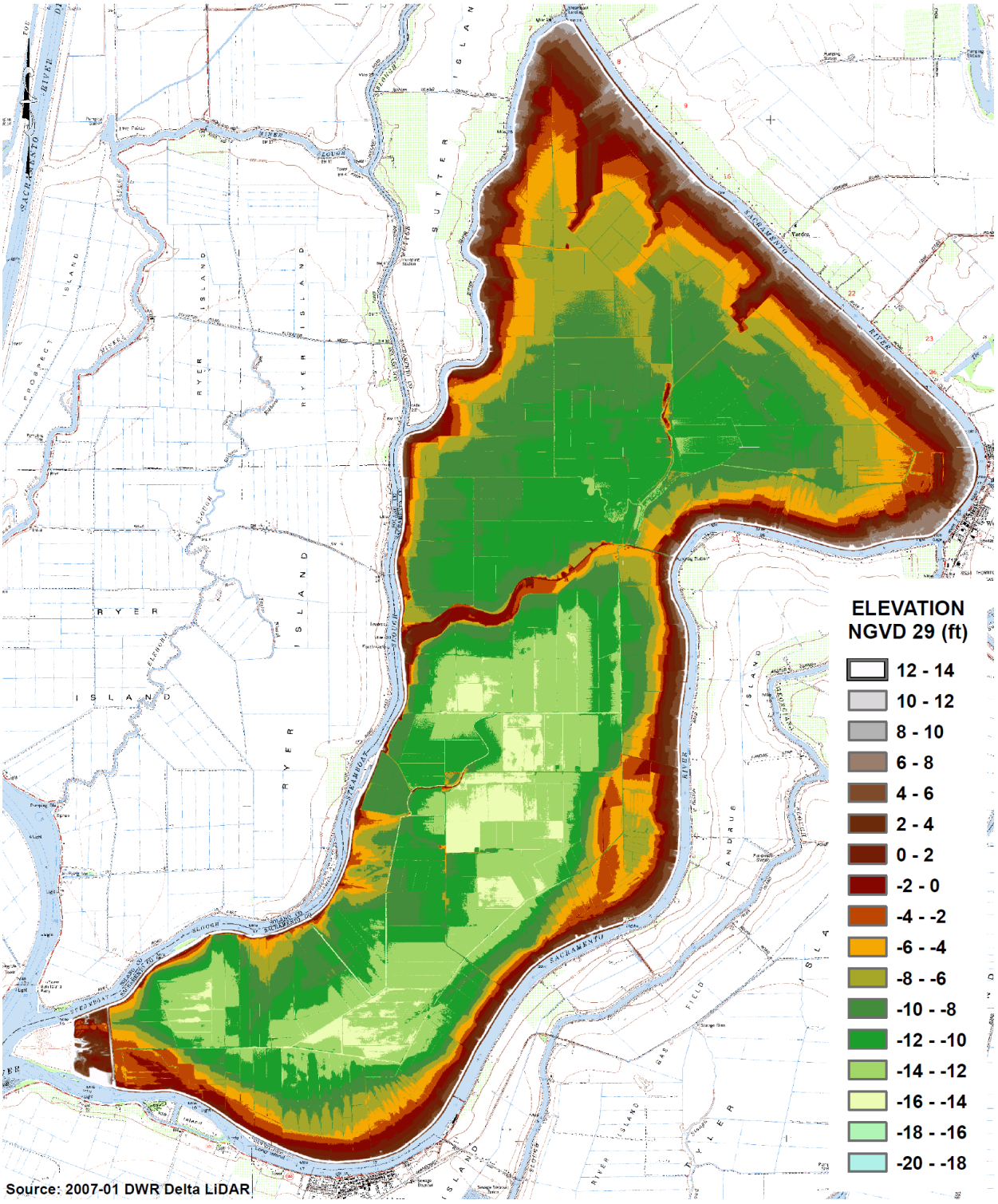
The RD 3 levees have not failed in over 100 years. Two floods over the past few decades (1986 & 1997) required extensive flood fighting by RD 3 forces in order to prevent a levee breach.

Vulnerability to Levee Failure

Assets/Critical Facilities at Risk

A levee failure would impact almost all the assets and critical facilities on Grand Island; including the small communities of Walnut Grove and Ryde. State Highways 160 and 220, as well as a number of county roads are at risk. Approximately 16,000 of agricultural land would be damaged and possibly rendered unfarmable for at least a year. There are many permanent crops on Grand Island, such as wine grapes, pears, apples and cherries that would be destroyed.

Figure 3-2 Elevation Map of Reclamation District 3



Source: Reclamation District 3

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800's, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

Past Occurrences

RD 3 experiences bank erosion essentially every year there is above normal precipitation. As part of the Corps of Engineers Sacramento River Flood Control Project, RD 3 erosion has been periodically repaired by the Corps of Engineers under PL84-99. In years when the Corps does not perform repair, RD 3 repairs the erosion with financial assistance from the state's Delta Levees Subventions Program. Since RD 3 has been recently deemed ineligible for PL84-99 assistance, the likelihood is that the Corps will not perform erosion repairs in the future.

Vulnerability to Erosion

Assets at Risk

Erosion by itself puts the levee and any structures on the levee at risk. These structures include irrigation and drainage systems, residential buildings, agricultural buildings, wildlife habitat, etc. If left unresolved, erosion would lead to a levee breach, imposing risk on all of the assets of Grand Island.

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the District. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

Although water surface elevation is a major factor to levee seepage and overtopping, severe weather can cause significant damage, such as erosion, that puts the integrity of the Grand Island levee system at risk.

Vulnerability to Heavy Rain and Storms

Assets at Risk

Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include erosion, flooding, pavement deterioration, washouts, landslide/mudslides, and downed trees. However, it is the secondary effects of heavy rain and storms that are of concern to RD 3. Heavy rains can cause flooding, levee failure, and stream bank erosion. Flooding, levee failure, and stream bank erosion can cost RD 3 millions in damages.

OTHER HAZARDS

Other hazards that affect RD 3 levees and the area they protect include earthquake and liquefaction. Although there has never been documented levee damage due to an earthquake, hypothetically damage can occur due to levee construction materials. The sands and gravels that comprise a large amount of the levee and its foundation are highly susceptible to liquefaction during an earthquake.

3.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

3.6.1. Regulatory Mitigation Capabilities

Table 3-4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 3.

Table 3-4 RD 3's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y/2011	Five-year plan consisting of levee stability, seepage control and maintenance projects.
Capital Improvements Plan	N	
Economic Development Plan	N	

Local Emergency Operations Plan	Y/2017	Through a state grant, Sacramento County is funding development of an Emergency Action Plan for RD 3. The plan will be complete in early 2017
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	Y/Ongoing	RD 3 is evaluating flooding of low areas and the need for improvements in it drainage system
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y	Annual routine maintenance plans and participation in the state Delta Levees Subventions Program which assists in funding levee maintenance. RD 3 is also drafting a Letter of Intent to draft a System-Wide Improvement Framework to respond to maintenance and rehabilitation issues brought up by the Corps of Engineers 2103 Periodic Inspection Report
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	Y	Erosion control measures on levee and canal slopes as necessary. Sediment removal from drainage system canals as necessary.
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 3

3.6.2. Administrative/Technical Mitigation Capabilities

Table 3-5 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 3.

Table 3-5 RD 3's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	RD 3 annually performs over $500,000 in maintenance. In addition, it periodically constructs projects to repair deficiencies in the levee such as a $1.5 million seepage berm constructed in 2014.
Mutual aid agreements	N	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y	David Robinson - District Manager
Community Planner	N	
Civil Engineer	Y	Gilbert Cosio and the staff at MBK Engineers has served as District Engineer for over 35 years and has participated in many flood fight actions.
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 3

3.6.3. Fiscal Mitigation Capabilities

Table 3-6 identifies financial tools or resources that the RD 3 could potentially use to help fund mitigation activities.

Table 3-6 RD 3's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	RD 3's annual assessment includes funding for future anticipated capital projects
Authority to levy taxes for specific purposes	Y	Yes, RD 3 modified its benefit assessment roll in 1996 and it provides authority and flexibility
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	RD 3 has the ability to levy special assessments
Incur debt through private activities	N	
Community Development Block Grant	Y	
Other federal funding programs		
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 3

3.6.4. Mitigation Education, Outreach, and Partnerships

Table 3-7 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 3-7 RD 3's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	RD 3 maintains a web page with appropriate information to educate the public
Natural disaster or safety related school programs	N	
StormReady certification	Y	The RD 3 manager, trustees, and District Engineer have been, or soon will be, trained in SEMS and NIMS
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

3.6.5. Other Mitigation Efforts

As stated previously, RD 3 modified its benefit assessment roll in 1996, adding a tremendous amount of flexibility, while still complying with Proposition 218 legal requirements. In addition, RD 3 has been a very active participant in the state's Delta Levee Subventions Program for about 20 years. These 2 factors have proven useful and have enabled RD 3 to react financially if a non-routine cost arises.

3.7 Mitigation Strategy

3.7.1. Mitigation Goals and Objectives

RD 3 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

3.7.2. Mitigation Actions

The planning team for RD 3 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Levee Improvements

Hazards Addressed: EQ, EQ Liquefaction, Flood: 100/200/500-year, Flood: Localized Stormwater Flooding, Levee Failure, River/Stream/Creek Bank Erosion, Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning), Severe Weather (Wind and Tornadoes)

Goals Addressed: 1, 3

Issue/Background: The goal of this Mitigation Action is to improve the Grand Island levees over the next five years to a level of protection that repairs current deficiencies as noted in the state's Flood System Repair Project, and correct issues noted in the 2013 Corps of Engineers Periodic Inspection Report.

Other Alternatives: None proposed at this time

Existing Planning Mechanisms through which Action will be Implemented:

Responsible Office: Reclamation District No. 3 as the local maintaining agency and the State of California Flood Protection Board as the local sponsor of the federal flood control project.

Priority (H, M, L): High

Cost Estimate: $15 million

Potential Funding: Delta Levee Subventions Project currently funded by Propositions 1, 1E and 84. The state flood control deferred maintenance program (2016), the state Flood System Repair Program.

Benefits (avoided Losses): Preservation of the protection of nearly 17,000 acres. Most of this property is farmed and thus a contributing factor to the local, state and national economy. The assets on Grand Island have been estimated to exceed $250 million 10 years ago, and therefore are much larger today.

Schedule: 1 – 10 years depending on the availability of funds

Delta Annex Chapter 4 Reclamation District 341

4.1 Introduction

This chapter of the Delta Annex details the hazard mitigation planning elements specific to the Reclamation District 341 (RD 341), a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the RD 341. This chapter of the Delta Annex provides additional information specific to RD 341, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

4.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 341 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 4-1. Additional details on plan participation and RD 341 representatives are included in Appendix A.

Table 4-1 RD 341 Planning Team

Name	Position/Title	How Participated
Robert C. Wagner, P.E.	District Engineer	Reviewed Draft Documents
Patrick W. Ervin, P.E.	Engineer	Attended Meetings, Drafted Text
Martin Berber	Staff Engineer	Collected Data, Reviewed Draft Documents

Source: RD 341

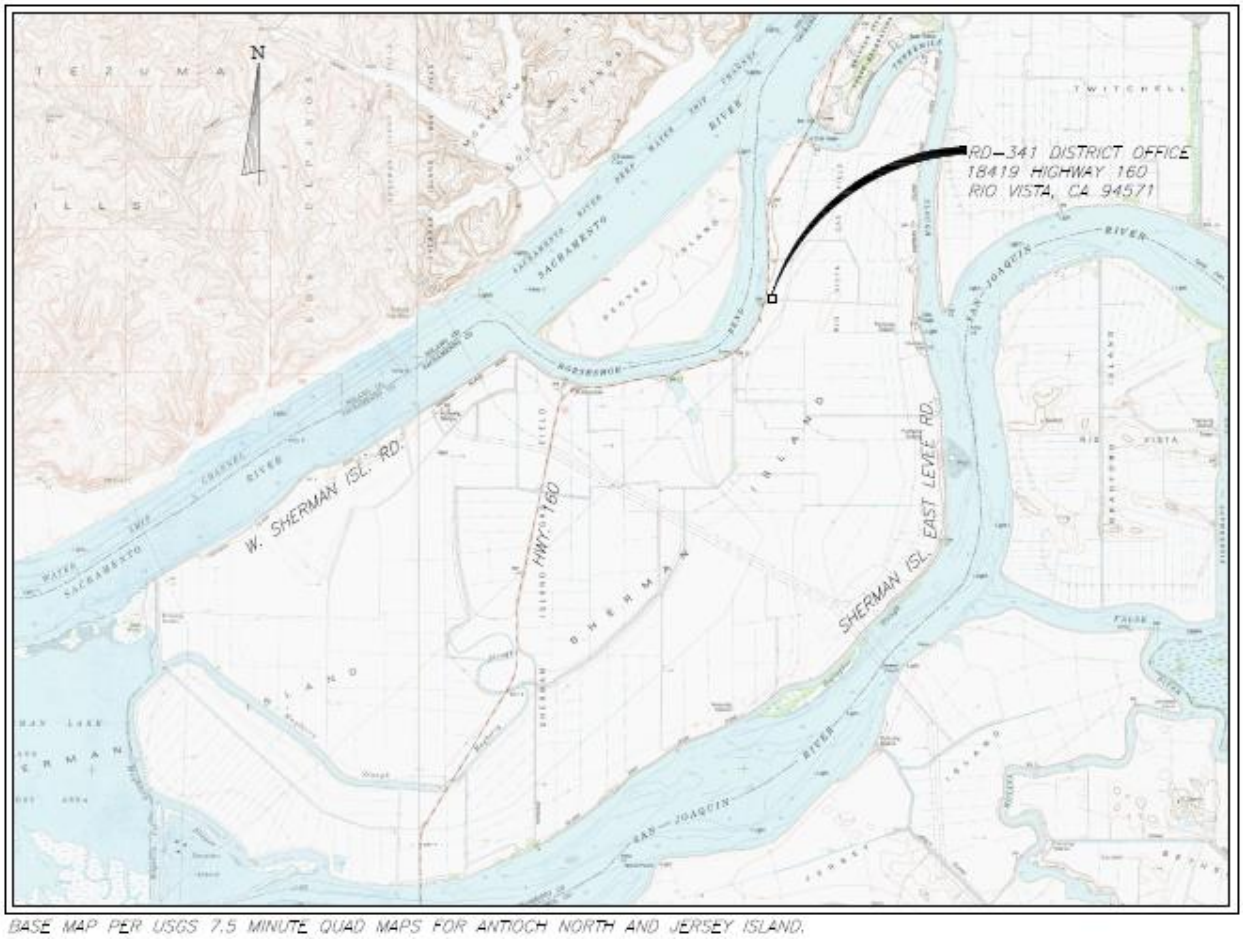
4.2.1. Coordination with Other District Planning Efforts

Coordination with other District planning efforts is paramount to the successful implementation of this plan. This section provides information on how the District integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. The District Planning Team noted that they didn't exactly implement the LHMP document into any planning mechanisms. The District did however complete projects that were part of our strategy to improving mitigation and have ongoing projects as well. For example, the Scour Lake habitat restoration project has been completed and the District is working on the long term maintenance plan for the habitat. The Fish Release Sites project has begun construction and is expected to last through December 2017. The District also already completed Phase 1 of SH-10-1.0 that is listed on the strategies for this updated document.

4.3 Community Profile

The community profile for RD 341 is detailed in the following sections. Figure 4-1 displays a map and the location of RD 341 boundaries within Sacramento County.

Figure 4-1 Reclamation District 341 Map



4.3.1. RD 341 Overview, Background, and History

In the Delta, for the last 5,000 years to the 1850s, relative sea-level rise was balanced by vertical marsh growth through biomass accumulation and sediment deposition. A transition from deposition of organic silt-clay to peat formation in the Delta largely reflects the decline in inundation frequency and the maturation of the marsh plain towards mean higher high water elevations. The resulting freshwater tidal marshes developed because a relatively large freshwater inflow compared to the size of the tidal prism sustained a low salinity, which supported highly productive organic peat formation through tule growth. The large roots of the tule created an organic fabric that supported and aided rapid vertical growth. The living surface was maintained within the intertidal zone (natural habitat), and marsh organic accretion (injection of roots and rhizomes, and incorporation of surface litter) was able to sustain vertical growth at

rates in excess of relative sea-level rise. The gradual accumulation of the organic and inorganic sediment must have also offset the loss and compaction of existing peat.

The development of today's Delta began in late 1850 when the Swamp and Overflow Land Act conveyed ownership of tall swamp and overflow land, including Delta marshes from the federal government to the State of California. Reclamation of Sherman Island began shortly thereafter, and by 1859, local property owners had constructed small peat levees of three to four feet in height, with a base width of about eight feet, along the banks of the Sacramento River and Mayberry Slough.

Today, Sherman Island is protected by approximately 18-miles of levee which encompass approximately 9,937 acres of land, according to the 1995 Sacramento Delta San Joaquin Atlas. Approximately 9 miles of levee are project levees, constructed by the US Army Corps of Engineers, and approximately 9 miles of levee are non-project levees. The entire levee system is maintained by RD 341. RD 341 maintains and operates five modern pumping stations on Sherman Island: three on the San Joaquin River (south) side; one on the Sacramento River (north) side; and one on Sherman Island's northwest corner. The pumps are part of a larger system of pumps, siphons irrigation ditches and canals used to circulate water and drain the Island.

4.4 Hazard Identification

RD 341's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 341 (see Table 4-2).

Table 4-2 RD 341—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards				
Bird Strike				
Climate Change				
Dam Failure				
Drought and Water Shortage				
Earthquake				
Earthquake: Liquefaction				
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding				
Landslides				
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Significant	Likely	Critical	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze				
Severe Weather: Extreme Temperatures – Heat				
Severe Weather: Fog				
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)				
Severe Weather: Wind and Tornadoes				
Subsidence				
Volcano				
Wildfire:(Burn Area/Smoke)				

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

4.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 341's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 341 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

4.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 4.5.3, includes a description as to how the hazard affects the RD 341 and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

4.5.2. Vulnerability Assessment

This section identifies RD 341's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 4-3 lists particular critical facilities and other District assets identified by the RD 341's planning team as important to protect in the event of a disaster. RD 341's physical assets, valued at over $12.7 million (without the value of the levees), consist of the buildings and infrastructure to support the RD 341 operations.

Table 4-3 RD 341's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Agricultural	High Potential Loss Facilities		$6,764,520	Flood, Levee Failure
Agricultural-Irrigated from District Facilities	High Potential Loss Facilities		$4,415,800	Flood, Levee Failure
Marina-Recreation	High Potential Loss Facilities		$16,530	Flood, Levee Failure
Urban	High Potential Loss Facilities		$87,700	Flood, Levee Failure
Commercial	High Potential Loss Facilities		$8,300	Flood, Levee Failure
Utilities (Including easements)	Transportation and Lifeline		$615,810	Flood, Levee Failure

Source: RD 341

The District Planning Team noted that "Replacement Value" in the table above isn't accurate. In reality, the true replacement of damages caused by a levee breach will be a far greater cost. Pumping cost to dewater the island would be very expensive, salt intrusion up the Sacramento River would cause serious water supply and agricultural problems, etc.

Natural Resources

The District Planning Team noted no notable natural resources exist in the District boundaries.

Historic and Cultural Resources

The District Planning Team noted no historic or cultural resources exist in the District boundaries.

Growth and Development Trends

Sherman Island has seen little to no growth since 2011. The State of California owns a large portion of the island, limiting potential development, and there are very few economic drivers on-island.

Development since the 2011 Plan

The RD has not seen an increase in their service area population since the 2011 plan.

4.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 4-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 341 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those

described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable structures are those located within the floodplain or within levee and dam inundation areas, such as older facilities that may be constructed with unreinforced masonry and buildings built prior to the introduction of modern building codes. Buildings that contain electronic or electrically operated equipment are also vulnerable to flood inundation.

In general, the most vulnerable District assets include the levees and supporting structures that the District owns.

An estimate of the vulnerability of the RD 341 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Flood: 100-/200-/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Through discussion of the visual inspections, the District Board members, District superintendent and District engineer have determined that Sherman Island levees are most vulnerable to failure cause by flooding.

Past Occurrences

The first significant flooding affecting Sherman Island agriculture occurred during the 1861/62 season and caused wide-spread damage throughout the delta's river islands, and Sherman Island farmers lost most of their livestock as a result when the Sacramento River breached the low levees constructed along its banks. After completion of the levee system in 1869, Sherman Island suffered several floods. Sherman Island levees failed during the winters of 1871/72, 1874/75, 1876, and 1878. Several crevasses cut through the north and south levees west of Mayberry Slough in the 1874 levee failure, resulting in the loss of all but 100 acres of cropland in the western portion of the island. The subsequent levee reconstruction featured a

12-foot high peat levee with 120 feet widths at the base. Even so, the 1876 flood covered the western portion of the island again. The flood of 1878 devastated the entire island.

Subsequent levee breaks on the San Joaquin River submerged most of the land and Sherman Island's 700 inhabitants fled to higher ground. The beleaguered reclamation districts were faced with underwriting thousands of dollars in assessments to replace most of the levee system. Landowners regrouped, and in March 1878, Reclamation District 252 formed out of a portion of RD 54. Sherman Island landowners reorganized again, and RD 54 and RD 252 combined to form Reclamation District No. 341 (RD 341) on June 17, 1879. Although reclamation efforts continued in RD 50 west of Mayberry Slough for several years after the 1879 floods, landowners eventually dropped reclamation efforts, and after the land flooded during the 1940s, ownership of the land reverted to the State for taxes.

By spring 1880, most of the new RD 341 was again under cultivation until high waters collapsed levee sections again in August later that year. Although an assessment of $13,141 was made for levee repair following the 1880 break, most of the land remained under water until 1894 when reclamation efforts were renewed.

In 1894, RD 341 encompassed 10,303.71 acres of land east of Mayberry Slough and the 3,000-foot cross-levee between Sacramento River and Mayberry Slough. The Sacramento and San Joaquin rivers are connected by Threemile Slough, which forms the eastern and northern boundary of the Island. The district included 24.76 miles of levee, much of it at the time destroyed by previous floods. At the time, much of Sherman Island had been underwater for fifteen years. Although some stretches of levee were intact, much of the levee had had sunk to the ground level of the island or below. The Horse Shoe Bend area of the Sacramento River had several breaks; one about 500 feet in width, with resulting scar holes measuring about 75 feet deep. The San Joaquin River levees on the south side of the island were essentially destroyed from Gallagher Slough, near the modern day location of Eddo's Resort, to the mouth of Mayberry Slough.

During the first decade of the twentieth century, RD 341 conducted frequent levee upgrading and restoration projects on Sherman Island. RD 341 leased four dredges in 1900 that worked in tandem around Sherman Island. Flooding occurred in some section of the Delta almost annually during the period from 1900 to 1910, and serious levee breaks and major flooding of RD 341 occurred during 1904 when a crevasse opened on Mayberry Slough, and in 1906 and 1909, when water again inundated the island. RD 341 trustees contracted with Franks Dredging Company for levee construction and repair work between 1908 and 1920.

The southern levee on the San Joaquin River side failed and flooded the Island on January 20, 1969 at approximate levee station 520+00. Upon finding the break, a large quantity of rock was placed on the upstream and downstream ends of the levee to protect against further erosion from high velocities into and out of the break due to tide. Without placement of the rock, the break which was approximately 275 feet wide and about 45 feet below mean sea level, would have been greatly enlarged. After the break, the water inside the island and in the San Joaquin River was at the same level. The flooding created a deep hole in the channel on the waterside and a deep lake on the landside toe of the levee at the site of the break. Pumps to dewater the Island were rented (District pumps were entirely submerged). Pumping with the rented equipment commenced February 28, 1969 and continued through August 9, 1969, at which point District pumps continued to remove the remaining water from the Island. All 93,000 feet of District drainage ditches were cleaned and/or excavated, primarily by drag line and ditcher operations before District ditches

were operable. The Corps of Engineers spent approximately $600,000 in emergency funds to repair, reslope, and regrade the levee break area after the 1969 break. Seepage and settlement in the area of the break have been ongoing issues requiring constant levee improvements.

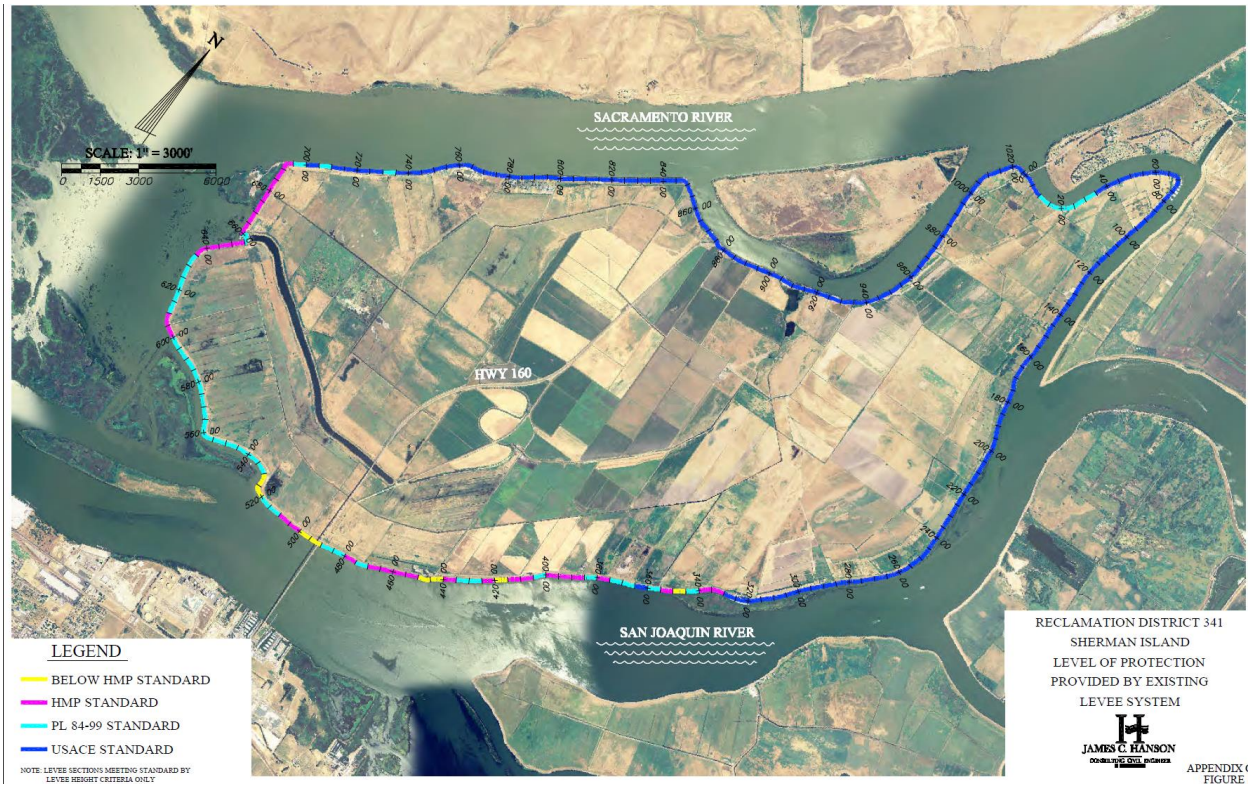
Vulnerability to Flood

Assets at Risk

Should a high water flood event cause levees to collapse, Sherman Island would be fully inundated, risking the $12.7 million in district assets discussed in Table 4-2.

Areas of the existing levee system most susceptible to overtopping are those which do not meet the PL 84-99 height standard. An inventory of levee sections and their respective heights is maintained by the District. Analysis of this inventory shows that the levee along the San Joaquin River from about levee station 330+00 to 450+00, the Sacramento River from about 720+00 to 750+00 and Three Mile Slough from about 20+00 to 40+00 contains stretches which are below the PL 84-99 height standard (1.5 feet above 1:100 year flood event) and therefore are susceptible to overtopping. Figure 4-2 depicts levee flood protection levels for each individual section of the Sherman Island levees.

Figure 4-2 Level of Levee Flood Protection in Reclamation District 341



Source: Reclamation District 341 Five Year Plan (2009)

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and can protect against floods. The District Planning Team noted that the State of California has purchased the majority of the land on Sherman Island over the last several years with the intent of not developing the island. It's leased as grazing land or being converted back to natural habitat.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters

Past Occurrences

See the flood section of this document for a history of flooding and levee failure.

Vulnerability to Levee Failure

Assets at Risk

In addition to the costs incurred to repair or replace the assets destroyed by Sherman Island levee failure, an immediate cost would be pumping out the Island. To estimate the cost of restoring Sherman Island, the 2004 failure of the Upper Jones Tract was considered, an Island of 6,259 acres which cost approximately $120 million to restore. This equates to about $19,100 per acre, and assuming inflation of 4% a year, would be about $22,200 in 2009. Accordingly, it would cost approximately $221 million to pump out and restore Sherman Island (9,937 acres X $22,200 per/acre). This estimate is conservative in that it does not account for the elevations on the interior of Sherman Island, which are up to 20 feet below sea level. Sherman will likely impound a greater volume of water per acre than Upper Jones Tract, and per acre restoration costs will therefore be greater.

Electrical Infrastructure Affected

In addition to the dewatering costs, three major electric transmission lines (greater then 500kV) cross Sherman Island: the California Oregon Transmission Project, operated by the Western Area Power Administration, the Pacific Gas and Electric Company (PG&E) Table Mountain-Tesla line, and the PG&E Vaca-Dixon-Tesla line. These lines work mainly to interconnect California loads and generation with loads and generation in the Pacific Northwest. The three lines through the Delta are operated as a coordinated grouping, with maximum imports or exports limited to provide some joint redundancy to help ensure reliability.

The combined load on these three lines is typically around 4,000 MW, though under some circumstances it can be as high as 4,800 MW (Mirzadeh 2006). This is approximately ten percent of statewide summer loads, which is less than the required planning reserve margin of 15 percent. However, other outages may occur at the same time as this disruption, so under some circumstances the loss of all three lines due to the failure of the Sherman Island levee system could cause operating problems.

PG&E also operates two other lines with less than 500kV capacity to provide local service to Sherman Island and nearby Delta Islands. Failure of the Sherman Island levee system would impact the ability of PG&E to serve the local delta community. The DRMS report estimates the cost of a two-month outage of two 500 kV lines to be $42,000,000, which equates to $46,300,000 in 2016 dollars.

Oil and Gas Production Affected

Sherman Island has 60 natural gas and oil wells, and approximately 1,082 acres of gas and oil production fields. In addition, the levees protect 145,514 feet of a natural gas pipeline which originates in Canada and crosses Sherman Island. Failure of the Sherman Island levee system would interrupt gas service through the pipeline and gas production and storage occurring on Sherman Island.

Civil Infrastructure Affected

Sherman Island levees also protect State Highway 160 and the drawbridge at Three Mile Slough. State Route 160 connects Sherman Island to the mainland Sacramento County on the northeast corner via

Threemile Slough Bridge (Bridge 24-0121), and to Contra Costa County on the island's west side, via the Antioch Bridge (Bridge 28-0009). Failure of the Sherman Island levee system and resulting loss of State Route 160 and access to the Antioch Bridge would severely impact truck and vehicular traffic relying on this roadway. The Sherman Island Five Year Plan (2009) estimated that the closure of State Highway 160 would cost approximately $70,000 per day.

Sherman Island levees also provide a public benefit by maintaining water quality and water supply reliability for cities and farms in the San Francisco Bay area, San Joaquin Valley, and Southern California. Sherman Island is situated where fresh river water and salty bay water meet and mix. Under typical summer salinity conditions in the lower Sacramento River, salinity rises sharply in the area of Sherman Island. Consequently, the island's levees are critical to controlling salinity intrusion to the interior Delta. A levee break would increase the rate and area of mixing and would allow the saline bay water to move further upstream, jeopardizing the fresh water supply taken from the Delta for the Central Valley Project water supply, the State Water Project and the Contra Costa intake.

The presence of the western Delta islands, Sherman Island in particular, is believed to effectively inhibit the inland migration of the salinity interface between the Bay and Delta. If Sherman Island were to become permanently inundated with saline water, the water available to the massive pumping facilities near the Clifton Court Forebay might become too saline to use. The timing of levee breaks and flooding is critical in this regard. Fortunately, most flooding occurs in winter and spring, when major saltwater intrusion is less likely. However, there are occasional levee failures under low-flow conditions. These failures can cause major short-term water-quality problems, even if the flooded areas are later reclaimed. During one such incident, which occurred in summer of 1972, the Andrus Island levee failed, flooding an area slightly larger than Sherman Island. Salt concentrations in the central and western Delta quickly showed an increase up to six hundred percent. It took a large volume of extra reservoir releases to flush the salty water from the west Delta. The Andrus Island levee break may also have been a contributing factor in high mortality of juvenile bass that year. Similar impact could occur if one of Sherman Island's levees were to fail under low flow conditions.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards. The District Planning Team noted that the State of California has purchased the majority of the land on Sherman Island over the last several years with the intent of not developing the island. It's leased as grazing land or being converted back to natural habitat.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers

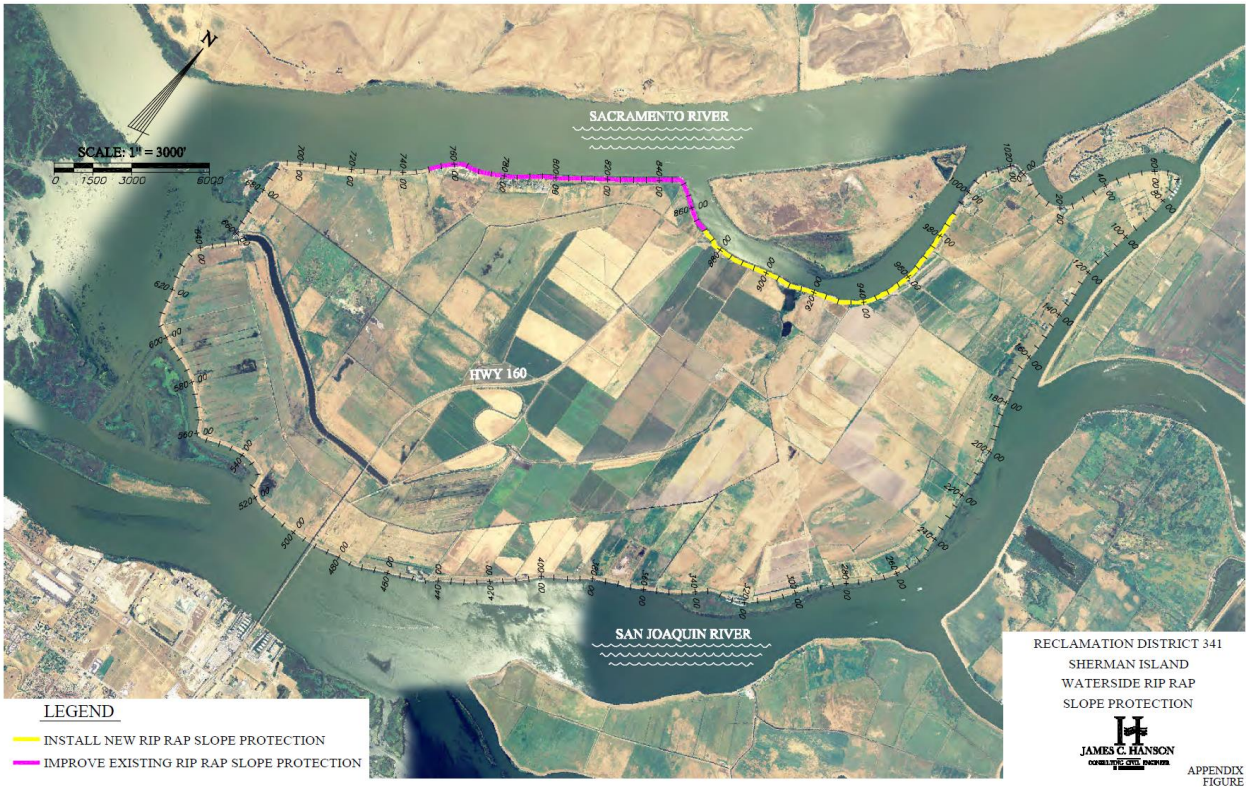
settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

Due to the public benefit provided by Sherman Island levees and the valuable local and non-local assets they protect, District employees conduct visual inspections of the Sherman Island levee system every day of the year. In addition, the superintendent, Board president and District engineer survey the levee a minimum of twice a month and participate in an annual inspection of the levee from the waterside. These inspections are invaluable for identifying issues such as seepage, cracking, erosion and lack of splash cap and riprap.

Past Occurrences

According to the District's Five Year Plan, levee erosion is an ongoing problem. Areas of the existing levee system most susceptible to failure due to flooding resulting from erosion are those areas with inadequate riprap protection. The large expanse of waterway of the Sacramento River adjacent to Sherman Island provides the necessary distance, or fetch, when accompanied by high winds can produce large waves. The existing rip rap protection lacks the required coverage of the waterside slope to protect the levee from wind generated waves. The existing large breakwater quarry stones and limited amount of rip rap are below the high tide level of the Sacramento River exposing the unprotected levee embankment material to wind generated erosion damage. High winds originating from the north during periods of high tide and/or high storm runoff will seriously erode the unprotected levee slope. Accordingly, the District feels that the lack of riprap slope protection is a critical issue which could affect the stability of the levee, should erosion damage occur.

Figure 4-3 Erosion Sites in Reclamation District 341 Levees



Source: RD 341 Five Year Plan (2009)

The District Planning Team noted that erosion is an ongoing issue, with varying levels of erosion occurring every year.

Vulnerability to Erosion

Assets at Risk

The entirety of the levee system in RD 341 is at risk to erosion.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and are protected from erosion. The District Planning Team noted that the State of California has purchased the majority of the land on Sherman Island over the last several years with the intent of not developing the island. It's leased as grazing land or being converted back to natural habitat.

4.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections:

regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

4.6.1. Regulatory Mitigation Capabilities

Table 4-4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 341.

Table 4-4 RD 341's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	N	
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y	5-year plan, California DWR Emergency Safety Plan
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	

Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	Y	Erosion control measures on levee and canal slopes as necessary
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 341

4.6.2. Administrative/Technical Mitigation Capabilities

Table 4-5 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 341.

Table 4-5 RD 341's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	
Mutual aid agreements	N	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	
Civil Engineer	Y	
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	

Other
How can these capabilities be expanded and improved to reduce risk?

Source: RD 341

4.6.3. Fiscal Mitigation Capabilities

Table 4-6 identifies financial tools or resources that the RD 341 could potentially use to help fund mitigation activities.

Table 4-6 RD 341's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	N	
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	Y	
Other federal funding programs		
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 341

4.6.4. Mitigation Education, Outreach, and Partnerships

Table 4-7 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 4-7 RD 341's Mitigation Education, Outreach, and Partnerships

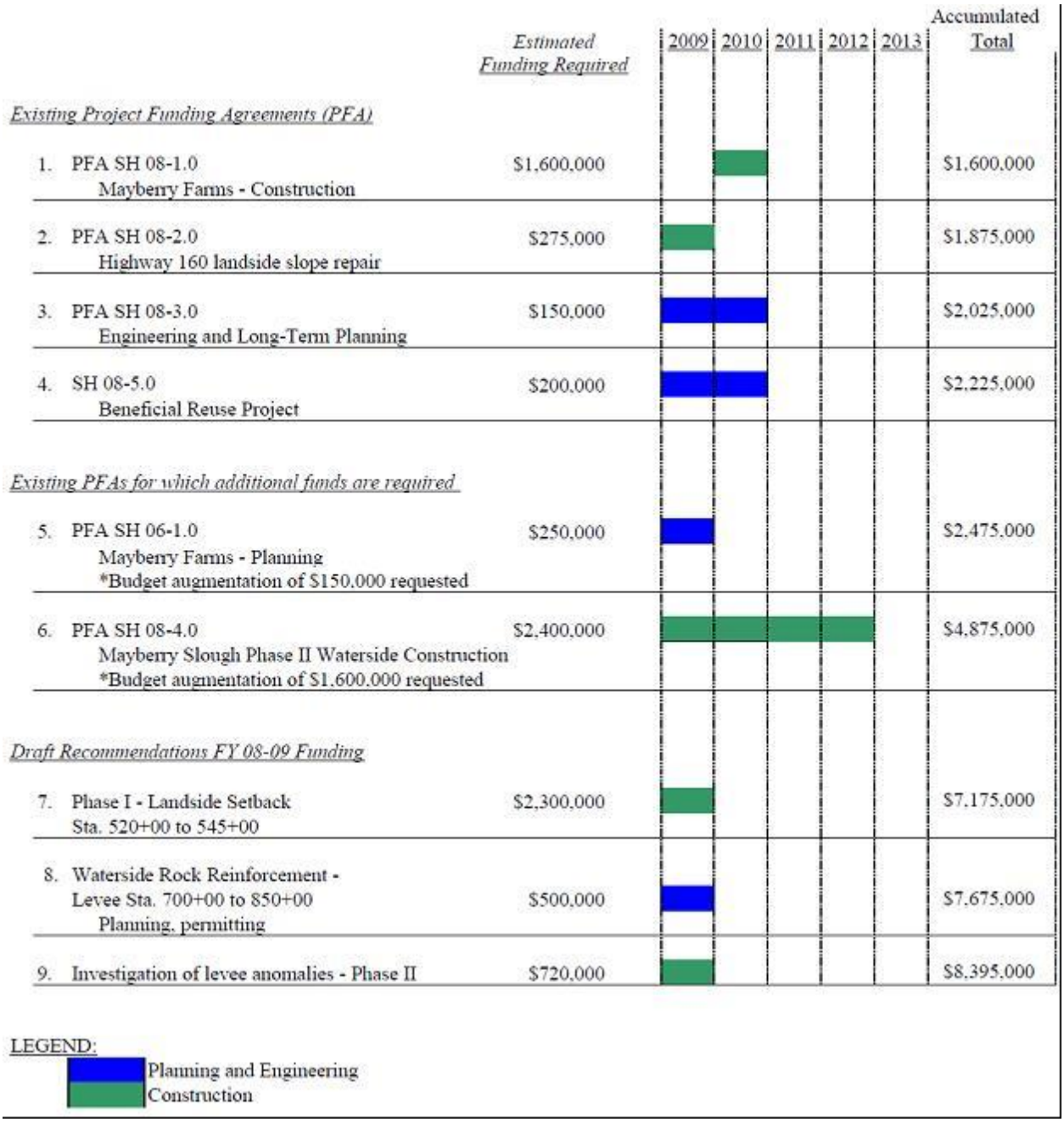
Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

4.6.5. Other Mitigation Efforts

RD 341 has completed the Scour Pond Habitat Enhancement and Levee Stability Project, Mayberry Farms Construction, both part of the District's Five Year Plan. The District has also continued its Levee Stability Monitoring Program.

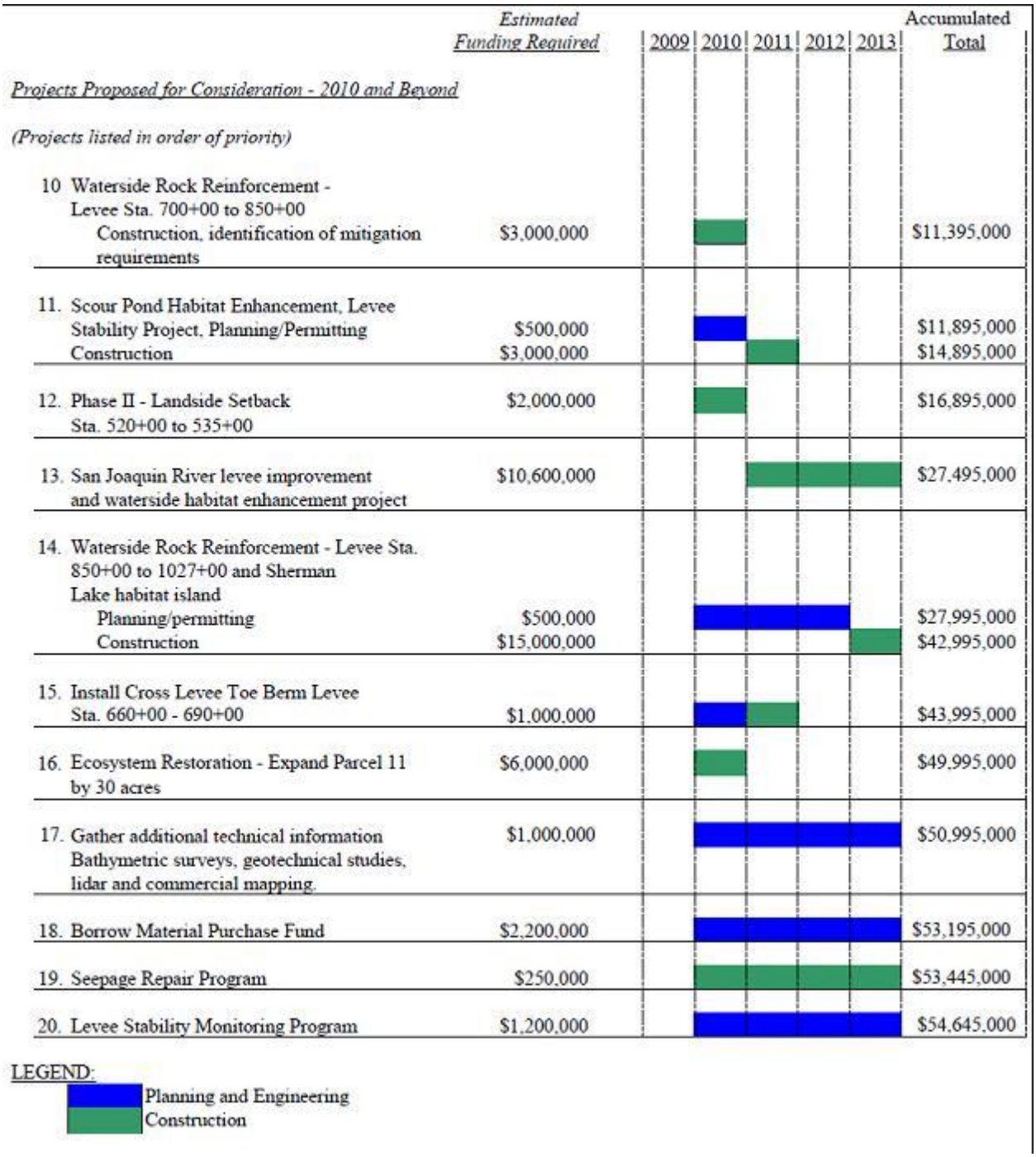
The Reclamation District 341 5 Year Plan (2009) lists may mitigation projects and efforts. These are shown in Figure 4-4 and Figure 4-5.

Figure 4-4 Reclamation District 341 Strategy to Meet Desired Levels of Protection



Source: RD 341 Five Year Plan (2009)

Figure 4-5 Reclamation District 341 Strategy to Meet Desired Levels of Protection (cont.)



	Estimated Funding Required	2009	2010	2011	2012	2013	Accumulated Total
Projects Proposed for Consideration - 2010 and Beyond							
(Projects listed in order of priority)							
10 Waterside Rock Reinforcement - Levee Sta. 700+00 to 850+00 Construction, identification of mitigation requirements	$3,000,000						$11,395,000
11. Scour Pond Habitat Enhancement, Levee Stability Project, Planning/Permitting	$500,000						$11,895,000
Construction	$3,000,000						$14,895,000
12. Phase II - Landside Setback Sta. 520+00 to 535+00	$2,000,000						$16,895,000
13. San Joaquin River levee improvement and waterside habitat enhancement project	$10,600,000						$27,495,000
14. Waterside Rock Reinforcement - Levee Sta. 850+00 to 1027+00 and Sherman Lake habitat island Planning/permitting	$500,000						$27,995,000
Construction	$15,000,000						$42,995,000
15. Install Cross Levee Toe Berm Levee Sta. 660+00 - 690+00	$1,000,000						$43,995,000
16. Ecosystem Restoration - Expand Parcel 11 by 30 acres	$6,000,000						$49,995,000
17. Gather additional technical information Bathymetric surveys, geotechnical studies, lidar and commercial mapping.	$1,000,000						$50,995,000
18. Borrow Material Purchase Fund	$2,200,000						$53,195,000
19. Seepage Repair Program	$250,000						$53,445,000
20. Levee Stability Monitoring Program	$1,200,000						$54,645,000

Source: RD 341 Five Year Plan (2009)

4.7 Mitigation Strategy

4.7.1. Mitigation Goals and Objectives

RD 341 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

4.7.2. Mitigation Actions

The planning team for RD 341 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. San Joaquin River Setback Levee/Habitat Bench Multi-Benefit Project, Phase 1

Hazards Addressed: Levee Failure / Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The existing levees on Sherman Island were constructed approximately 100 years ago, using sandy soil dredged out of the river. The construction of these historic levees were not engineered to modern standards and did not include concerted compaction efforts nor did it include screening out granular soils for the more preferred fine-grained soils. Historic boring logs show the levees to be comprised of sandy material over an organic silty/clayey foundation. Additionally, the levees were constructed adjacent to the river bank, limiting riparian and riverine habitat. Since the levees were constructed of sandy material and directly adjacent to the river, they are highly susceptible to seepage, erosion, and stability failures.

The setback levee will be designed and constructed to meet the minimum U.S. Army Corps of Engineers (USACE) Standard along with a 28-foot crest, 2H:1V waterside slope, 4H:1V landside slope. Prior to Project design, geotechnical investigations including borings and strength parameters will be performed to develop design criteria. The 28-foot crest will support a road built to required Sacramento County rural road standards which includes 12-foot travel lanes in each direction along with 2-foot shoulders.

Other Alternatives: None

Existing Planning Mechanisms through which Action will be Implemented: Delta Levees Program 2016 Projects Solicitation Package for Multi-Benefit Projects

Responsible Office: RD 341, RD 341 Engineer, California Department of Water Resources Delta Levees Program

Priority (H, M, L): High

Cost Estimate: $10,070,000

Potential Funding: Delta Levees Program

Benefits (avoided Losses): The Delta Risk Management Strategy (DRMS) July 16, 2008 Risk Analysis Report indicates that the Sherman Island levee system protects approximately $11,500,000 in local assets. Adjusted for inflation, the system currently protects $12,700,000 in local assets.

The levees also protect non-local assets which provide public benefit. Facilities which would be impacted by the failure of the levee system protecting Sherman Island are State Route 160, the water delivery systems for the State Water Project and the Central Valley Water Project, and utilities such as natural gas and major transmissions lines. The levee system also provides access to recreational resources such as fishing, windsurfing, and Sherman Island County Park. The proposed Project bolsters the Sherman Island levee system, thus providing benefit to local and non-local assets. In addition, Sherman Island is home to approximately 250 permanent residents. Levee system integrity protects the safety of these individuals and their property.

Schedule: Landside construction would occur during the 2018 construction season while awaiting issuance of the regularity permits. Waterside construction would occur during the 2019 construction season.

Action 2. Complete Projects from Regional Flood Management Plan

Hazards Addressed: Levee Failure, Flooding, Streambank Erosion

Goals Addressed: 1, 2, 3, 4

Issue/Background: Sherman Island has similar issues to the other communities in the region. Its primary issues however, are related maintenance activities.

Project Description: There are four erosion sites along the Sacramento River identified in the FSRP. These erosion sites can be improved through the construction of a bank protection project along Cache Slough. The project will rehabilitate the waterside bank from levee mile 4.12 and 6.09, a total rehabilitated length of 1,994 feet.

Other Alternatives: None

Existing Planning Mechanisms through which Action will be Implemented: Regional Flood Management Plan

Responsible Office: RD 341, RD 341 Engineer

Priority (H, M, L): High

Cost Estimate: $2,261,136

Potential Funding: Cal DWR Grant

Benefits (avoided Losses):

Schedule: As soon as funds are available.

Delta Annex Chapter 5 Reclamation District 369

5.1 Introduction

This new chapter to the Delta Annex details the hazard mitigation planning elements specific to the Reclamation District 369 (RD 369), a new 2016 participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by RD 369. This chapter of the Delta Annex provides additional information specific to RD 369, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

5.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 369 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 5-1. Additional details on plan participation and RD 369 representatives are included in Appendix A.

Table 5-1 RD 369 Planning Team

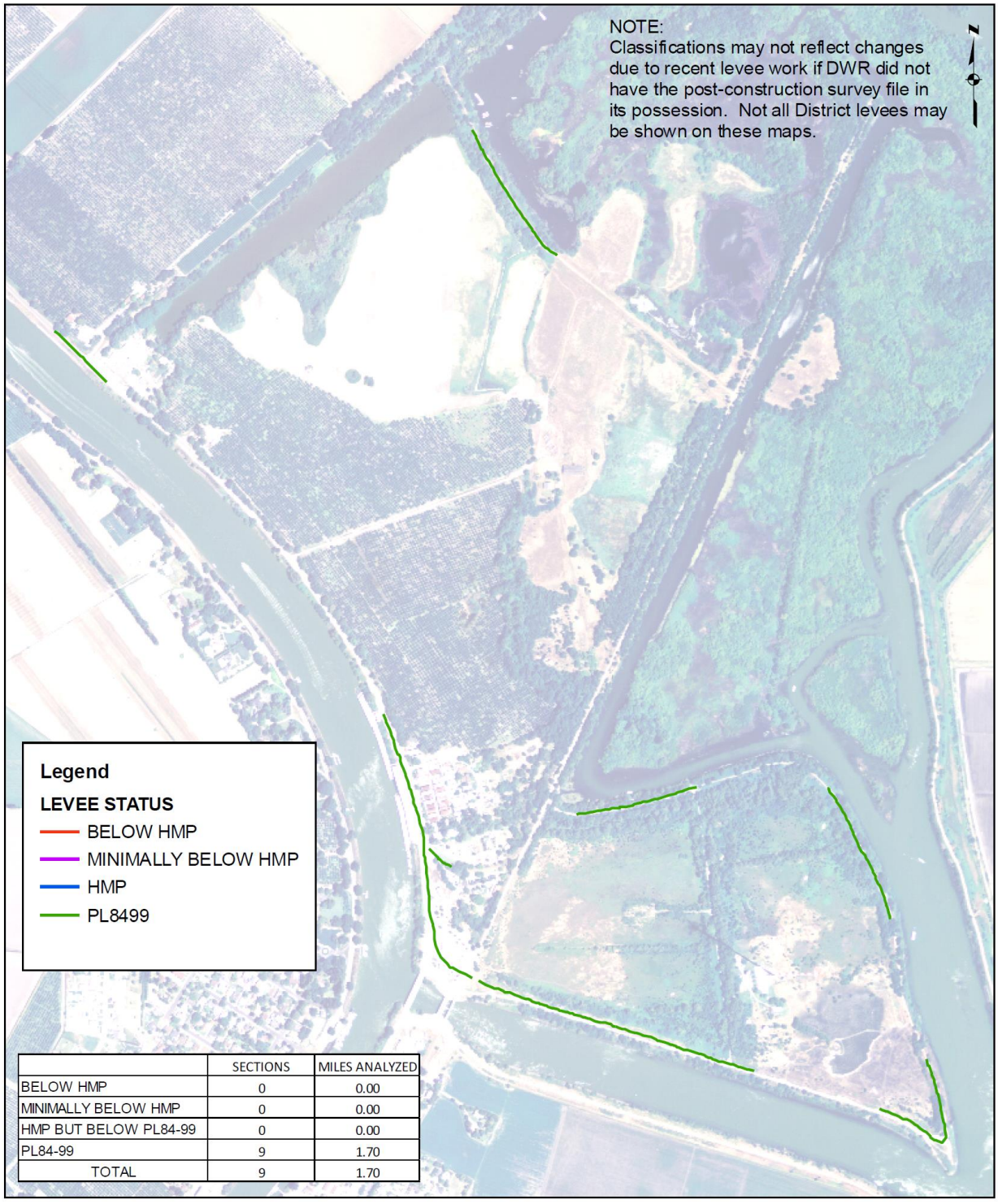
Name	Position/Title	How Participated
Clarence Chu	Landowner/Locke Town Board	Attended meetings, provided data and information, reviewed draft documents
Jeanine Foster	Foster Morrison Consulting, Principal	Interviewed Mr. Chu, developed Annex drafts, coordinated meeting attendance and input on draft documents with Mr. Chu
Chris Ferrari	GEI Consultants, Senior Engineer	Interviewed Mr. Chu for related ESP project, provided input to Annex, including text and maps

Source: RD 369/FM

5.3 Community Profile

The community profile for RD 369 is detailed in the following sections. Figure 5-1 displays a map and the location of RD 369 boundaries within Sacramento County.

Figure 5-1 Reclamation District 369 Map



Source: RD 369

5.3.1. RD 369 Overview

Reclamation District No. 369 (RD 369), also known as Libby McNeil, is located in the Northern Delta, near the town of Walnut Grove and the Delta Cross Channel to the South, route 160 and the Sacramento River to the west, Snodgrass Slough to the east, and the Meadows waterway to the North.

The town of Locke is south on the edge of RD 369 border. The District staff consists of a landowner and a journey worker. The District is responsible for maintenance, repair, and improvements of Snodgrass Slough and Meadow Slough levees; Maintenance Area 9 (MA-9) is responsible for the levee maintenance, repair, and improvements along the left bank of the Sacramento River protecting the land under the District jurisdiction. Maintenance Areas take over in providing the maintenance on federal flood control levees. MA-9 is the only flood control Maintenance Area in the Sacramento County which the CVFPB governs. The district is also responsible for the drainage system providing flood protection. Additionally, the District maintains canals and ditches that provide drainage to the property owners. The levees protect about 586 acres of predominantly agricultural land from flooding; the primary orchard grown on the island is pear; there is also irrigated pasture for cattle and goats. According to the 2000 census, there are 20 households and with a population of 52 people. The island's current assets are estimated to be worth about $19.3 million.

According to Mr. Chu, the leveed area under the jurisdiction of RD 369 includes an approximate one mile stretch on the Sacramento River side, and a smaller area to the east of the District. RD 369's primary responsibility is to maintain the vegetation along the levee. This consists of using goats to eat down the vegetation and a semi-annual spraying. Cal DWR provides inspections to ensure adequate maintenance of vegetative areas.

5.3.2. District History and Background

Mr Clarence Chu, purchased the original 490 acres which housed the Town of Locke and RD 369 in the 1977 from the Locke heirs. Since then, approximately 200 acres was sold to the state for use as the Delta Meadows State Park and another 10 acres comprising the Lock Townsite was sold in 2002 to the Sacramento County Housing and Redevelopment Agency, which later sold the land back to the existing townsite building owners. Mr. Chu currently owns an approximate 280 acres which is primarily used for agricultural purposes, some of which is orchards, farmed by himself and some leased out for farming by others.

The Town of Locke, now the Locke Historic District, was built in 1915 by Chinese immigrants from Heungshan County in Guangdong Province, China. The Locke Historic District is the largest, most complete example of a rural, agricultural Chinese American community in the United States.

5.4 Hazard Identification

RD 369's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 369 (see Table 5-2).

Table 5-2 RD 369—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Significant	Highly Likely	Critical	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Extensive	Likely	Limited	Low
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Extensive	Occasional	Critical	Medium
Earthquake	Extensive	Occasional	Limited	Low
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium
Flood: 100/200/500-year	Extensive	Occasional/Unlikely	Catastrophic	High
Flood: Localized Stormwater Flooding	Significant	Occasional	Limited	Low
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Extensive	Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Significant	Highly Likely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Negligible	Low
Severe Weather: Fog	Extensive	Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Critical	Medium
Severe Weather: Wind and Tornadoes	Extensive	Likely	Limited	Medium
Subsidence	Extensive	Occasional	Limited	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Significant	Likely	Critical	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

5.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 369's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 369 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

5.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 5.5.3, includes a description as to how the hazard affects RD 369 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

5.5.2. Vulnerability Assessment

This section identifies RD 369's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 5-3 lists particular critical facilities and other District assets identified by RD 369's planning team as important to protect in the event of a disaster. RD 369's physical assets consist of the buildings and infrastructure to support RD 369 operations.

Table 5-3 RD 369's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Locke Ranch Ag Buildings and Infrastructure			$300K	Most structures built on high ground

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
3 pumps (drinking water, water from river, water to river)			Unknown	
Locke Property Orchards and Open Farmlands			Unknown	
Assets owned by others				
Levees			Unknown	
Locke Town Assets: Residential and Commercial Buildings			$1M	

Source: RD 369

Natural Resources

According to the 2014 Lower Sacramento/Delta North Regional Flood Management Plan, this Region, which included RD 369, has significant natural resources such as: aquatic habitats, wetlands, riparian habitats, and wildlife foraging areas. Many of the more than 500 species of native plants and wildlife found in the Central Valley rely, to some extent, on habitat existing within the Region. Examples include the remnant riparian vegetation located along the banks of the Sacramento and American rivers, and along the tributaries of these major rivers. Agricultural areas within the Region also provide valuable habitat including wintering waterfowl within flooded rice fields and Swainson's hawk foraging habitat within alfalfa fields.

Also, within RD 369, the State of California operates the approximately 200 acre Delta Meadows State Park which contains valuable natural and habitat areas essential for many plant and wildlife species.

Historic and Cultural Resources

The Locke Historic District, which is comprised of the Town of Locke, was listed on the National Register of Historic Places on May 6,1971 and was further designated a National Historic Landmark District on December 14, 1990 due to its unique example of a historic Chinese American rural community.

Growth and Development Trends

From its purchase in 1977, RD 369 was predominantly owned by one landowner, until its sell of the Town of Lock to the County in 2002 and its sale of approximately 200 acres to the State for the Delta Meadows State Park. The Town was later sold by the County to the residents that had been living in the town. . Due to Lock's designation as a historic district, new development is not allowed. The District Planning Team notes that there has been no growth and/or development in the District in recent years with no planned development in the near future.

5.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 5-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 369 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable District assets include the pump stations that the District owns. Other important assets include the Town of Locke and the agricultural lands and structures.

An estimate of the vulnerability of RD 369 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Drought and Water Supply

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Severe and extended drought conditions could impact irrigation for agricultural operations which could affect the District's ability to finance the ongoing maintenance of District Levees. The residents and businesses could be impacted by drought but it is unlikely due to senior water rights and a prioritization system that puts municipal water at a higher priority than agriculture.

Past Occurrences

Although California did recently experience an extended drought, agriculture in this District remained largely unaffected due to senior water rights and riparian water rights. The District Planning Team also noted that even with recent drought conditions, no water conservation restrictions were implemented; water supply within the District has remained constant.

Vulnerability to Drought and Water Supply

Assets/Critical Facilities at Risk

The agricultural operations and orchards are at risk to a prolonged drought; however as mentioned water supply for all uses has not been an issue in the District

Natural Resources at Risk

All natural resources could be affected by severe drought conditions. Extended droughts can destroy habitat areas within the District.

Historic and Cultural Resources at Risk

The residents and businesses of the Locke Historic District is at potentially at risk to extended drought conditions. However, it is unlikely due to senior water rights and a prioritization system that puts municipal water at a higher priority than agriculture.

Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

Earthquake Liquefaction

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicenter location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per

second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

In the event an earthquake is intense enough to result in shaking that could cause the sandy soils to liquefy, the levees could resettle, move off their foundations and possibly fail. Failure could compromise the levee system and result in flooding.

Past Occurrences

There is no known history of earthquake liquefaction in the District. The most recent Napa Earthquake in 2014 did not result in any damages to District Assets.

Vulnerability to Earthquake Liquefaction

Assets/Critical Facilities at Risk

The levees, pump stations and residential and commercial structures in the Town of Locke are potentially at risk to an earthquake.

Natural Resources at Risk

All natural resources could be affected by flooding resulting from an earthquake event that caused failure of the levees or pump stations. Flooding destroys habitat and kills most terrestrial species present.

Historic and Cultural Resources at Risk

The entire Locke Historic District is at risk to a damaging earthquake whether resulting from ground shaking alone or ground shaking combined with liquefaction. With much of the town being constructed in the early 1900's, there is little protection against a damaging earthquake event.

Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

Flood: 100/200/500-year

Likelihood of Future Occurrence–100-year: Occasional; 200-/500-year: Unlikely
Vulnerability–High

Hazard Profile and Problem Description

RD 369 is surrounded by numerous waterways, including the Sacramento River, the Delta Cross Channel, Snodgrass Slough and the Meadows waterway. Flooding of any of these waterways could cause problems for the District.

Past Occurrences

The District Planning Team noted that there has been no historic flooding to District lands. The closet the District came to flooding was during the 1995/96 floods when nearby areas were impacted, but the District was spared.

Vulnerability to Flood

Assets/Critical Facilities at Risk

All of RD 369 is at risk to a significant flood event. Flooding of RD 369 could potentially impact the District owned assets, including agricultural operations, and the residential and commercial structures comprising the Town of Locke. Levee structures could also be damaged from flood waters and extensive flooding could create a life safety issue to area residents and visitors. The District Planning Team noted that if their pumps were damaged or failed during a flood, it would put the District at significant risk of substantial flooding.

Flooding of Delta islands also has the potential to negatively impact water quality both locally and statewide. The largest of California's drinking water sources is the Sacramento-San Joaquin Delta and its tributaries. The Delta provides water throughout the state via the State and Federal water projects. During a flood, there is a higher potential for the waters in the Delta to be exposed to chemicals, fuel, oil, and multiple other constituents of concern that can quickly degrade water quality. Flooding can also disturb soil and soil-borne materials such as mercury and organic matter that can degrade water quality.

Should a flood breach the levees, the entirety of the assets of RD 369 would be at risk. Levee failure is discussed later in this section. Flooding also causes erosion, which is also discussed later in this section.

Natural Resources at Risk

Flooding of the Delta region can destroy habitat, kill terrestrial animals caught in the flood zones, and can entrain and strand large populations of fish species.

Historic and Cultural Resources at Risk

The entire Locke Historic District is at risk to damaging floods.

Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–Extremely High

Hazard Profile and Problem Description

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters

Past Occurrences

Historically, flooding in the Delta has resulted from levee failures caused by the separate or coincidental occurrence of very high tides and high stream outflow through the delta region. Strong onshore winds associated with low pressure storms aggravate flood potential by causing an additional rise of the water surface elevations, and can cause severe erosion on levees in a short period of time. Flood events resulting from high tides and/or high stream outflow cannot be reliably predicted, but should be expected to occur in the future. Levee failures from collapse of rodent dens, seepage, falling trees, or some other mechanical failure are unpredictable and relatively uncommon. Routine levee inspections are the primary protection against these types of levee failure events. It should be noted that since 1986, significant portions of the levee system within the Legal Delta have been rehabilitated and improved, which has resulted in an overall reduction in the number of flooded islands during post-1986 Delta flood threats.

The District Planning Team noted that there have been no levee failures of RD 369 during his ownership since 1977.

Vulnerability to Levee Failure

The primary threats to Delta levees are high water surface elevations from floods or high tides, wave action due to high winds or boat wakes, and rodent damage, either as individual actions or in combination. Levees that may have structural issues involving poor foundations, inadequate geometry or other geotechnical issues can be at a higher risk of failure from any of the primary threats. Subsidence of Delta lands has been reported to be a major risk to Delta levees, however, subsidence is limited or non-existent under and adjacent to the levees as those areas have consolidated over the last fifty years and oxidation of the peat foundations is limited because it is not farmed. Subsidence in general is limited to a very small percentage of the delta. Seismic risk is always a factor for California, but it is generally thought by Delta engineers to have been overstated in the DRMS study, and therefore is not something that is currently designed for, although, any levee improvements will help to mitigate that risk. Climate change and sea level rise have also been identified as issues for levee vulnerability. Because these impacts will occur over long periods of time, it should not be an overwhelming problem to address them as they occur.

Assets/Critical Facilities at Risk

Should the levees fail, all District assets would be at risk.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

Should a levee failure occur, the Locke Historic District would be at risk.

Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous

amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

Past Occurrences

The District Planning Team was unaware of specific instances of erosion. However, it was noted that erosion is an ongoing occurrence and that repairs to the levee's rock slope protection areas are periodically made.

Vulnerability to Erosion

Assets/Critical Facilities at Risk

The entirety of the levee system in RD 369 is at risk to erosion.

Natural Resources at Risk

Erosion within RD 369 should not have significant impacts to natural resources, except to the extent erosion leads to significant flooding.

Historic and Cultural Resources at Risk

The Locke Historic District should not be affected by erosion of the leveed areas, except to the extent erosion leads to significant flooding.

Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the District. Damage and disaster declarations related to severe weather for the Sacramento County Planning Area have occurred and will continue to occur in the future.

Past Occurrences

The following severe weather events in the Delta area were noted:

- 1986 – Due to the extreme storm event, multiple days of heavy rain, strong winds from extreme low pressure gradients, high tides and runoff affecting the entire Sacramento-San Joaquin Delta.
- 1997 – A series of large storms that produced heavy rain and high winds caused heavy runoff and high tide conditions that impacted the entire Sacramento – San Joaquin Delta region.

However, there were no identified damages to RD 369 from these events.

Vulnerability to Heavy Rains and Storms

Assets/Critical Facilities at Risk

Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, and downed trees. However, it is the secondary effects of heavy rain and storms that are of concern to RD 369. Heavy rains can cause flooding, levee failure, and stream bank erosion. The District noted that in the past when the system starts to become overwhelmed due to heavy rains, additional, temporary pumps have been brought in to assist.

Natural Resources at Risk

The District Planning Team noted that any resulting flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The entire Locke Historic District is at risk to damaging floods resulting from heavy rains.

Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather (including high winds) is an annual occurrence in the District. Tornadoes occur much less frequently. Damage related to high winds have occurred in the District

and will continue to occur in the future. Primarily, within the District, high winds cause increased wave action which act to erode the levees.

Past Occurrences

The following high wind events were noted within the Delta area:

- 1986 – Due to the extreme storm event, multiple days of heavy rain, strong winds from extreme low pressure gradients, high tides and runoff affecting the entire Sacramento-San Joaquin Delta.
- 1997 – A series of large storms that produced heavy rain and high winds caused heavy runoff and high tide conditions that impacted the entire Sacramento – San Joaquin Delta region.

Vulnerability to Wind and Tornadoes

Assets/Critical Facilities at Risk

The District Planning Team noted that the entire levee structures are at risk from wind. Other district assets may also be at risk depending on severity of wind event.

Natural Resources at Risk

The District Planning Team noted that all natural resources are at risk if wind caused levee failure in the District.

Historic and Cultural Resources at Risk

The entire Locke Historic District is potentially at risk to damaging winds.

Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Wildfire and urban wildfire are an ongoing concern for Sacramento County. Generally, the fire season extends from early spring to late fall. Fire conditions arise from a combination of hot weather, an accumulation of vegetation, and low moisture content in the air. These conditions when combined with high winds and years of drought increase the potential for a wildfire to occur. The Delta area can be extremely vulnerable to fires as a result of dense grassy vegetation combined with a growing number of structures and human activity in the region. RD 369 contains large areas of open grasslands that are a potential fuel source. The wooden construction of much of the town also contributes to the potential for a damaging fire. Any ignition has the chance to become an out of control wildfire.

Past Occurrences

Although not specifically a wildfire, on July 3, 2016, a fire erupted on the second floor of the Locke Country Store and two adjacent apartments located on Main Street. The fire resulted in the complete destruction of the second floor of the building and a building behind the store. There were no injuries. It should be noted that in 2004, when the County sold the land to the residents of Locke, numerous upgrades were made that include upgrades to water and sewer systems and the installation of overhead sprinklers which prevented the fire from spreading to other structures.

Vulnerability to Wildfire

Assets/Critical Facilities at Risk

All District owned and non-owned assets are at risk from wildfire.

Natural Resources at Risk

All natural resources are at risk from wildfire.

Historic and Cultural Resources at Risk

The Locke Historic District is at risk from wildfire.

Future Development

No future development is planned for RD 361. Development in the Town of Lock is limited due to its historic district designation. There are no known development plans for the remaining agricultural land and operations and state park.

5.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

5.6.1. Regulatory Mitigation Capabilities

Table 5-4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 369.

Table 5-4 RD 369's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	An Emergency Safety Plan is under development for this District.
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: County Code
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	

Land Use Planning and Ordinances	Y/N	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 369

5.6.2. Administrative/Technical Mitigation Capabilities

Table 5-5 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 369.

Table 5-5 RD 369's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	Y	Established for this plan
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	A vegetation maintenance program is in place for the levees. This involves using goats to eat down the weeds and spraying the vegetation twice annually.
Mutual aid agreements	Y	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	
Civil Engineer	N	
GIS Coordinator	N	

Other	
Technical	
Warning systems/services (Reverse 911, outdoor warning signals)	N
Hazard data and information	N
Grant writing	N
Hazus analysis	N
Other	
How can these capabilities be expanded and improved to reduce risk?	

Source: RD 369

5.6.3. Fiscal Mitigation Capabilities

Table 5-6 identifies financial tools or resources that the RD 369 could potentially use to help fund mitigation activities.

Table 5-6 RD 369's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	N	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 369

5.6.4. Mitigation Education, Outreach, and Partnerships

Table 5-7 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 5-7 RD 369's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

5.6.5. Other Mitigation Efforts

The District is responsible for levee maintenance. The District uses goats to maintain the vegetation on the levees. The District also sprays the vegetation semi-annually for additional vegetation control.

5.7 Mitigation Strategy

5.7.1. Mitigation Goals and Objectives

RD 369 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

5.7.2. Mitigation Actions

The planning team for RD 369 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Pump Station Upgrades and Backup Generators

Hazards Addressed: Flooding, Levee Failure, Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: The District maintains three pump stations: one for drinking water, one to pump water out of the land area, and one to pump from the waterway. In times of heavy storms, additional pumps have been brought in in order to effectively pump the large volumes of water. New pumps of increased capacity/power would be more effective when the current system is stressed and limit the need for temporary pumps. Backup generators would also be effective in establishing a constant power source to prevent flooding resulting from a failure of the current system.

Other Alternatives: Maintain status quo

Existing Planning Mechanisms through which Action will be Implemented: none

Responsible Office: RD 369 owner

Priority (H, M, L): High

Cost Estimate: To be determined

Potential Funding: HMGP, PDM

Benefits (avoided Losses): Property and Natural Resource Protection and Life Safety. New pumps and backup generators would improve the ability to pump during periods of heavy rain to limit any flood related damages to property and natural and historic resources and better protect local residents.

Schedule: 1-3 years

Action 2. Levee Maintenance Program Improvements

Hazards Addressed: Flooding, Levee Failure, Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: According to the Lower Sacramento/Delta North Regional Flood Management Plan, their primary District issues are related to maintenance activities. It is recommended that RD 369 focus on vegetation and rodent control, seepage control, bank protection/erosion control, access road maintenance, and encroachment repairs and modifications.

Other Alternatives: Maintain status quo

Existing Planning Mechanisms through which Action will be Implemented: to be determined

Responsible Office: RD 369 owner

Priority (H, M, L): High

Cost Estimate: To be determined

Potential Funding: HMGP, PDM, DWR grants

Benefits (avoided Losses): Property and Natural Resource Protection and Life Safety.

Schedule: 1-3 years

Delta Annex Chapter 6 Reclamation District 551

6.1 Introduction

This new chapter to the Delta Annex details the hazard mitigation planning elements specific to the Reclamation District 551 (RD 551), a new 2016 participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by RD 551. This chapter of the Delta Annex provides additional information specific to RD 551, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

6.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 551 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 6-1. Additional details on plan participation and RD 551 representatives are included in Appendix A.

Table 6-1 RD 551 Planning Team

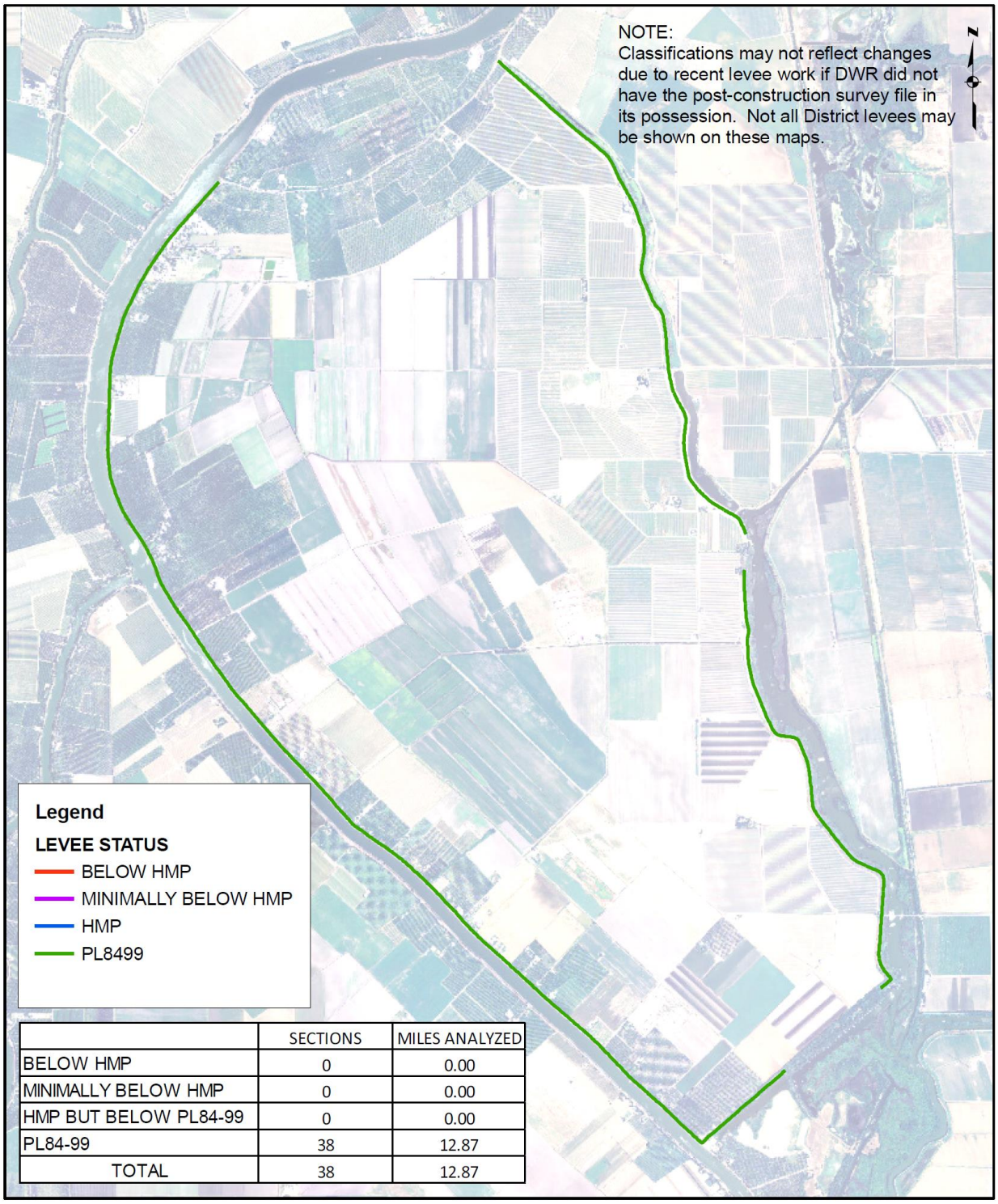
Name	Position/Title	How Participated
Gilbert Cosio	District Engineer	Attended meetings and workshops; reported to the District; compiled data for this annex; review draft documents
Topper van Loben Sels	District President	Briefed in Sacramento County LHMP

Source: RD 551

6.3 Community Profile

The community profile for RD 551 is detailed in the following sections. Figure 6-1 displays a map and the location of RD 551 boundaries within Sacramento County.

Figure 6-1 Reclamation District 551 Map



	SECTIONS	MILES ANALYZED
BELOW HMP	0	0.00
MINIMALLY BELOW HMP	0	0.00
HMP BUT BELOW PL84-99	0	0.00
PL84-99	38	12.87
TOTAL	38	12.87

Levee Assessment - RD 551 - Pearson District

0 0.25 0.5 1 Miles

Source: RD 551

6.3.1. RD 551 Overview, History, and Background

Reclamation District No. 551, Pearson District (District), is the local public entity that provides flood protection in the form of levee maintenance and drainage to the landowners of Pearson District. The District operates and maintains all the levees that protect the landowners. As described in Division of Water Resources, (currently known as Department of Water Resources) Bulletin No. 37, published in 1930, the District is described as protecting 8,800 gross acres, with a net protected area of 8,537 acres, within Sacramento County.

The District originally built the project levee along the Sacramento River (6.85 miles); USACE, under authority of the SRFCP, rebuilt portions of the levee. This is the levee recognized by both the state and federal governments as the primary flood protection levee, as part of the SRFCP. The District built the non-project levee along Snodgrass Slough (5.91 miles) to its present design in the 1920s. There are also 1.37 miles of non-project cross levee, adjacent to the Delta Meadows State Park.

The District does not supply water, which is the responsibility of the individual landowners; however, the District maintains 37.97 miles of canals and ditches that provide drainage to the property owners. These ditches and canals are fed by farmer ditches, which are designed by the landowner to drain their property adequately. Once the drain water enters the District's ditches and canals, water is removed at pumping plants located at one location on Pearson District.

Land use is predominantly agricultural, aside from the small town of Courtland. Orchards (including pears, apples, and cherries), vineyards, alfalfa, grain, and miscellaneous row crops are the primary crops. The historic town of Courtland is the largest residential area on the District. There are an estimated 636 residents within the District. Courtland has a sewage treatment plant operated by Sacramento County. There are public roads running along the entire length of the Sacramento River levee.

The District has no major land use changes, although there are statewide planning efforts that if carried out could require major land use changes, affecting all aspects of the District operation and maintenance of the levee and drainage system.

Interior ground elevations slope toward the center of the District. Interior ground elevations range from 12 feet (toe of Sacramento River levee) to -12 NGVD within the District interior. Top of levee elevations range from 19.0 to 27.5 feet national geodetic vertical datum (NGVD) along the non-project back levee, and 24.9 to 26.2 feet NGVD along the project levee (left bank of Sacramento River). The low elevation of 19.0 on the non-project levee is located at Lambert Road, still over 2.0 feet above the 100-year flood elevation. Except for this and two other road crossings, the non-project levee generally has over 6 feet of freeboard above the 100-year flood elevation.

Reclamation is one of the first forms of public improvement in California, with the early focus on reclaiming "swamp and overflowed" lands granted to the state under the Federal 1850 Arkansas Act. The term reclamation primarily encompasses flood control and drainage, but has also long included irrigation.[1] To

[1] Hershey v. Reclamation Dist. No. 108, 200 Cal. 550, 567-68 (1927).

help local landowners reclaim the swamp and overflowed lands, the state adopted a series of statutes authorizing them to form local reclamation and levee districts. The area of a proposed district was outlined in a formation petition presented to a state or county board, which would order a district to be formed after a majority vote of the affected landowners. Beginning in 1861, the Board of Swamp Land Commissioners issued the orders organizing reclamation and levee districts. Beginning in 1867, districts were organized under the Green Act by county boards of supervisors. (Stats. 1867-8, c. 415.) A few reclamation districts were also created by special act of the legislature. (See, e.g., Stats. 1911, c. 100 (RD 900).) Regardless of how they were formed, reclamation districts now operate under Water Code Division 15, § 50000 et seq., and levee districts under Division 19, § 70000 et seq. (See also Stats. 1911, c. 100, § 2.)

As reclamation districts were formed under the above noted laws, they were given numbers sequentially. Pearson District formed in 1893, and was given the number "551." The area protected by the District has remained the same for essentially the entire time of its existence.

Starting in the 1940s, USACE improved the Sacramento River levee is a flood control structure to meet the federal design standard. To satisfy the conditions of federal involvement in such projects, the Central Valley Flood Protection Board (CVFPB) agreed to operate and maintain the Sacramento River levee. USACE transferred the District levee, as part of Unit No. 111, completely over to CVFPB, formerly the State Reclamation Board, in September 1955. Under Section 8618 of the Water Code, reclamation districts are authorized to establish agreements with the CVFPB to perform these actions for the state. The District is required to maintain and operate the levees to meet the standards as listed in the Supplemental Operation and Maintenance Manual.

6.4 Hazard Identification

RD 551's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 551 (see Table 6-2).

Table 6-2 RD 551—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Extensive	Occasional	Limited	Low
Bird Strike				
Climate Change	Extensive	Occasional	Limited	Low
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Extensive	Occasional	Critical	Low
Earthquake	Extensive	Occasional	Limited	Medium
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Extensive	Likely	Limited	High
Landslides				
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Significant	Highly Likely	Catastrophic	High
Severe Weather: Extreme Temperatures – Cold/Freeze				
Severe Weather: Extreme Temperatures – Heat				
Severe Weather: Fog				
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Significant	Likely	Critical	Medium
Severe Weather: Wind and Tornadoes				
Subsidence				
Volcano				
Wildfire:(Burn Area/Smoke)				

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area
Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid
Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

6.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 551's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 551 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

6.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 6.5.3, includes a description as to how the hazard affects RD 551 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

6.5.2. Vulnerability Assessment

This section identifies RD 551's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 6-3 lists particular critical facilities and other District assets identified by RD 551's planning team as important to protect in the event of a disaster. RD 551's physical assets, valued at over $4 million, consist of the buildings and infrastructure to support RD 551 operations.

Table 6-3 RD 551's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Pumps – Snodgrass Slough	Drain Pumps		$2,000,000	
Pumps – Lake	Drain Pumps		$1,000,000	

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
District Owned Facilities	Home, Buildings & Equipment		$2,000,000	

Source: RD 551

Natural Resources

In the past, RD 551 has protected a number of natural gas wells. Currently, there are no wells in operation on Pearson District. RD551's levees support vegetation that provide fish and wildlife habitat. Agricultural ground and ditches also support wildlife.

Historic and Cultural Resources

Since the land has been settled for over 150 years, there are many historic structures on Pearson District.

Growth and Development Trends

Pearson District is within the Primary Zone of the Delta. Therefore, in addition to Sacramento County, development is controlled by a State agency, the Delta Protection Commission. Therefore, there is little, if any, potential for growth beyond that allowed by agricultural zoning.

6.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 6-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 551 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County planning area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable District assets include the levees and supporting structures that the District owns. As stated, above, RD 551 levees and drainage provide protection to over $89,000,000 in assets as estimated by the Delta Risk Management Strategy report.

An estimate of the vulnerability of RD 551 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Earthquake and Earthquake: Liquefaction

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

In Sacramento County, the Delta (including RD 551) is at risk to liquefaction. The Delta sits atop a blind fault system on the western edge of the Central Valley. Moderate earthquakes in 1892 near Vacaville and in 1983 near Coalinga demonstrate the seismic potential of this structural belt. The increasing height of the levee system has prompted growing concern about the seismic stability of the levees. The concern is based on the proximity of faulting, the nature of the levee foundations, and the materials used to build the levees. Many levees consist of uncompacted weak local soils that may be unstable under seismic loading. The presence of sand and silt in the levees and their foundations indicates that liquefaction is also a possibility.

Past Occurrences

The District Planning Team noted no past occurrences of earthquake that have affected the District.

Vulnerability to Earthquake and Liquefaction

Although there have been no significant quakes in or closely adjacent to the Delta since high levees were originally constructed, there are at least five major faults within the vicinity of the Delta capable of generating peak ground acceleration values that would likely lead to levee failures. Should the levees that protect RD 551 fail, the dewatering costs would be in the millions of dollars.

Future Development

The consequences of a major earthquake in RD 551 will also increase with time. Because of increasing water demand and the state's growing population and economy, the economic consequences of an interruption in Delta water supply operations due to an earthquake will increase. Consequences to the Delta Region will also increase due to additional development.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Flooding on the Sacramento River has threatened the levees of RD 551 in the past. Flooding inside the leveed area would occur as a result of levee failure or overtopping. The flood elevations around Pearson

District exceed the elevation of almost every acre of ground protected by RD 551 levees. Therefore, a levee breach under flood conditions would be catastrophic to the landowners. In addition, the Pearson District levees are not certified to protect against the 100-year flood.

Past Occurrences

Past river floods have damaged the RD 551 levees in the form of erosion. Some of this erosion was repaired by RD 551 under flood fight conditions. Restoration erosion repair has typically been performed by the Corps of Engineers as authorized under PL 84-99. Repair work under PL 84-99 was performed by the Corps of Engineers on Pearson District levees following the recent floods of 1986, 1997, 1998, and 2006.

Past floods have also required flood fighting by RD 551. This flooding fighting has consisted of seepage control and emergency erosion repair. Seepage control is critical in levee breach prevention. The levees and levee foundations of Pearson District are very porous and subject to flood water seeping through, and under, the levee. If left uncontrolled, this seepage could accelerate to the point that it has the force to move levee material. This phenomenon is called piping, or internal erosion of the levee. Once enough material is moved out of the levee section, a levee breach occurs.

Vulnerability to Flood

Assets/Critical Facilities at Risk

Fl Flooding of Delta islands has the potential to negatively impact water quality both locally and statewide. The largest of California's drinking water sources is the Sacramento-San Joaquin Delta and its tributaries. The Delta provides water throughout the state via the State and Federal water projects. During a flood, there is a higher potential for the waters in the Delta to be exposed to chemicals, fuel, oil, and multiple other constituents of concern that can quickly degrade water quality. Flooding can also disturb soil and soil-borne materials such as mercury and organic matter that can degrade water quality. If the flood water rushing into a Pearson District levee breach is large enough in volume, the surge of water into the island will call saltwater to be pull from San Francisco Bay and into the Delta, thus impacting the water quality of the Delta and water users who export water out of the Delta.

Should a flood breach the levees, the entirety of the assets of RD 551 would be at risk. These assets include the small community of Courtland. All of the RD 3551 drain pumps would be flooded and therefore, RD 551 could not drain the flooded areas with their existing pumps; auxiliary pumps would have to be brought in.

Natural Resources at Risk

The District Planning Team noted no specific natural resources at risk to flooding.

Historic and Cultural Resources at Risk

The District Planning Team noted no specific historic or cultural resources at risk to flooding.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards.

Flood: Stormwater/Localized Flooding

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

During high rainfall events, the drainage system is not capable to evacuate water from the interior of Pearson District without flooding some low lying properties. On properties that farm annual row crops, this is not a problem since crops are not normally planted until after the rainy season. However, winter wheat, perennial, or multi-year crops are susceptible to damage when water overflows the banks of the drain canals.

Past Occurrences

Stormwater flooding occurs every few years. In most years, it is not significant enough to be a problem. For the most part, past flooding has damaged alfalfa and winter wheat. However, past floods have damaged county roads. In addition, many acres of vineyards and orchards have been planted in the past few years, so it is anticipated that these recently planted permanent crops may be damaged by future canal bank flooding.

Vulnerability to Localized Flooding

As stated above, stormwater flooding has the potential to result in significant damage due to the increased acreage of permanent crops. In addition, residences in the lower elevations of Courtland are at risk.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters.

Past Occurrences

The RD 551 levees have not failed in over 100 years. Two floods over the past few decades (1986 & 1997) required extensive flood fighting by RD 551 forces in order to prevent a levee breach.

Vulnerability to Levee Failure

Assets/Critical Facilities at Risk

A levee failure would impact almost all the assets and critical facilities on Pearson District; including the small community of Courtland. State Highways 160, as well as a number of county roads are at risk. Approximately 8,000 of agricultural land would be damaged and possibly rendered unfarmable for at least a year. There are many permanent crops on Pearson District, such as wine grapes, pears, apples and cherries that would be destroyed.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

Should a levee failure occur, all historic and cultural resources in the District would be at risk.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

Past Occurrences

RD 551 experiences bank erosion essentially every year there is above normal precipitation. As part of the Corps of Engineers Sacramento River Flood Control Project, RD 551 erosion has been periodically repaired by the Corps of Engineers under PL84-99. In years when the Corps does not perform repair, RD 551 repairs the erosion with financial assistance from the state's Delta Levees Subventions Program. Since RD 551 has been recently deemed ineligible for PL84-99 assistance, the likelihood is that the Corps will not perform erosion repairs in the future.

Vulnerability to Erosion

Erosion by itself puts the levee and any structures on the levee at risk. These structures include irrigation and drainage systems, residential buildings, agricultural buildings, wildlife habitat, etc. If left unresolved, erosion would lead to a levee breach, imposing risk on all of the assets of Pearson District.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards.

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the District. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

Although water surface elevation is a major factor to levee seepage and overtopping, severe weather can cause significant damage, such as erosion, that puts the integrity of the Pearson District levee system at risk.

Vulnerability to Heavy Rain and Storms

Assets at Risk

Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include erosion, flooding, pavement deterioration, washouts, landslide/mudslides, and downed trees. However, it is the secondary effects of heavy rain and storms that are of concern to RD 551. Heavy rains can cause flooding, levee failure, and stream bank erosion. Flooding, levee failure, and stream bank erosion can cost RD 551 millions in damages.

6.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

6.6.1. Regulatory Mitigation Capabilities

Table 6-4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 551.

Table 6-4 RD 551's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y/2012	Five-year plan consisting of levee stability, seepage control and maintenance projects.
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y/2017	Through a state grant, Sacramento County is funding development of an Emergency Action Plan for RD 3. The plan will be complete in early 2017
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	Y/Ongoing	RD 551 consistently evaluates flooding of low areas and the need for improvements in it drainage system
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		Y Annual routine maintenance plans and participation in the state Delta Levees Subventions Program which assists in funding levee maintenance. RD 551 is also drafting a Letter of Intent to draft a System-Wide Improvement Framework to respond to maintenance and rehabilitation issues brought up by the Corps of Engineers 2013 Periodic Inspection Report
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	

Erosion or sediment control program	Y	Erosion control measures on levee and canal slopes as necessary. Sediment removal from drainage system canals as necessary.
Other		

Source: RD 551

6.6.2. Administrative/Technical Mitigation Capabilities

Table 6-5 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 551.

Table 6-5 RD 551's Administrative and Technical Mitigation Capabilities

Administration	**Y/N**	**Describe capability Is coordination effective?**
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	RD 551 annually performs over $100,000 in maintenance. In addition, it periodically constructs projects to repair deficiencies in the levee.
Mutual aid agreements	N	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y	Topper van Loben Sels, President
Community Planner	N	
Civil Engineer	Y	Gilbert Cosio and the staff at MBK Engineers has served as District Engineer for over 30 years and has participated in many flood fight actions.
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other		

Source: RD 551

6.6.3. Fiscal Mitigation Capabilities

Table 6-6 identifies financial tools or resources that the RD 551 could potentially use to help fund mitigation activities.

Table 6-6 RD 551's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	RD 551's annual assessment includes funding for future anticipated capital projects
Authority to levy taxes for specific purposes	Y	As dictated by law, RD 551 has the authority to levy taxes for specific purposes
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	RD 551 has the ability to levy special assessments
Incur debt through private activities	N	
Community Development Block Grant	Y	
Other federal funding programs		
State funding programs		
Other		

Source: RD 551

6.6.4. Mitigation Education, Outreach, and Partnerships

Table 6-7 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 6-7 RD 551's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	
Natural disaster or safety related school programs	N	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
StormReady certification	Y	The RD 551 manager, trustees, and District Engineer have been, or soon will be, trained in SEMS and NIMS
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

6.6.5. Other Mitigation Efforts

RD 551 has been a very active participant in the state's Delta Levee Subventions Program for about 20 years. This program have proven useful and has enabled RD 551 to react financially if a non-routine cost arises.

6.7 Mitigation Strategy

6.7.1. Mitigation Goals and Objectives

RD 551 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

6.7.2. Mitigation Actions

The planning team for RD 551 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Levee Improvements

Hazards Addressed: EQ, EQ Liquefaction, Flood: 100/200/500-year, Flood: Localized Stormwater Flooding, Levee Failure, River/Stream/Creek Bank Erosion, Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning), Severe Weather (Wind and Tornadoes)

Goals Addressed: 1, 3

Issue/Background: The goal of this Mitigation Action is to improve the Pearson Distrct levees over the next five years to a level of protection that repairs current deficiencies as noted in the state's Flood System Repair Project, and correct issues noted in the 2013 Corps of Engineers Periodic Inspection Report.

Other Alternatives: None proposed at this time

Existing Planning Mechanisms through which Action will be Implemented:

Responsible Office: Reclamation District No. 551 as the local maintaining agency and the State of California Flood Protection Board as the local sponsor of the federal flood control project.

Priority (H, M, L): High

Cost Estimate: $5 million

Potential Funding: Delta Levee Subventions Project currently funded by Propositions 1, 1E and 84. The state flood control deferred maintenance program (2016), the state Flood System Repair Program.

Benefits (avoided Losses): Preservation of the protection of 8,000 acres. Most of this property is farmed and thus a contributing factor to the local, state and national economy. The assets on Grand Island have been estimated to exceed $89 million 10 years ago, and therefore are much larger today.

Schedule: 1 – 10 years depending on the availability of funds

Delta Annex Chapter 7 Reclamation District 554

7.1 Introduction

This chapter to the Delta Annex details the hazard mitigation planning elements specific to Reclamation District 554 (RD 554), a new participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the RD 554. This chapter of the Delta Annex provides additional information specific to RD 554, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

7.2 Planning Process

As described above, the District followed the planning process detailed in Section 554 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 554 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 7-1. Additional details on plan participation and RD 554 representatives are included in Appendix A.

Table 7-1 RD 554 Planning Team

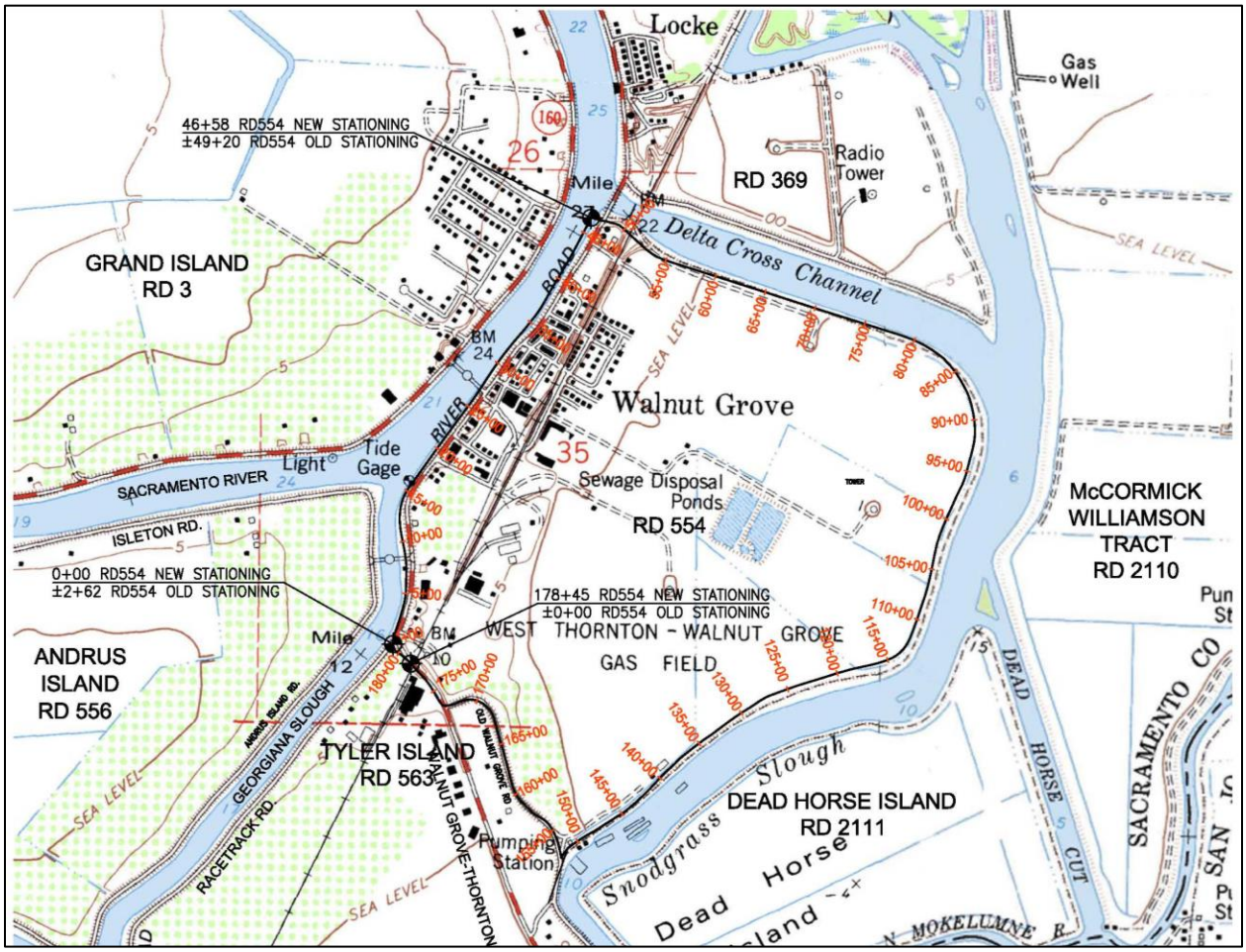
Name	Position/Title	How Participated
Emily Pappalardo	Project Manager	Attended meetings, collected data, drafted text, reviewed draft docs
Gilbert Labrie	District Engineer	Collected data, reviewed draft docs

Source: RD 554

7.3 Community Profile

The community profile for RD 554 is detailed in the following sections. Figure 7-1 displays a map and the location of RD 554 boundaries within Sacramento County.

Figure 7-1 Reclamation District 554 Map



Source: RD 554

7.3.1. RD 554 Overview, Background, and History

Reclamation District 554 protects the urban, eastern side of Walnut Grove, 374 acres of cropland, and the Walnut Grove Marina service area. Walnut Grove was established in 1850 by John Sharp and became a thriving agricultural center and shipping port by 1865.

Reclamation District 554 is the upper 452-acre portion of Tyler Island that is separately protected by 3.58 miles of levee. The District includes the east Walnut Grove urban area. It is the only town in the Delta that is interdependent and occupies both sides of the Sacramento River. The main commercial corridor is on this side of Walnut Grove along with the main sewer collection system and key government services. But the majority of the land use in this small district is rural/agricultural since the urban area is only 77 acres.

RD 554 is bordered by Sacramento River, Georgiana Slough, Snodgrass Slough, the Delta Cross Channel, and the cross levee between RD 554 and RD 563 (lower Tyler Island). Levees along the Sacramento River, Georgiana Slough, and the Delta Cross Channel are federal project levees (1.6 miles). The Cross Channel, Snodgrass Slough, and the cross-levee are non-project levees (1.98 miles), but are still held to the project

levee standard. Reclamation District 554 manages levee inspections, levee maintenance, and two pumping stations on the island. The pumping stations are both located along Snodgrass Slough.

7.4 Hazard Identification

RD 554's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 554 (see Table 7-2).

Table 7-2 RD 554—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Significant	Occasional	Critical	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Limited	Occasional	Negligible	Low
Dam Failure	Extensive	Unlikely	Catastrophic	Medium
Drought and Water Shortage	Significant	Likely	Critical	Medium
Earthquake	Limited	Occasional	Limited	Low
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Significant	Highly Likely	Limited	High
Landslides	Limited	Unlikely	Limited	Low
Levee Failure	Significant	Occasional	Critical	High
River/Stream/Creek Bank Erosion	Significant	Highly Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Limited	Low
Severe Weather: Fog	Extensive	Highly Likely	Limited	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Critical	Medium
Severe Weather: Wind and Tornadoes	Extensive	Highly Likely	Limited	Medium
Subsidence	Limited	Occasional	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 5540 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

7.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 554's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.554 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 554 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

7.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 7.5.3, includes a description as to how the hazard affects the RD 554 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

7.5.2. Vulnerability Assessment

This section identifies RD 554's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 7-3 lists critical facilities and other District assets identified by the RD 554's planning team as important to protect in the event of a disaster. RD 554's physical assets, valued at over $35 million, consist of the buildings and infrastructure to support the RD 554 operations.

Table 7-3 RD 554's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address/ Coordinates	Replacement Value	Hazard Info
Levee	Infrastructure	n/a	$30,000,000	
Cross-levee	Infrastructure	n/a	$5,000,000	

Name of Asset	Facility Type	Address/ Coordinates	Replacement Value	Hazard Info
Pump Station	Infrastructure	38° 14' 12.86" 121° 29' 58.37"	$500,000	
Pump Station	Infrastructure	38° 14' 05.14" 121° 30' 05.79"	$500,000	

Source: RD 554

Natural Resources

Due to the urban nature of RD 554 there are only a few areas of freshwater wetland, upland, and riparian habitats. The size of the island and development that has taken place over time, has resulted in mostly ruderal vegetation. See Figure 7-2 for a map of vegetation types. According to the Department of Fish and Game Levee Log in the 5-Year Plan, riparian, scrub shrub, and freshwater marsh habitat types exist on and adjacent to the levees. The estimated amount of each type of habitat per lineal feet is shown on Table 7-4.

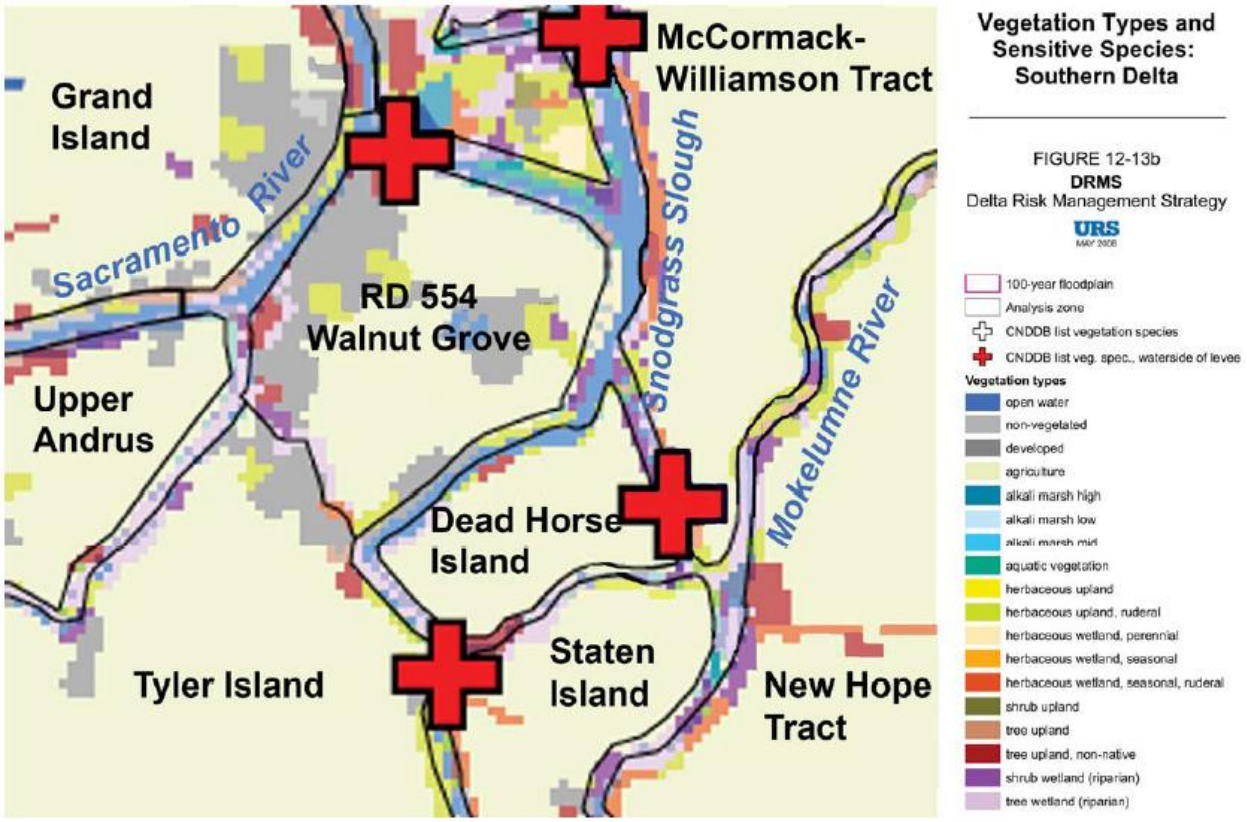
Table 7-4 RD 554 Vegetation Types

Type	Waterside	Landside
Riparian	2223 lf (3.66 ac.), 29 single trees	1710 lf (1.35 ac.) , 15 single trees
Scrub Shrub	880 lf (0.62 ac.), 23 single trees	1700 lf (1 ac), 40 single trees
Freshwater Marsh	1229 lf (0.37 ac.)	0 lf

Source: RD 554 2012 5-Year Plan

Note: These estimates are for non-project levees comprising the location of proposed projects in this plan.

Figure 7-2 RD 554 Vegetation Types

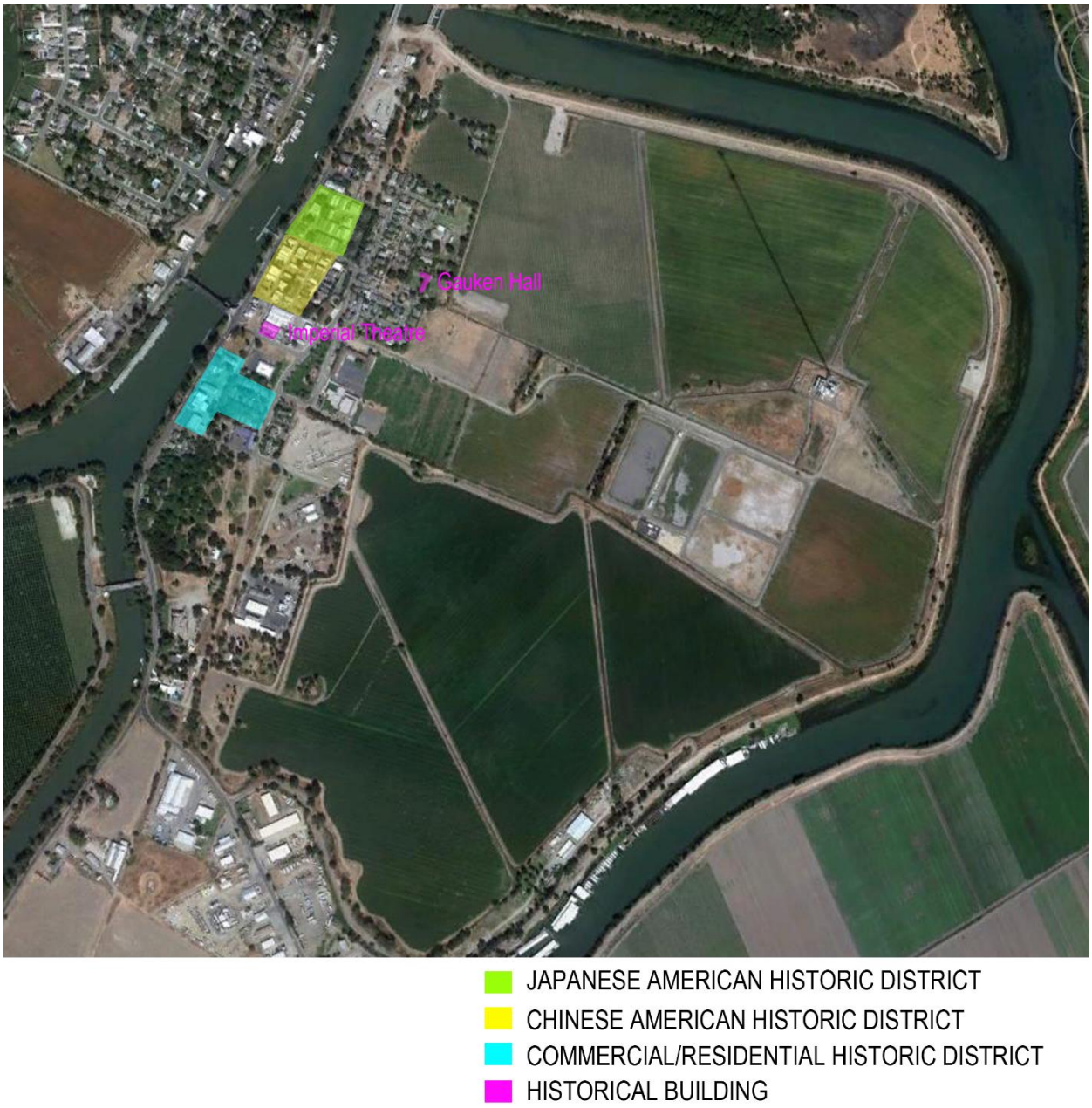


Source: RD 554 2012 5-Year Plan

Historic and Cultural Resources

In the Walnut Grove area, there are three nationally registered historic districts, the Walnut Grove Chinese and Japanese American Historical Districts, and the Walnut Grove Commercial/Residential Historic District. There are three nationally registered historical buildings, Guaken Hall, The Imperial Theatre, and the Jean Harvie Community Center. These are shown on Figure 7-3.

Figure 7-3 Historic Sites in Walnut Grove



Source: RD 554 2012 5-Year Plan

Growth and Development Trends

Limited growth is expected to occur in the District due to limits of Walnut Grove's SPA. There are approximately 10 acres of land available for development. Provided 1 new home has been built in the last decade, any anticipated growth is expected to be slow and small in nature.

7.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 7-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 554 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.554 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable District assets include the levees and pumping stations that the District owns and maintains. There are approximately 3.58 miles of levee surrounding the District. The levees along Georgiana Slough and the Delta Cross Channel are federal project levees. Snodgrass Slough and the cross-levee are non-project levees. The levee system is subject to riverine flooding. However, it is highly unlikely the levee system will fail due to overtopping. A high water situation could increase the hydraulic gradient within the levee that could result in under or through seepage. Seepage, if left unchecked, can result in levee failure and subsequent flooding. The District owns two pumping stations that are critical for island drainage. If the drainage system becomes compromised the District could experience localized flooding. If the system becomes compromised in a flood situation, damages could be worse than anticipated.

An estimate of the vulnerability of RD 554 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

While unlikely, it is possible that dam failure can create a high water situation in the adjacent channels that could put the levee system at risk of failure from overtopping, under seepage, through seepage or debris

impact. Given the distance from the dam system, a dam surge could dissipate prior to reaching this point in the Delta and result in a minor change in water elevation.

Past Occurrences

There are no past occurrences of dam failure.

Vulnerability to Dam Failure

Assets/Critical Facilities at Risk

The levees are at the highest risk to this hazard.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to erosive forces of high flows from dam failure.

Historic and Cultural Resources at Risk

Historic homes could be lost as a result of flooding due to dam failure.

Future Development

While future development may occur in the areas protected by levee that can be damaged during a dam failure, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Drought and Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

This hazard could disrupt crop irrigation. Prolonged disruption could result in the loss of a crop that year. In the event that orchards or vineyards experience disruption in irrigation, they could be lost for multiple years until they are replanted and begin producing a crop between 3 to 5 years. Agriculture is the primary industry on the island. Agricultural users pay assessments for levee maintenance and improvements. While there is some population on the island their assessment fees are low, but if agriculture is lost the District will not be able to cover levee maintenance or make any necessary improvements.

The residents and businesses could be impacted by drought but it is unlikely due to senior water rights and a prioritization system that puts municipal water at a higher priority than agriculture.

Past Occurrences

Although California did recently experience an extended drought, agriculture in this District remained largely unaffected due to senior water rights and riparian water rights. Some farmers voluntarily cut water use by 25% in the Delta in response to the drought in the Summer of 2015.

Vulnerability to Drought and Water Shortage

Assets/Critical Facilities at Risk

None.

Natural Resources at Risk

None.

Historic and Cultural Resources at Risk

None.

Future Development

Future development in the District should not be affected by drought conditions.

Earthquake: Liquefaction

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

In the event an earthquake is intense enough to result in shaking that could cause the sandy soils to liquefy, the levees could resettle, move off their foundations and possibly fail. Failure could compromise the levee system and result in flooding.

Liquefaction at the base of historic buildings and residences can compromise the structures and possibly result in significant damage.

Past Occurrences

None.

Vulnerability to Liquefaction

Assets/Critical Facilities at Risk

The District levees and unreinforced historic buildings are the most at risk from this hazard.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to a destabilization of the bank from liquefaction. Liquefaction could also introduce substantial sediment into the waterway through the destabilization of soils. Sedimentation could impact sensitive aquatic species.

Historic and Cultural Resources at Risk

Historic homes could be lost as a result of compromised foundations from soil liquefaction.

Future Development

While future development may occur in the areas protected by levees, which can be comprised by earthquakes and liquefaction, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

A 100/200/500-year flood event could cause flooding within the District. A high water event, depending on the water elevation, is unlikely to cause failure due to overtopping as many other surrounding Districts are lower and more likely to fail before failure of RD 554 levees. Higher levels of water could increase hydraulic gradients within the levee section resulting in landside seepage or boils. Continued seepage, if left unaddressed, could erode the levee and result in failure. Heavy flows could also cause erosion and scour on the waterside bank that could undermine the levee and cause failure.

Past Occurrences

1986 was the closest the District came to experiencing a 100-year flood event when adjacent lower Tyler flooded. The District has not experienced a 200 or 500-yr flood.

Vulnerability to Flood: 100/200/500-year

Assets/Critical Facilities at Risk

The levee system and pumping stations are vulnerable to a 100/200/500-year flood. As the flows could exceed the capacity of both the levee system and the pumping station that is needed to drain the island.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to erosive forces of high flows from 100/200/500-year flows.

Historic and Cultural Resources at Risk

There are three nationally registered historic districts protected by the levee system, the Walnut Grove Chinese and Japanese American Historic Districts and the Walnut Grove Commercial/Residential Historic District. There are also three nationally registered historical buildings, Gauken Hall, Imperial Theater and Jean Harvie Community Center. There are also historic homes that are over 100 years old. A 100/200/500 year flood event could inundate these districts and historic places if the event results in levee failure. Such an event may also exceed the District's pumping facility and improper drainage could also flood the districts. Flooding could cause irreparable damage to the structures and they could be lost.

Future Development

While future development may occur in the areas protected by levees, which if compromised could cause severe flooding, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Localized stormwater flooding can occur during heavy rains or seepage events that exceed the District's drainage capabilities. Lower areas around the island may be subject to minor flooding.

Past Occurrences

Localized stormwater flooding rarely occurs due to the higher elevation of the island. The most likely time this could have occurred in the past was during the wet year in 2006.

Vulnerability to Flood: Localized Stormwater Flooding

Assets/Critical Facilities at Risk

Localized flooding can overtax the Districts pumping system and create for a more hazardous situation involving the levee system by limiting the ability for inspection.

Natural Resources at Risk

None

Historic and Cultural Resources at Risk

There are three nationally registered historic districts protected by the levee system, the Walnut Grove Chinese and Japanese American Historic Districts and the Walnut Grove Commercial/Residential Historic District. There are also three nationally registered historical buildings, Gauken Hall, Imperial Theater and

Jean Harvie Community Center. There are also historic homes that are over 100 years old. Localized flooding could occur if the capacity of the District's pumping facility is exceeded. Flooding could cause irreparable damage to the structures and they could be lost.

Future Development

While future development may occur in the areas protected by levees, which if compromised could cause localized flooding, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Levee failure could result in inundation of the District and could also result in the flooding of lower Tyler Island.

Past Occurrences

The 5-Year Plan noted that in 1986, lower Tyler Island flooded and threatened to flood RD 554. At that time, an effort was undertaken to enhance the cross levee height by adding a berm on the lower Tyler side of the levee to insure that the urban area did not get flooded. The added height was not necessary when the water crested but the emergency construction paved the way for the more permanent configuration that exists today. That levee upgrade then led to a successful LOMR for eastern Walnut Grove and its Zone X determination in 1987.

Vulnerability to Levee Failure

The 2012 5-Year Plan addressed levee repair costs due to failure. To repair a levee breach and pump out the island the average cost has been estimated to be approximately $25 million. But the total truly depends on access, the size and severity of the breach, volume of water to be pumped out, weather conditions, etc. The $25 million figure assumes costs for $5/yd^3 of on-island replacement fill, 15/yd^3 of off-island fill, 6% per linear foot of engineering costs, and $5/foot for rip rap. The Jones Tract failure in 2004 is the most recent levee failure to provide insight into determining what a levee breach could cost today. It has been publicized that the 500-foot levee breach cost approximately $90 million for the repair, recovery, and associated damage. Many knowledgeable locals consider that figure inflated by as much as a factor of two.

Not only would a breach inundate RD 554, it would overtop (or by an intentional breach) the dry cross levee and flood the rest of Tyler Island. Flood waters would flow down to the lower part of the island since it is at a lower elevation than RD 554. The lowest elevation on the southern part of Tyler Island is -15.0 feet (NAVD 88) according to the LIDAR survey supplied by DWR. By the same survey, the lowest elevation on RD 554 is -1.0 feet.

The 5-Year Plan broke down costs by land use type:

- **Residential** – For RD 554, it is estimated that there could be a one-time displacement cost of $57,500 for all occupied households along with an additional $4,780 per day to house these residents elsewhere. On lower Tyler Island, the estimated one-time displacement could be $9000 and an additional $756 per day. The Walnut Grove Marina adds a transient population that is difficult to quantify since there are no statistics covering that element to determine associated costs. Furthermore, this number would fluctuate with the seasons. To house this population in emergency shelters it is estimated to cost $85 a day. As there would be sufficient time to evacuate, the costs to accommodate this unique group of part-time residents may not be significant. But the marina would be shut down until the island was pumped out.
- **Commercial** – Commercial structures will be adversely impacted from the time they are inundated through the time it takes to repair such damage and damage to surrounding infrastructure. There are about 48 businesses on the all of Tyler Island. Overall, a flood could cost Walnut Grove and Tyler Island businesses an estimated $113,000 per day. Some businesses may be unable to recover from a flood and could possibly be lost as the result of a flood event. Even west side residents and business would be affected because the sewer service may have to be curtailed.
- **Agricultural** – Crops grown on Tyler Island are generally alfalfa, wheat, corn, pears, truck crops, tomatoes, rice, and wine grapes. Tyler Island has a total of 8,687 acres of crops. Average cost for rehabilitation and field clean up is $235 per acre. This involves the removal of debris and sediment deposits after floodwaters have receded. Silt and debris can also clog drainage and irrigation ditches adding a variable cost to rehabilitation. The estimated total one-time cost for clean-up and rehabilitation is estimated to be $2.7 million. If inundation lasts longer than 14 days, it is assumed that the crops will be permanently lost. Any flood event that occurs between planting and harvest, could completely destroy the crops. Reestablishment of a lost crop dramatically increases economic losses. The inundation period is assumed to be five weeks on lower Tyler Island, meaning all crops on the lower end could potentially be lost in a flood event. However, due to the smaller size of RD 554 and an assumed inundation period of five days, not all crops may be lost. Not including clean-up costs, reestablishment of all crops on the island could total an estimated $29 million.

The 5-Year Plan also addressed infrastructure issues related to levee failure. Levee failure on Reclamation District 554 could cause direct physical damage to the island's infrastructure. If a break was to occur in the north inundating Walnut Grove/Thornton Road/J11, it would disrupt the island's connection to Highway 160 or 1-5, delaying up to 1,500 trips. The cost due to lost trips is small but the estimated time delay could cost $48,000 per day, $53,000 if 10% are assumed to be truck trips. Walnut Grove's surface streets could be inundated affecting the area on a local level by removing access to the town's businesses and services. The District also houses a FM radio and television transmission tower with support facilities serving KOVR, KXTV, and KQCA. This 2049' tower currently serves the Stockton-Sacramento-Modesto broadcasting area stations and radio stations (Fybush). The transmitter building is on stilts so the equipment will not be affected in a flood. But a flood could still restrict maintenance access to the building, and potentially interfere with broadcasting if there is a lengthy power disruption.

Overall, residential, commercial, agriculture, and infrastructure losses due to a flood event on all of Tyler Island could cost approximately $185,000 per day. The one-time/direct cost of the event to relocate the residents and businesses and reestablish cropland would be around $2.2 million. Assuming an inundation residence period 5 days on RD 554 (upper Tyler) a flood event there could cost approximately $1.6 million. Lower Tyler with an assumed inundation residence period of 5 weeks (35 days), a flood event could costapproximately $27.2 million of direct and indirect costs. These figure includes daily losses to residents

and business, one-time costs of displacement, rehabilitation costs of cropland, and reestablishment and annual production loss costs for vineyards and orchards. A flood event occurring between February and October, that would delay planting until the next season and is assumed to kill all crops, could add up to approximately $78.3 million of direct and indirect costs for both districts. This figure includes the estimated costs associated with repairing the breach and pumping out the islands, about $30 million.

Assets/Critical Facilities at Risk

Levees and district pumping plants. On island inundation can create an open water situation where a large fetch could develop and erode the interior of other levees within the District. Inundation of the drainage pump can make it inoperable and require replacement. Other critical facilities at risk include a fire department, police station and elementary school.

Natural Resources at Risk

Water quality issues were also addressed in the 5-Year Plan. Due to the urban nature of a portion of RD 554, a flood could release household and commercial chemicals potentially contaminating the surrounding waterways. A flood could also suspend sediment, metals, fertilizers, and pesticides that are attached to soil particles. Increased sedimentation of the waterway can reduce the amount of sunlight to reach submerged aquatic plants and also smother fish larvae and harm fish by clogging their gills. The extent of the effects on fish and aquatic species from suspended sediment and chemicals depend on the quantities of pollutants, amount of dilution, and frequency of freshwater releases.

Besides those listed above, other potential in-island pollutant sources could degrade water quality on the island and in the waterways. A long inundation period could create anoxic conditions in the soil can release toxic substances, such as manganese that is naturally occurring but can be dangerous to health in high concentrations. Other toxic substances such as, organochlorine "legacy" pesticides that, although have been banned for over 20 years, slowly degrade in the environment and can still be present in soils where it was applied. This can have harmful effects on fish species in terms of reducing food production, namely a primary producer, phytoplankton if released into the waterway. Although not harmful in small traces, "legacy" pesticides can become more concentrated through bioamplification and not only harm fish species but terrestrial and avian species as well.

Waterside habitat that is adjacent to the break could be lost due to the erosive forces of the water flowing through the break.

Historic and Cultural Resources at Risk

There are three nationally registered historic districts protected by the levee system, the Walnut Grove Chinese and Japanese American Historic Districts and the Walnut Grove Commercial/Residential Historic District. There are also three nationally registered historical buildings, Gauken Hall, Imperial Theater and Jean Harvie Community Center. There are also historic homes that are over 100 years old. A levee failure could inundate these districts and historic places. Such an event may also exceed the District's pumping facility and improper drainage could also flood the districts. Flooding could cause irreparable damage to the structures and they could be lost.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

River/Stream/Creek bank erosion could destabilize the levee slope and, if left unaddressed, cause levee failure through undercutting.

Past Occurrences

Bank erosion is currently occurring on the District levee but is minor and is a low priority for District repairs.

Vulnerability to Erosion

Assets/Critical Facilities at Risk

The District's levees are at risk of erosion.

Natural Resources at Risk

Riparian benches exist along the District's levee and are at risk of being lost due to bank erosion.

Historic and Cultural Resources at Risk

None.

Future Development

While future development may occur in the areas protected by levees, which can be compromised by severe erosion issues the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Severe Weather: Fog

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Fog can make it difficult to perform levee inspections during high water due to lack of visibility. It can also impact commuters that use the county road within this district. Many businesses front this road which creates slow car traffic and high pedestrian traffic. Low visibility can prove to be dangerous in high traffic areas.

Past Occurrences

Fog occurs annually.

Vulnerability to Fog

Assets/Critical Facilities at Risk

The levees are at risk due to the inability to perform inspections.

Natural Resources at Risk

None.

Historic and Cultural Resources at Risk

None.

Future Development

While future development may occur in the areas protected by levees, which could be a concern if compromised during extreme erosion events, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Heavy rains and storms can result in higher flood flows that could increase the hydraulic gradients within the levee section and result in seepage or if great enough, possibly overtopping. They can also increase flows and result in erosion of the waterside bank.

Past Occurrences

The last heavy rain and storm event the District experienced was in 2006, 1997 and 1986. No significant damages occurred due to these high water events.

Vulnerability to Heavy Rain and Storms

Assets/Critical Facilities at Risk

The District levees and pumping plant are at risk of damage from heavy rains and storms.

Natural Resources at Risk

Riparian vegetation could be lost from high flows as a result of heavy rains and large storms.

Historic and Cultural Resources at Risk

The historic buildings and districts discussed above could be damaged from heavy storms due to falling trees or flooding.

Future Development

While future development may occur in the areas protected by levee, which can be compromised during severe weather events, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

In the event of high water, wind can create wave action that could cause erosion at the waterside bank of the District's levees.

Past Occurrences

Wind occurs on a regular basis. The hazard comes when high winds are coupled with high water, which happened in the winter of 2006. There was negligible impact from this event.

Vulnerability to Wind and Tornadoes

Assets/Critical Facilities at Risk

The District's levees are at risk.

Natural Resources at Risk

None.

Historic and Cultural Resources at Risk

Wind could cause trees to fall and create flying debris that could damage historic structures.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

A wildfire could destroy private property and other such structures on the island.

Past Occurrences

None. A fire did cause part of a marina and 14 boats to burn down January 2015.

Vulnerability to Wildfire

Assets/Critical Facilities at Risk

The District's pumping station could be damaged in a fire. Furthermore the vegetation on the District levees could be burned leaving bare soil that could be subject to erosion.

Natural Resources at Risk

Riparian and shrub scrub vegetation could be lost in a wildfire.

Historic and Cultural Resources at Risk

There are three nationally registered historic districts protected by the levee system, the Walnut Grove Chinese and Japanese American Historic Districts and the Walnut Grove Commercial/Residential Historic District. There are also three nationally registered historical buildings, Gauken Hall, Imperial Theater and Jean Harvie Community Center. There are also historic homes that are over 100 years old. A wildfire on this island would devastate these districts and historic buildings if they become substantially burned.

Future Development

Future development should not be affected by the wildfire hazard.

7.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

7.6.1. Regulatory Mitigation Capabilities

Table 7-5 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 554.

Table 7-5 RD 554's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	The plan addresses flooding hazards and can be used to implement mitigation actions
Continuity of Operations Plan	Y	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		N

Building Code, Permitting, and Inspections	Y/N	Are codes adequately enforced?
Building Code	Y	Version/Year: CBC 2013
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Walnut Grove Special Planning Area controls land use and development so could aide in reducing hazard impacts through land use and development criteria
Subdivision ordinance	N	
Floodplain ordinance	Y	Yes, Sacramento County Floodplain Ordinance restricts development in the floodplain
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	Y	PAL - District is working on being mapped back in Zone X
Elevation Certificates	Y	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 554

7.6.2. Administrative/Technical Mitigation Capabilities

Table 7-6 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 554.

Table 7-6 RD 554's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Annual vegetation management.
Mutual aid agreements	N	
Other	N	

Staff	Y/N FT/PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	N	
Floodplain Administrator	Y	Determined via the Emergency Operations Plan
Emergency Manager	Y	Determined via the Emergency Operations Plan
Community Planner	N	
Civil Engineer	Y, FT	Staff is trained to coordinate with agencies and perform tasks in an emergency situation
GIS Coordinator	N	
Other	N	
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Fire Station siren in Walnut Grove, phone tree, Reverse 911
Hazard data and information	Y	
Grant writing	N	
Hazus analysis	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
RD 554 must organize a more appropriate warning system among trustees, public and staff. Also needs to have a plan in place to determine an Emergency Manager to coordinate Emergency Response activities.		

Source: RD 554

7.6.3. Fiscal Mitigation Capabilities

Table 7-7 identifies financial tools or resources that the RD 554 could potentially use to help fund mitigation activities.

Table 7-7 RD 554's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Delta Levees Subventions program to maintain levee system.
Authority to levy taxes for specific purposes	Y	Proposition 218 provides the District with the ability to raise assessments through a vote
Fees for water, sewer, gas, or electric services	Y	Fees are assessed by the County for sewer and water. SMUD provides electrical service.
Impact fees for new development		unknown
Storm water utility fee	Y	Assessments are developed for drainage
Incur debt through general obligation bonds and/or special tax bonds	N	

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Incur debt through private activities	Y	Bonds are obtained from the Bank of Rio Vista
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	Y	Delta Levee Subventions Program and Delta Levee Special Projects, Proposition 84 and 1E
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
The involvement of Federal agencies funds would help in reducing risk as well as the removal of the sunset clause on the Delta Levees Subventions Program.		

Source: RD 554

7.6.4. Mitigation Education, Outreach, and Partnerships

Table 7-8 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 7-8 RD 554's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	Walnut Grove Volunteer Fire Department, Delta Citizens Municipal Advisory Council
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Department of Water Resources Delta Flood Emergency Preparedness, Cal OES
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

7.6.5. Other Mitigation Efforts

The US Army Corps of Engineers performed an erosion repair project along the Sacramento River levee summer 2007 to create a riparian bench and resolve erosion issues. The District is currently developing a geotechnical study to locate deficiencies within the system. Once problematic areas are identified the District will perform repair projects to improve the levee system and reduce risk.

7.7 Mitigation Strategy

7.7.1. Mitigation Goals and Objectives

RD 554 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

7.7.2. Mitigation Actions

The planning team for RD 554 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Apply for a Letter of Map Revision (LOMR) to bring the District back into Zone X.

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: The District is aiming to prove their levee system meets FEMA 100-year certification standards so that the District may be put back into a Zone X designation. The District applied for a Provisional Accredited Levee (PAL), but it took longer than anticipated for the District to provide the necessary information due to budgetary restrictions.

Project Description: District will apply for a Letter of Map Revision (LOMR) to re-certify that the levee system will protect against a 100-year flood event, Zone X.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: $50,000

Benefits (Losses Avoided): Reduce in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Fall 2018

Action 2. Fill Abandoned Slough

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: An old slough that long ago was cut off from its source is creating a deficient area adjacent to the island cross levee due to its depth and steep slopes.

Project Description: Vegetation in the slough will be removed and the slough will be filled with imported fill to match the existing land level within the district.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: $200,000

Benefits (Losses Avoided): Reduce in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Fall 2018

Action 3. Geotechnical Investigation

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: The District is aiming to prove their levee system meets FEMA 100-year certification standards so that the District may be put back into a Zone X designation. A geotechnical investigation is necessary information needed for levee evaluation.

Project Description: CPT tests will be done along certain areas where there are data gaps. From there a geotechnical study will be performed to determine if there are any repairs that need to be made to increase levee stability to meet FEMA requirements.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: $30,000

Benefits (Losses Avoided): Aides in providing information for projects that will reduce in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Fall 2016

Action 4. Snodgrass Slough Levee Improvements

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: The District is aiming to prove their levee system meets FEMA 100-year certification standards so that the District may be put back into a Zone X designation. Improvements on the landside slopes of Snodgrass Slough are needed to meet FEMA criteria based on geotechnical studies.

Project Description: Based on findings in the geotechnical studies, landside slope improvements will be performed to accommodate FEMA criteria for 100-year level flood protection.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: Dependent on geotechnical studies, estimated $500,000

Benefits (Losses Avoided): Aides in providing information for projects that will reduce in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Summer 2017

Delta Annex Chapter 8 Reclamation District 556

8.1 Introduction

This chapter of the Delta Annex details the hazard mitigation planning elements specific to the Reclamation District 556 (RD 556), a new participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the RD 556. This chapter of the Delta Annex provides additional information specific to RD 556, with a focus on providing additional details on the risk assessment and mitigation strategy for this District.

8.2 Planning Process

As described above, the District followed the planning process detailed in Section 556 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 556 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 8-1. Additional details on plan participation and RD 556 representatives are included in Appendix A.

Table 8-1 RD 556 Planning Team

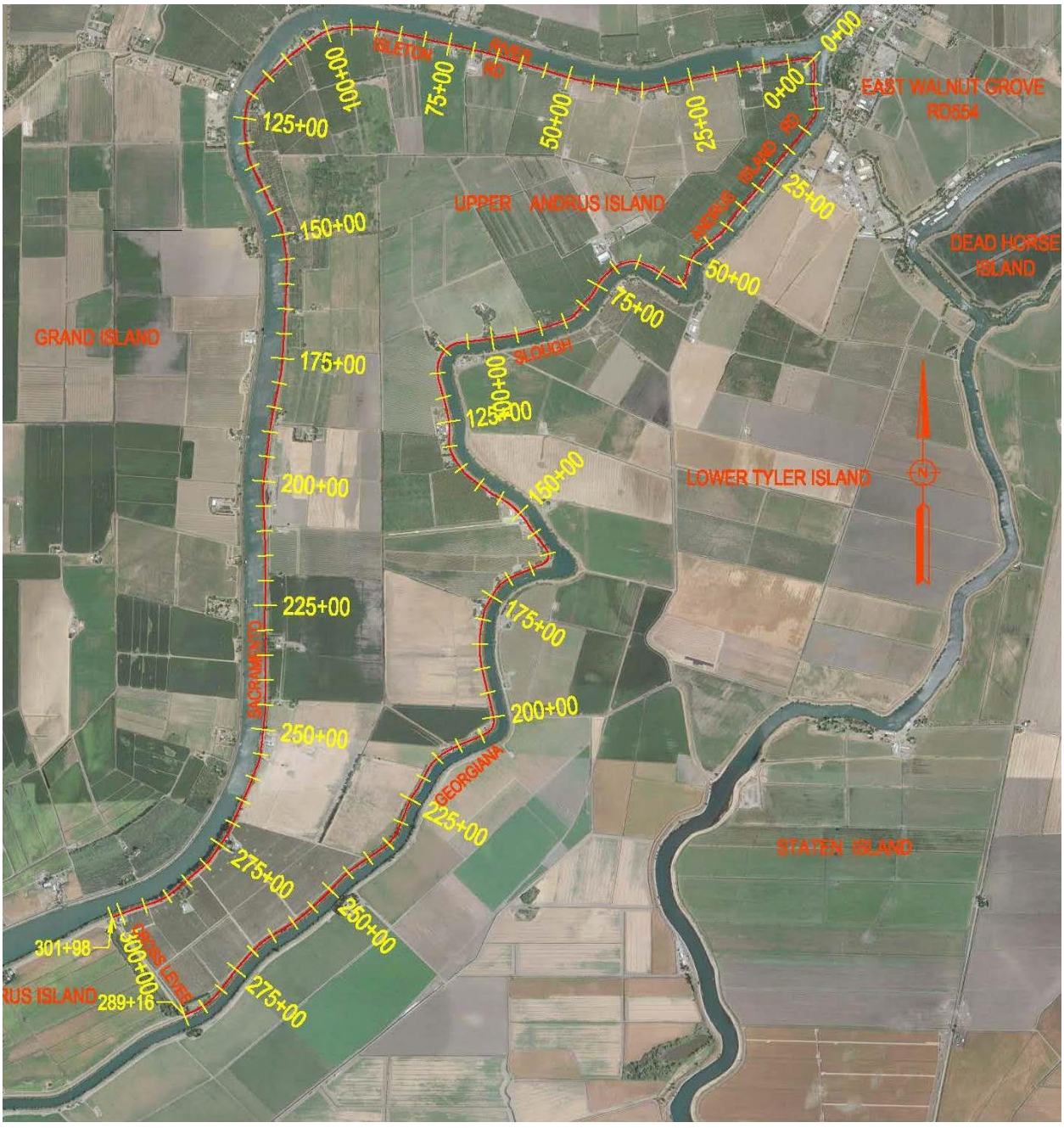
Name	Position/Title	How Participated
Emily Pappalardo	Project Manager	Attended meetings, collected data, drafted text, reviewed draft docs
Gilbert Labrie	District Engineer	Collected data, reviewed draft docs

Source: RD 556

8.3 Community Profile

The community profile for RD 556 is detailed in the following sections. Figure 8-1 displays a map and the location of RD 556 boundaries within Sacramento County.

Figure 8-1 Reclamation District 556 Map



8.3.1. RD 556 Overview, Background, and History

Reclamation District 556 was established in September 8, 1983 by the Water Code section 50000 et seq. There are five trustees that are elected every four years. The terms are staggered.

The District is currently under the FEMA Flood Zone designation AE. Meaning the District has a greater than 1% chance annually that it will flood, restricting development.

8.4 Hazard Identification

RD 556's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 556 (see Table 8-2).

Table 8-2 RD 556—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Significant	Occasional	Critical	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Limited	Occasional	Negligible	Low
Dam Failure	Extensive	Unlikely	Catastrophic	Medium
Drought and Water Shortage	Significant	Likely	Limited	Medium
Earthquake	Limited	Occasional	Limited	Low
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Limited	Highly Likely	Limited	High
Landslides	Limited	Unlikely	Limited	Low
Levee Failure	Significant	Occasional	Critical	High
River/Stream/Creek Bank Erosion	Significant	Highly Likely	Negligible	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Limited	Low
Severe Weather: Fog	Extensive	Highly Likely	Limited	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Critical	Medium
Severe Weather: Wind and Tornadoes	Extensive	Highly Likely	Limited	Medium
Subsidence	Limited	Occasional	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 5560 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

8.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 556's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.556 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 556 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

8.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 0, includes a description as to how the hazard affects the RD 556 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

8.5.2. Vulnerability Assessment

This section identifies RD 556's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 8-3 lists critical facilities and other District assets identified by the RD 556's planning team as important to protect in the event of a disaster. RD 556's physical assets, valued at over $105 million, consist of the buildings and infrastructure to support the RD 556 operations.

Table 8-3 RD 556's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address/ Coordinates	Replacement Value	Hazard Info
Levee	Infrastructure	n/a	$100,000,000	
Cross-Levee	Infrastructure	n/a	$5,000,000	

Name of Asset	Facility Type	Address/ Coordinates	Replacement Value	Hazard Info
Pump Station	Infrastructure	38°12'04.75" 121°32'40"	$500,000	

Source: RD 556

Natural Resources

The District is primarily comprised of cultivated lands within the interior of the island. Some riparian habitat can be found on the waterside slope of the levees.

Historic and Cultural Resources

There are no registered historical sites. But the bucolic nature of the historic farm homes surrounded by crops within the island adds to cultural value of the Delta as place.

Growth and Development Trends

Due to zoning and floodplain restrictions, essentially no growth has occurred on the island in recent history. For this reason no growth is expected.

8.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 8-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 556 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are similar to those described in Section 4.556 of the Base Plan and are based on data provided by the District as described further below.

In general, the most vulnerable District assets include the levees and supporting structures that the District owns. There are approximately 11.2 miles of project levees and 0.46 miles of cross levee separating Upper Andrus from the rest of Andrus Island. The levee system is subject to riverine flooding. However, it is unlikely the levee system will fail due to overtopping. A high water situation could increase the hydraulic gradient within the levee that could result in under or through seepage. Seepage, if left unchecked, can result in levee failure and subsequent flooding. The District owns a pumping station that is critical for island drainage. If the drainage system becomes compromised the District could experience localized flooding. If the system becomes compromised in a flood situation, damages could be worse than anticipated.

An estimate of the vulnerability of RD 556 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

While unlikely, it is possible that dam failure can create a high water situation in the adjacent channels that could put the levee system at risk of failure from overtopping, under seepage, through seepage or debris impact. Given the distance from the dam system, a dam surge could dissipate prior to reaching this point in the Delta and result in a minor change in water elevation.

Past Occurrences

There are no past occurrences of dam failure.

Vulnerability to Dam Failure

Assets/Critical Facilities at Risk

The levees are at the highest risk to this hazard.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to erosive forces of high flows from dam failure.

Historic and Cultural Resources at Risk

Historic homes could be lost as a result of flooding due to dam failure.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by the levee system. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Drought and Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

This hazard could disrupt crop irrigation. Prolonged disruption could result in the loss of a crop that year. In the event that orchards or vineyards experience disruption in irrigation, they could be lost for multiple years until they are replanted and begin producing a crop between 3 to 5 years. Agriculture is the primary industry on the island. Agricultural users pay assessments for levee maintenance and improvements. If agriculture is lost the District will not be able to cover levee maintenance or make any necessary improvements.

Past Occurrences

Although California did recently experience an extended drought, agriculture in this District remained largely unaffected due to senior water rights and riparian water rights. Some farmers voluntarily cut water use by 25% in the Delta in response to the drought in the Summer of 2015.

Vulnerability to Drought and Water Shortage

Assets/Critical Facilities at Risk

None.

Natural Resources at Risk

None.

Historic and Cultural Resources at Risk

None.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. Further, future development is not likely to be affected by drought conditions.

Earthquake: Liquefaction

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

In the event an earthquake is intense enough to result in shaking that could cause the sandy soils to liquefy, the levees could resettle, move off their foundations and possibly fail. Failure could compromise the levee system and result in flooding.

Past Occurrences

None.

Vulnerability to Earthquake: Liquefaction

Assets/Critical Facilities at Risk

The levees are at the highest risk to this hazard.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to a destabilization of the bank from liquefaction. Liquefaction could also introduce substantial sediment into the waterway through the destabilization of soils. Sedimentation could impact sensitive aquatic species.

Historic and Cultural Resources at Risk

Historic homes could be lost as a result of compromised foundations from soil liquefaction.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by the levee system, that can be compromised during an earthquake or liquefaction event. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

A 100/200/500-year flood event could cause flooding within the District. A high water event, depending on the water elevation, could cause failure due to overtopping but more realistically could increase hydraulic gradients within the levee section resulting in landside seepage or boils. Continued seepage, if left unaddressed, could erode the levee and result in failure. Heavy flows could also cause erosion and scour on the waterside bank that could undermine the levee and cause failure.

Past Occurrences

1986 was the closest the District came to experiencing a 100-year flood. The District has not experienced a 200 or 500-year flood.

Vulnerability to Flood: 100/200/500-year

Assets/Critical Facilities at Risk

The levee system and pumping station are vulnerable to a 100/200/500-year flood, as the flows could exceed the capacity of both the levee system and the pumping station that is needed to drain the island.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to erosive forces of high flows from 100/200/500-year flows.

Historic and Cultural Resources at Risk

Historic homes could be lost as a result of flooding due to a 100/200/500 year flood event.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by the levee system, which can be compromised during a flood event. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Localized stormwater flooding can occur during heavy rains or seepage events that exceed the District's drainage capabilities. Lower areas around the island may be subject to minor flooding.

Past Occurrences

Some form of localized stormwater flooding occurs during most heavy rains. The most likely time this could have occurred in the past was during the wet year in 2006.

Vulnerability to Flood: Localized Stormwater Flooding

Assets/Critical Facilities at Risk

Localized flooding can overtax the Districts pumping system and create for a more hazardous situation involving the levee system by limiting the ability for inspection.

Natural Resources at Risk

None

Historic and Cultural Resources at Risk

Historic homes could be subject to localized stormwater flooding.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by the levee system, which can be compromised during flood events. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Levee failure could result in inundation of the District and could also result in the flooding of

Past Occurrences

None.

Vulnerability to Levee Failure

Assets/Critical Facilities at Risk

Levees and district pumping plant. An island inundation can create an open water situation where a large fetch could develop and erode the interior of other levees within the District. Inundation of the drainage pump can make it inoperable and require replacement.

Natural Resources at Risk

Waterside habitat that is adjacent to the break could be lost due to the erosive forces of the water flowing through the break.

Historic and Cultural Resources at Risk

Historic homes could be damaged from flooding as a result of a levee break.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by levee system. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

River/Stream/Creek bank erosion could destabilize the levee slope and, if left unaddressed, cause levee failure through undercutting.

Past Occurrences

Bank erosion is currently occurring on the District levees and must be remedied.

Vulnerability to Erosion

RD 556 tends to have issues along Georgiana Slough where natural curves in the channel have created erosion issues.

Assets/Critical Facilities at Risk

The District's levees are at risk of erosion.

Natural Resources at Risk

Riparian benches exist along the District's levee and are at risk of being lost due to bank erosion.

Historic and Cultural Resources at Risk

None.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by the levee system, which can be compromised by erosion. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Severe Weather: Fog

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Fog can make it difficult to perform levee inspections during high water due to lack of visibility.

Past Occurrences

Fog occurs annually.

Vulnerability to Fog

Assets/Critical Facilities at Risk

The levees are at risk due to the inability to perform inspections.

Natural Resources at Risk

None.

Historic and Cultural Resources at Risk

None.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by the levee system that could be compromised during heavy fog events. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Heavy rains and storms can result in higher flood flows that could increase the hydraulic gradients within the levee section and result in seepage or if great enough, possibly overtopping. They can also increase flows and result in erosion of the waterside bank.

Past Occurrences

The last heavy rain and storm event the District experienced was in 2006, 1997 and 1986. No significant damages occurred due to these high water events.

Vulnerability to Heavy Rain and Storms

Assets/Critical Facilities at Risk

The District levees and pumping plant are at risk of damage from heavy rains and storms.

Natural Resources at Risk

Riparian benches could be lost from high flows as a result of heavy rains and large storms.

Historic and Cultural Resources at Risk

None.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by the levee system, which can be compromised during severe storms. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

In the event of high water, wind can create wave action that could cause erosion at the waterside bank of the District's levees.

Past Occurrences

Wind occurs on a regular basis. The hazard comes when high winds are coupled with high water, which happened in the winter of 2006.

Vulnerability to Wind and Tornadoes

Assets/Critical Facilities at Risk

The District's levees.

Natural Resources at Risk

None.

Historic and Cultural Resources at Risk

None.

Future Development

It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by the levee system, which can be compromised by high wind events. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

A wildfire could destroy private property and other such structures on the island.

Past Occurrences

None.

Vulnerability to Wildfire

Assets/Critical Facilities at Risk

The District's pumping station could be damaged in a fire. Furthermore the vegetation on the District levees could be burned leaving bare soil that could be subject to erosion.

Natural Resources at Risk

Riparian and shrub scrub vegetation could be lost in a wildfire.

Historic and Cultural Resources at Risk

Historic homes could be lost in a wildfire.

Future Development

Future Development It is unlikely future development will occur provided existing zoning codes and the District's FEMA flood designation that limits building on grade. The District does not control any building that may occur in the areas protected by the levee system. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees. Wildfire is unlikely to affect future development in the District.

8.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

8.6.1. Regulatory Mitigation Capabilities

Table 8-4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 556.

Table 8-4 RD 556's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	

Local Emergency Operations Plan	In development	While this plan is being developed, there is unofficial protocol of those that live on the island have used over time to respond to flooding related hazards.
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: CBC 2013
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	Yes, the District is mostly zoned agriculture which limits development
Subdivision ordinance	N	
Floodplain ordinance	Y	Yes, Sacramento County Floodplain Ordinance restricts development in the floodplain
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	Y	AE Zone
Elevation Certificates	Y	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
RD 556 will create a Five Year Plan to develop projects that reduce risk to life and property.		

Source: RD 556

8.6.2. Administrative/Technical Mitigation Capabilities

Table 8-5 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 556.

Table 8-5 RD 556's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Drainage system is effective. Developing a tree trimming and vegetation clearing plan
Mutual aid agreements	N	
Other	N	
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	Y	Determined via the Emergency Operations Plan
Emergency Manager	Y	Determined via the Emergency Operations Plan
Community Planner	N	
Civil Engineer	Y	Staff is trained to coordinate with agencies and perform tasks in an emergency situation
GIS Coordinator	N	
Other	N	
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Fire Station siren in Walnut Grove, phone tree, Reverse 911
Hazard data and information	Y	
Grant writing	N	
Hazus analysis	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
RD 556 must organize a more appropriate warning system among trustees, public and staff. Also needs to have a plan in place to determine an Emergency Manager to coordinate Emergency Response activities.		

Source: RD 556

8.6.3. Fiscal Mitigation Capabilities

Table 8-6 identifies financial tools or resources that the RD 556 could potentially use to help fund mitigation activities.

Table 8-6 RD 556's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Delta Levees Subventions program to maintain levee system.
Authority to levy taxes for specific purposes	Y	Proposition 218 provides the District with the ability to raise assessments through a vote
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	Y	Assessments for drainage
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	Y	Bonds from Bank of Rio Vista
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	Y	Delta Levee Subventions Program and Delta Levee Special Projects, Proposition 84 and 1E
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
The involvement of Federal agencies funds would help in reducing risk as well as the removal of the sunset clause on the Delta Levees Subventions Program.		

Source: RD 556

8.6.4. Mitigation Education, Outreach, and Partnerships

Table 8-7 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 8-7 RD 556's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	Walnut Grove Volunteer Fire Department
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Department of Water Resources Delta Flood Emergency Preparedness, Cal OES
Natural disaster or safety related school programs	N	
StormReady certification	N	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
Greater public outreach from State agencies to community organizations to provide information about emergency response.		

8.6.5. Other Mitigation Efforts

The US Army Corps of Engineers performed an erosion repair project along the Sacramento River levee summer 2015 to create a riparian bench and resolve erosion issues. The District will perform vegetation removal on the Sacramento River and Georgiana Slough to reveal erosion issues. Once problematic areas are identified the District will perform repair projects to improve the levee system and reduce risk.

8.7 Mitigation Strategy

8.7.1. Mitigation Goals and Objectives

RD 556 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

8.7.2. Mitigation Actions

The planning team for RD 556 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Flood Response Activities, Georgiana Slough Weir

Hazards Addressed: Dam Failure, Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: A weir would reroute flood flows on Upper Andrus Island to Georgiana Slough to keep Andrus, lower Andrus and Brannan Islands from flooding. This would reduce the damages from a flood event on Upper Andrus significantly as the islands are separated by a cross-levee that may be insufficient for blocking flood flows.

Project Description: Place a weir along Georgiana Slough upstream of the cross levee to protect the adjacent islands from flooding.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Cost Estimate: In development, unknown at this time

Benefits (Losses Avoided): Will flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains from downstream islands with high value property and infrastructure.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Summer 2017

Project Priority: Medium

Action 2. Georgiana Slough Vegetation Management

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind, Wildfire

Goals Addressed: 1, 2, 3

Issue/Background: Limited funding has resulted in deferred maintenance of the levees vegetation. The vegetation is so dense it covers any potential erosion areas on the levee system.

Project Description: Trim trees and remove dense vegetation in accordance with the Central Valley Flood Protection Plan

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: $500,000

Benefits (Losses Avoided): Aides in providing information for projects that will reduce in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Summer 2017

Action 3. Georgiana Slough Waterside Erosion Repair

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: Scour due to high flows and channel meander has eroded and undercut the waterside bank. If left unaddressed, the slope may fail or result in underseepage that could ultimately cause levee failure and flood.

Project Description: These erosion areas have to initially be determined. Once they are a design will be developed. The designs will generally include filling voids at the waterside toe with rip rap and riparian bench will be enhanced with added fill. The levee slopes will be regraded and fill added to accommodate a Bulletin 192-82 critical levee section. Levee slopes will be a minimum of 2:1 landside and 3:1 water side where applicable.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: Not available.

Benefits (Losses Avoided): Reduction in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Summer 2018

Action 4. Topographic and Hydrographic Surveys and Data Collection

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: In the development of projects, topographic and hydrographic survey data must be performed to reveal areas that need repair and maintenance. It can also be used to develop designs and estimate costs to repair the levee system.

Project Description: Topographic survey data will be assembled through the use of field surveys and LiDAR data. Hydrographic surveys will be performed along Georgiana Slough to reveal bank erosion.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: $30,000

Benefits (Losses Avoided): Aides in providing information for projects that will reduce in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: 2019

Delta Annex Chapter 9 Reclamation District 563

9.1 Introduction

This new chapter of the Delta Annex details the hazard mitigation planning elements specific to Reclamation District 563 (RD 563), a new 2016 participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by RD 563. This chapter of the Delta Annex provides additional information specific to RD 563, with a focus on providing additional details on the planning process, risk assessment and mitigation strategy for this District.

9.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 563 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 9-1. Additional details on plan participation and RD 563 representatives are included in Appendix A.

Table 9-1 RD 563 Planning Team

Name	Position/Title	How Participated
Chris Neudeck, KSN, Inc	District Engineer	Attended meetings, collected data, reviewed draft docs
Bill Darcie, KSN, Inc.	Project Manager	Attended meetings, collected data, reviewed draft docs
Brenna Howell, KSN, Inc.	Emergency Planner	Attended meetings, collected data, drafted text, reviewed draft docs

Source: RD 563

9.3 Community Profile

The community profile for RD 563 is detailed in the following sections. Figure 9-1 displays a map and the location of RD 563 boundaries within Sacramento County.

Figure 9-1 Reclamation District 563 Map

Source: RD 563 2013 5-Year Plan

9.3.1. RD 563 Overview

Reclamation District No. 563, also known as Tyler Island, is responsible for maintaining the levee and drainage system that provides flood protection for primarily agricultural land, there's also a small portion of infrastructure, residential, commercial, industrial, and governmental land use. Tyler Island is located in the Northern Delta between the town of Walnut Grove to the north, Staten Island to the east, Bouldin Island to the south, and Andrus Island to the West. The Island is surrounded by three major waterways, Snodgrass Slough to the north, the Mokelumne River to the east and Georgiana Slough to the west. There are three land access points onto the island including Walnut Grove Road to the north, the Walnut Grove bridge crossing of the Mokelumne River in the northeast, and the Tyler Island Road bridge crossing of Georgiana Slough in the southwest. Much of the District's levees are topped with paved or gravel Sacramento County roads including Walnut Grove Road to the north, Tyler Island Road which wraps around the southern two-thirds of the District, and Race Track Road to the northwest. The remainder of the District's levees are topped with a minimum 16' wide all-weather gravel road surface.

9.3.2. District History and Background

Reclamation District No. 364 (Upper Tyler Island) was formed on August 6, 1880, and Reclamation District No. 532 (Lower Tyler Island) was formed on February 11, 1891. On May 7, 1894 a petition was filed with the Sacramento County Board of Supervisors to form the current Reclamation District No. 563, which included the lands within the existing Reclamation District Nos. 364 and 532, along with lands that up to that time did not fall within the boundaries of an organized Reclamation District. Upon the formation of Reclamation District No. 563, District Nos. 364 and 532 ceased. Today Reclamation District No. 563 encompasses a total area of 8,990 acres, surrounded by 22.9 miles of levee, all located within Sacramento County.

The District's Board of Trustees is made up of three Trustees who meet regularly on a quarterly basis.

9.4 Hazard Identification

RD 563's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 563 (see Table 9-2).

Table 9-2 RD 563—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Extensive	Occasional	Limited	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Extensive	Occasional	Limited	Low
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Extensive	Occasional	Critical	Low
Earthquake	Extensive	Occasional	Limited	Medium
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Extensive	Occasional	Critical	High
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Extensive	Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Limited	Unlikely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Likely	Limited	Low
Severe Weather: Fog	Extensive	Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Likely	Critical	Medium
Severe Weather: Wind and Tornadoes	Extensive	Likely	Critical	High
Subsidence	Extensive	Likely	Critical	Medium
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Unlikely	Negligible	Low

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

9.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 563's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 563 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

9.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 9.5.3, includes a description as to how the hazard affects the RD 563 and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

9.5.2. Vulnerability Assessment

This section identifies RD 563's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 9-3 lists particular critical facilities and other District assets identified by the RD 563's planning team as important to protect in the event of a disaster. RD 563's physical assets, valued at over $6.3 million, consist of the buildings and infrastructure to support the RD 563 operations.

Table 9-3 RD 563's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Drainage Conveyances (92,650 ft.)	Essential Services	–	$325,000	Flood, Levee Failure, Liquefaction

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Pump Station #1 (including all station components)	Essential Services	–	$2.0 mil	Flood, Levee Failure, Liquefaction
Pump Station #2 (including all station components)	Essential Services	–	$2.0 mil	Flood, Levee Failure, Liquefaction
Pump Station #3 (including all station components)	Essential Services	–	$2.0 mil	Flood, Levee Failure, Liquefaction
West Thornton-Walnut Grove Gas Field	Essential Services	–	–*	Flood, Levee Failure, Liquefaction

Source: RD 563

* The gas field is not owned by the District, but is protected by its levees. No replacement value was available to the District Planning Team.

The Delta Risk Management Strategy Phase 1 report estimates the total assets within Reclamation District No. 563 to be $91,184,000, and does not include the value of the land. The Public Policy Institute estimates the land value to be $33,202,759, and the asset value to be $92,866,000. Recent land sales of similar properties and soil types in the region indicate the current land values are approximately $62,930,000. The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately $6,293,000. This does not take into account two bridges on the Island which are collectively valued at approximately $50,000,000. The total value of land and assets is approximately $119,223,000. Given that this is a unique property is in a very desirable location with many opportunities for other uses, the value could be in excess of the stated amount.

Natural Resources

The Reclamation District No. 563 levee provides protection for valuable habitat essential for many threatened and endangered species. In general, Delta lands, including those protected by the District's levees, provide forage and cover for local and migratory populations of birds and terrestrial wildlife including many special status species. The levees also provide important waterside habitat and shoreline for various fisheries that includes several special status species. Flooding of Delta islands destroys habitat and kills most terrestrial species present.

In the District, according to a survey done in 2002, a total of 53.0 acres of levee-associated habitat and 38,997 linear feet of SRA habitat exist. Most of the levee-associated vegetation recorded on Tyler Island (44.7 acres) was riparian forest (trees greater than 20ft.tall). Riparian forest stands with Willow, Alder, and/or Oregon Ash consisted of 29.2 acres. Stands with Oak and/or Cottonwood accounted for 10.7 acres (24.0% of all RF). Additionally, Walnut trees totaled 2.5 acres. Other species accounted for 2.3 acres and associated with Tyler levees include: Box Elder, Black locust, Elderberry, Sycamore, Pine, and Button Bush. Most of the above habitat was recorded along Georgiana slough.

The second most common habitat type was shrub/scrub (7.8 acres). Observations involved individual plants from 5 to 19 feet tall. Over half (4.6 acres) of all shrub/scrub included Himalayan Blackberry and/or California Wild Rose. Both species can serve as forage and cover for birds and small mammals. Willow and Alder were also well represented (2.8 acres or 36%). All other shrub/scrub species only accounted for 0.37 acres or 5.0% of the total.

Freshwater marsh species were not very prevalent on Tyler Island (0.5-acre total). Tule species made up the vast majority of all freshwater marsh species recorded here. Cattail was only observed in one area and represents a negligible amount of freshwater marsh on Tyler.

Special Status Species identified on Tyler Island include three Western Pond Turtles (*Clemmys marmorata*) and a single Swainson Hawk (*Buteo swainsoni*). The Western Pond Turtles were identified at two separate locations (two individuals at one and a single turtle at the other). A Swainson Hawk was also identified on Tyler Island. "Special status" refers only to nesting populations of Swainson Hawks.

Historic and Cultural Resources

The District Planning Team noted that there are no known sites in the District.

Growth and Development Trends

Reclamation District No. 563 is zoned almost entirely (96%) as agricultural land. The remainder of the District is zoned as Industrial, Miscellaneous, Pipeline, Residential, Roadway, and Gas Well. The land on the District is owned by more than fifty different entities ranging from private land owners and utility companies to the local county government. The District Planning Team noted that there has been no growth and or development in the District during the last planning period.

9.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 9-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 563 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable structures are those located within the floodplain or within levee and dam inundation areas, such as older facilities that may be constructed with unreinforced masonry and buildings built prior to the introduction of modern building codes. Buildings that contain electronic or electrically operated equipment are also vulnerable to flood inundation.

In general, the most vulnerable District assets include the levees and supporting structures that the District owns.

An estimate of the vulnerability of the RD 563 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.

- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Earthquake

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicenter location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

Past Occurrences

After the most recent Napa Earthquake the District performed levee inspections and verified the continued operation of the pump stations around the island to check the levee integrity and ensure there was no damage to District assets as a result of the earthquake.

Vulnerability to Earthquake

Assets/Critical Facilities at Risk

The levees structures, pump stations and drainage conveyances are potentially at risk to an earthquake.

Natural Resources at Risk

All natural resources could be affected by an earthquake causing damage to the levee structure should the island flood due to an earthquake.

Historic and Cultural Resources at Risk

There are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levee, which could be compromised during an earthquake event, the District does not control this development. The District only can control whether the levees meet certification standards.

Earthquake: Liquefaction

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Earthquake is discussed in the section above, but is primarily focused on the vulnerability of buildings and people from earthquake shaking. This section deals with a secondary hazard associated with earthquake – the possible collapse of structural integrity o and the possible collapse of delta levees, due to liquefaction.

Past Occurrences

The District Planning Team noted that there are no known past occurrences of liquefaction to have affected RD 563.

Vulnerability to Liquefaction

Assets/Critical Facilities at Risk

The U.S. Geological Survey estimates that an earthquake of magnitude 6.7 or greater has a 62 percent probability of occurring in the San Francisco Bay Area between 2003 and 2032. Such an earthquake is capable of causing multiple levee failures in the Distict which could result in fatalities, extensive property damage and the interruption of water exports from the Delta for an extended period of time. Potential earthquakes on the Hayward, Calaveras or San Andreas faults pose the highest risk to Delta Region levees. All assets in the District are at risk to the effects of liquefaction.

Natural Resources at Risk

All natural resources in the District would be at risk to liquefaction and associated levee failures.

Historic and Cultural Resources at Risk

There are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levee, which could be compromised during an earthquake event, the District does not control this development. The District only can control whether the levees meet certification standards.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Tyler Island is located between two significant waterways, the North Fork of the Mokelumne River to the east, and Georgiana Slough to the south and west. Flooding on any of these waterways could cause problems for RD 563. Any overtoppings or other failures due to the proximity of these waterways are specifically noted below.

Past Occurrences

The 5-year plan for RD 563 included the following events of flooding in the District.

- 1906 and 1907 - A series of regional flood events occurred. More information can be found in the Past Occurrences Section of Levee Failure below.

Vulnerability to Flood

Assets/Critical Facilities at Risk

Flooding of Delta islands has the potential to negatively impact water quality both locally and statewide. The largest of California's drinking water sources is the Sacramento-San Joaquin Delta and its tributaries. The Delta provides water throughout the state via the State and Federal water projects. During a flood, there is a higher potential for the waters in the Delta to be exposed to chemicals, fuel, oil, and multiple other constituents of concern that can quickly degrade water quality. Flooding can also disturb soil and soil-borne materials such as mercury and organic matter that can degrade water quality.

Should a flood breach the levees, the entirety of the assets of RD 563 would be at risk. Levee failure is discussed later in this section. Flooding also causes erosion, which is discussed later in this section.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards.

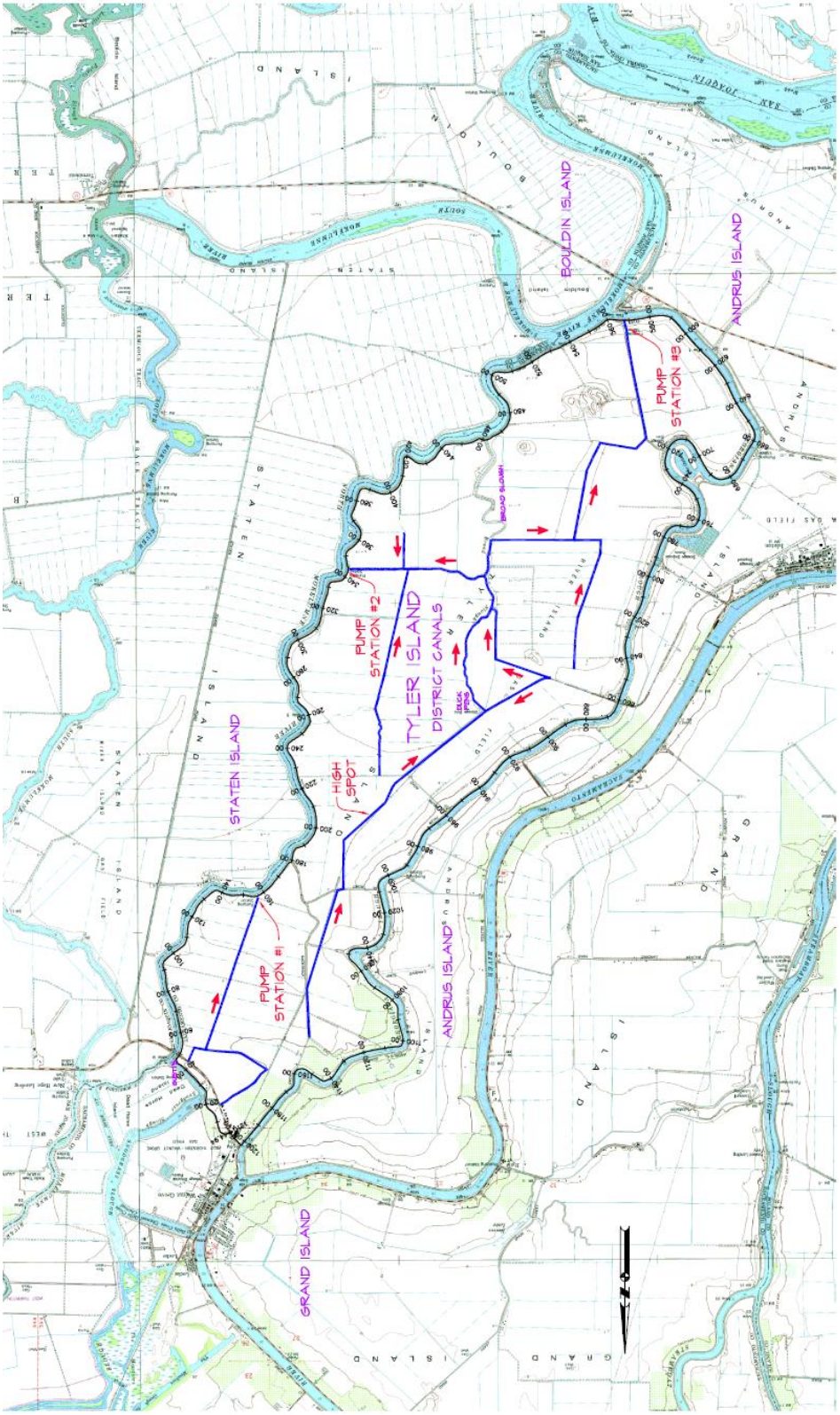
Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Historically, RD 563 has been at risk to flooding primarily during the spring months when river systems in the County swell with heavy rainfall. Localized flooding also occurs throughout the Planning Area at various times throughout the year with several areas of primary concern unique to the District. The District has a drainage system set up deal with localized flooding. This is shown on Figure 9-2.

Figure 9-2 RD 563 Drainage System



Source: RD 563 2013 5-Year Plan

Past Occurrences

The District Planning Team noted that in the last planning period there were no past occurrences.

Vulnerability to Localized Flood

Assets/Critical Facilities at Risk

The District Planning Team noted that all District assets are at risk to localized flooding; however, this flooding is likely to be a nuisance-type of flood, and would not have lasting impacts on the District.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will

collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters.

The Tyler Island levee provides a public benefit by maintaining water quality and water supply reliability for cities and farms in the San Joaquin Valley, San Francisco Bay area, and Southern California. Tyler Island is situated upstream of where fresh river water and salty bay water meet and mix. Under typical summer salinity conditions in the lower Sacramento River, salinity rises sharply at the outlet of the river into the bay. The Tyler Island levee is critical to controlling salinity intrusion to the interior Delta. A levee break would increase the rate and area of mixing and would allow the saline bay water to move further upstream, jeopardizing the fresh water supply exported from the Delta for the Central Valley Project water supply, the State Water Project, and the Contra Costa intake.

Most flooding occurs in winter and spring, when major saltwater intrusion is less likely. There are occasional levee failures under low-flow conditions, which can cause major short-term water-quality problems. For instance, the Andrus Island levee failed in the summer of 1972.

According to sources cited in the 5-Year Plan, salt concentrations in the central and western Delta quickly showed an increase up to six times their pre-failure levels, and additionally may have been a contributing factor in high mortality of juvenile bass that year. It took a large volume of extra reservoir releases to flush the salty water from the west Delta. Similar effects could occur if the Tyler Island levee was to fail under low flow conditions.

Past Occurrences

Historically, flooding in the Delta has resulted from levee failures caused by the separate or coincidental occurrence of very high tides and high stream outflow through the delta region. Strong onshore winds associated with low pressure storms aggravate flood potential by causing an additional rise of the water surface elevations, and can cause severe erosion on levees in a short period of time. Flood events resulting from high tides and/or high stream outflow cannot be reliably predicted, but should be expected to occur in the future. Levee failures from collapse of rodent dens, seepage, falling trees, or some other mechanical failure are unpredictable and relatively uncommon. Routine levee inspections are the primary protection against these types of levee failure events. It should be noted that since 1986, significant portions of the levee system within the Legal Delta have been rehabilitated and improved, which has resulted in an overall reduction in the number of flooded islands during post-1986 Delta flood threats.

The 5-year plan for RD 563 included the following events of levee failure in the District.

- 1906 and 1907 – A series of regional flood events caused the inundation of several islands including Reclamation District No. 563.

- 1982 – A series of large storms that produced heavy rain and high winds caused heavy runoff and high tide conditions that impacted the Districts levee, as well as the entire Sacramento – San Joaquin Delta region. The resulting impacts to the District's levee included water overtopping the levee, increased seepage through the levee, subsidence and partial failure of the levee landside slope, and severe erosion to the waterside slope including degradation of the existing rock slope erosion protection. $1.44 million in damages were sustained in this event.
- 1986 – Due to the extreme storm event, multiple days of heavy rain, strong winds from extreme low pressure gradients, high tides and runoff affecting the entire Sacramento-San Joaquin Delta, the District's levee failed in two locations along the North Fork of the Mokelumne River at approximate levee stations 228+00 and 238+00. More than $9 million in damages were sustained in this event.
- 1997 - A series of large storms that produced heavy rain and high winds caused heavy runoff and high tide conditions that impacted the Districts levee, as well as the entire Sacramento – San Joaquin Delta region. The District claimed costs for flood event related erosion repairs, emergency response – floodfight, and engineering technical assistance. Due to the improvements to the District's levee since the 1986 flood event, and well organized floodfight response, the District's levees and sustained only minor damage and performed well. $781,912 in damages were reported.
- 2006 Winter Storms. (FEMA 1628-DR) A large series of storm events generating high winds and heavy rain caused rivers to rise above flood stage. High winds during this time caused damage to the District's rock slope protection at various locations, road damage from levee patrols and repair equipment and seepage problems. Repairs were made to the rock slope protection and roads. The seepage site was stabilized with a gravel blanket. Overall the levee performance was good.

Vulnerability to Levee Failure

The primary threats to Delta levees are high water surface elevations from floods or high tides, wave action due to high winds or boat wakes, and rodent damage, either as individual actions or in combination. Levees that may have structural issues involving poor foundations, inadequate geometry or other geotechnical issues can be at a higher risk of failure from any of the primary threats. Subsidence of Delta lands has been reported to be a major risk to Delta levees, however, subsidence is limited or non-existent under and adjacent to the levees as those areas have consolidated over the last fifty years and oxidation of the peat foundations is limited because it is not farmed. Subsidence in general is limited to a very small percentage of the delta. Seismic risk is always a factor for California, but it is generally thought by Delta engineers to have been overstated in the DRMS study, and therefore is not something that is currently designed for, although, any levee improvements will help to mitigate that risk. Climate change and sea level rise have also been identified as issues for levee vulnerability. Because these impacts will occur over long periods of time, it should not be an overwhelming problem to address them as they occur.

The two primary vulnerabilities that threaten the levee system on Tyler Island involve levee stability and levee geometry. The Tyler Island levee system has a history of levee stability problems including settlement, movement, seepage, and slope failure. Documentation of the levee's performance is extensive. There are several historical seepage sites up and down the district due to threats ranging from foundation and structural soil deficiencies to rodent damage. Waterside erosion also continues to be a constant threat, especially along the Project Levee portion of Georgiana Slough. The levee break in 1986 and the ensuing inundation of the entire Island however, stands as the most poignant reminder of levee vulnerability. Levee improvements since that time have greatly improved the District's levee system and the levee has performed well in subsequent flood events.

Georgiana Slough which borders the District Project Levee, is a major corridor to transport Sacramento River water to the State and Federal water project pumps located in the southern Delta. Failure the Project Levee could impact the operation of those facilities.

Assets/Critical Facilities at Risk

Should the levees fail, all District assets would be at risk.

A failure or breach of the District's levee system could result in flooding of the District to depths of approximately 25 feet on average. Costs associated with such an event have been calculated using actual costs from the 2004 Jones Tract Flood. All information used was gathered from the final FEMA Project Worksheets used to close out the claims for all of the public agencies involved in the disaster event (FEMA 1529-DR). Additional costs for work not claimed to FEMA included work performed by the United States Army Corps of Engineers; these costs were established from the invoiced amount provided by the Contractor. For Reclamation District No. 563, the estimated cost of a flood event resulting from a single levee failure would be approximately $31,600,000 based on the costs from the 2004 Jones Tract flood event, with costs for distinct emergency and repair activities. The cost analysis above does not include damage to privately owned property and improvements.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous

amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

Past Occurrences

The 5-year plan for RD 563 included the following events of erosion in the District.

- 1982 – A series of large storms that produced heavy rain and high winds causing erosion in the District. More information can be found in the Past Occurrences Section of Levee Failure above.
- 1997 – A series of large storms that produced heavy rain and high winds caused heavy runoff and high tide conditions that eroded the Districts levee. More information can be found in the Past Occurrences Section of Levee Failure above.
- 2006 – A large series of storm events generating high winds and heavy rain caused rivers to rise above flood stage. High winds during this time caused damage to the District's rock slope protection at various locations. More information can be found in the Past Occurrences Section of Levee Failure above.

Vulnerability to Erosion

Assets/Critical Facilities at Risk

The entirety of the levee system in RD 563 is at risk to erosion.

Natural Resources at Risk

The District Planning Team noted that flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levee, which can be compromised by severe erosion, the District does not control this development. The District only can control whether the levees meet certification standards.

Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning)

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the District. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

The 5-year plan for RD 563 included the following events of severe weather in the District.

- 1986 – Due to the extreme storm event, multiple days of heavy rain, strong winds from extreme low pressure gradients, high tides and runoff affecting the entire Sacramento-San Joaquin Delta, the District's levee failed. More information can be found in the Past Occurrences Section of Levee Failure above.
- 1997 – A series of large storms that produced heavy rain and high winds caused heavy runoff and high tide conditions that impacted the Districts levee, as well as the entire Sacramento – San Joaquin Delta region. More information can be found in the Past Occurrences Section of Levee Failure above.

Vulnerability to Heavy Rains and Storms

Assets/Critical Facilities at Risk

Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees. However, it is the secondary effects of heavy rain and storms that are of concern to RD 563. Heavy rains can cause flooding, levee failure, and stream bank erosion. Flooding, levee failure, and stream bank erosion can cost RD 563 millions in damages.

Natural Resources at Risk

The District Planning Team noted that flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levee, which can be compromised during severe storm events, the District does not control this development. The District only can control whether the levees meet certification standards.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

According to historical hazard data, severe weather (including high winds) is an annual occurrence in the District. Tornadoes occur much less frequently. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

The 5-year plan for RD 563 included the following events of winds and tornadoes in the District.

- 1986 – Due to the extreme storm event, multiple days of heavy rain, strong winds from extreme low pressure gradients, high tides and runoff affecting the entire Sacramento-San Joaquin Delta, the District's levee failed. More information can be found in the Past Occurrences Section of Levee Failure above.
- 2006 Flood Event. Rip rap was placed on waterside slopes to mitigate damage caused from high winds.

Vulnerability to Wind and Tornadoes

Assets/Critical Facilities at Risk

The District Planning Team noted that the entire levee structures are at risk from wind.

Natural Resources at Risk

The District Planning Team noted that all natural resources are at risk if wind caused levee failure in the District.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levee, which can be compromised during high wind events, the District does not control this development. The District only can control whether the levees meet certification standards.

Subsidence

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

For over a century, subsidence of the organic soils in portions of the Delta has led to an increasing need for subsurface drainage. Aerobic oxidation of organic carbon, the primary cause of subsidence, began in the late 1800s as the nutrient-rich organic soils were cleared and farming began. Peat fires, lit to level agricultural fields prior to 1950, and wind erosion are also significant causes of subsidence throughout the Delta. Since reclamation of the island began, elevations have fallen to as much as 20 feet below sea level, requiring protection by over 1,125 miles of man-made levees throughout the Delta. Drainage is provided by a network of ditches that collect and transport shallow groundwater, irrigation runoff, and levee seepage to pump stations that discharge back into the Delta waterways. These ditches create an unsaturated root zone for crops, and provide a more stable levee foundation.

Past Occurrences

The 5-year plan for RD 563 included the following events of subsidence in the District.

- 1982 – A series of large storms that produced heavy rain and high winds causing subsidence in the District. More information can be found in the Past Occurrences Section of Levee Failure above.

Vulnerability to Subsidence

Assets/Critical Facilities at Risk

The management issues raised by land subsidence range in scale from those faced by individual farmers to the possible global-scale issue posed by the carbon-dioxide flux, with its possible link to climate change. At the most local level, individual farmers or reclamation districts must maintain drainage networks on the islands and pump the agricultural drainage back into waterways. These costs increase gradually as subsidence progresses. All levee structures in RD 563 are at risk to subsidence.

Natural Resources at Risk

The District Planning Team noted that all natural resources are at risk from subsidence.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levee, which can be compromised by subsidence activity, the District does not control this development. The District only can control whether the levees meet certification standards.

9.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

9.6.1. Regulatory Mitigation Capabilities

Table 9-4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 563.

Table 9-4 RD 563's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y 2013	5 Year Plan identifies hazards that may affect RD 563. Some mitigation strategies are proposed. An Evacuation Plan is detailed, as well as an Emergency Response Plan.
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	Under development at time of development of this planning process
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Version/Year:

Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 563

9.6.2. Administrative/Technical Mitigation Capabilities

Table 9-5 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 563.

Table 9-5 RD 563's Administrative and Technical Mitigation Capabilities

Administration	**Y/N**	**Describe capability Is coordination effective?**
Planning Commission	N	
Mitigation Planning Committee	Y	RD 1601 staff and KSN, Inc. staff
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	
Mutual aid agreements	Y	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	

Emergency Manager	Y	KSN, Inc.
Community Planner	N	
Civil Engineer	Y	KSN, Inc.
GIS Coordinator	Y	KSN, Inc.
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	Y	KSN, Inc.
Grant writing	Y	KSN, Inc.
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 563

9.6.3. Fiscal Mitigation Capabilities

Table 9-6 identifies financial tools or resources that the RD 563 could potentially use to help fund mitigation activities.

Table 9-6 RD 563's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	
Authority to levy taxes for specific purposes	Y	Levy Assessment Program but not taxes
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	Y	Part of our Levy Assessment Program
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	Y	USACE PL84-99
State funding programs	Y	DWR Levee Subventions and Special Projects Program
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 563

9.6.4. Mitigation Education, Outreach, and Partnerships

Table 9-7 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 9-7 RD 563's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

9.6.5. Other Mitigation Efforts

The entire Tyler Island levee system is inspected daily by the landowners, Trustees, and/or District staff who are familiar with all aspects of its functions. The District Engineer typically performs inspections at the request of the District, or more frequently when warranted. During high water or severe weather events, inspection frequency is increased to meet the demand. Like all Federal Project Levees, the Georgiana Slough Project Levee portion of the District is inspected in the fall and spring by the Department of Water Resources levee inspectors. Reports are compiled and submitted to the District. The District staff also inspects the Federal Project Levee in the winter and summer, and submits reports back to the Department of Water Resources.

9.7 Mitigation Strategy

9.7.1. Mitigation Goals and Objectives

RD 563 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

9.7.2. Mitigation Actions

The planning team for RD 563 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Rock Slope Protection Project

Hazards Addressed: EQ, EQ Liquefaction, Flood: 100/200/500-year, Flood: Localized Stormwater Flooding, Levee Failure, River/Stream/Creek Bank Erosion, Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning), Severe Weather (Wind and Tornadoes), Subsidence

Goals Addressed: 1, 3

Issue/Background: The goal of this Mitigation Action is to improve the Tyler Island levees over the next five years to a level of protection that meets, or exceeds, the U.S. Army Corps of Engineers' (USACE) PL84-99 Levee Standard.

Project Description: The District would like to ensure the protection of the existing levee by adding supplementary quarry stone riprap above the existing riprap to any portions of the waterside slope of the levee requiring supplementary rock slope protection. This will prevent erosion and avoid ongoing repairs to the levee structure.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: Permitting process, Finalizing the EIR, potential CEQA Design Process

Responsible Office/Partners: RD 563

Project Priority: High

Cost Estimate: $813,000

Benefits (Losses Avoided): Preservation of 563 levee structures, Ecosystem Restoration and Habitat Enhancement Component, Reversing Land Subsidence, Ensuring Adequate and Effective Emergency Response Plans, Benefitting Water Quality, Improving Water Supply Reliability

Potential Funding: Prop 1 and 1E, 84 Funds, HMGP Grant Programs, seeking cost sharing partners for project ongoing.

Timeline: 1-10 years depending on regulatory process and funding

Action 2. HMP and PL-8499 Levee Improvement Projects

Hazards Addressed: EQ, EQ Liquefaction, Flood: 100/200/500-year, Flood: Localized Stormwater Flooding, Levee Failure, River/Stream/Creek Bank Erosion, Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning), Severe Weather (Wind and Tornadoes), Subsidence

Goals Addressed: 1, 3

Issue/Background: The goal of this Mitigation Action is to improve the Tyler Island levees over the next five years to a level of protection that meets, or exceeds, the U.S. Army Corps of Engineers' (USACE) PL84-99 Levee Standard.

Project Description: The District would like to bring portions of the RD 563 levee currently below the HMP Criteria to six inches above the PL 84-99 Standard using 2:1 landside slopes. If sufficient funding is available, the segments of levee improved during this phase will include portions of the levee that meet the HMP Criteria, but do not meet the design template for this project, due to the many relatively short stretches of levee that do not meet the PL 84-99 Standard in close proximity to longer stretches of levee that do not meet the HMP Standard. After the entire levee meets or exceeds the HMP Criteria, the District will bring any remaining portions of levee below the PL 84-99 Standard to six inches above the PL 84-99 Standard.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: Permitting process, Finalizing the EIR, CEQA Design Process

Responsible Office/Partners: RD 563

Project Priority: High

Cost Estimate: $16,000,000

Benefits (Losses Avoided): Preservation of 563 levee structures, Ecosystem Restoration and Habitat Enhancement Component, Reversing Land Subsidence, Ensuring Adequate and Effective Emergency Response Plans, Benefitting Water Quality, Improving Water Supply Reliability

Potential Funding: Prop 1 and 1E, 84 Funds, HMGP Grant Programs, seeking cost sharing partners for project.

Timeline: 1-10 years depending on regulatory process and funding

Delta Annex Chapter 10 Reclamation District 1002

10.1 Introduction

This chapter to the Delta Annex details the hazard mitigation planning elements specific to the Reclamation District 1002 (RD 1002), a new participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter to the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the RD 1002. This chapter of the Delta Annex provides additional information specific to RD 1002, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

10.2 Planning Process

As described above, the District followed the planning process detailed in Section 1002 of the base plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 1002 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 10-1. Additional details on plan participation and RD 1002 representatives are included in Appendix A.

Table 10-1 RD 1002 Planning Team

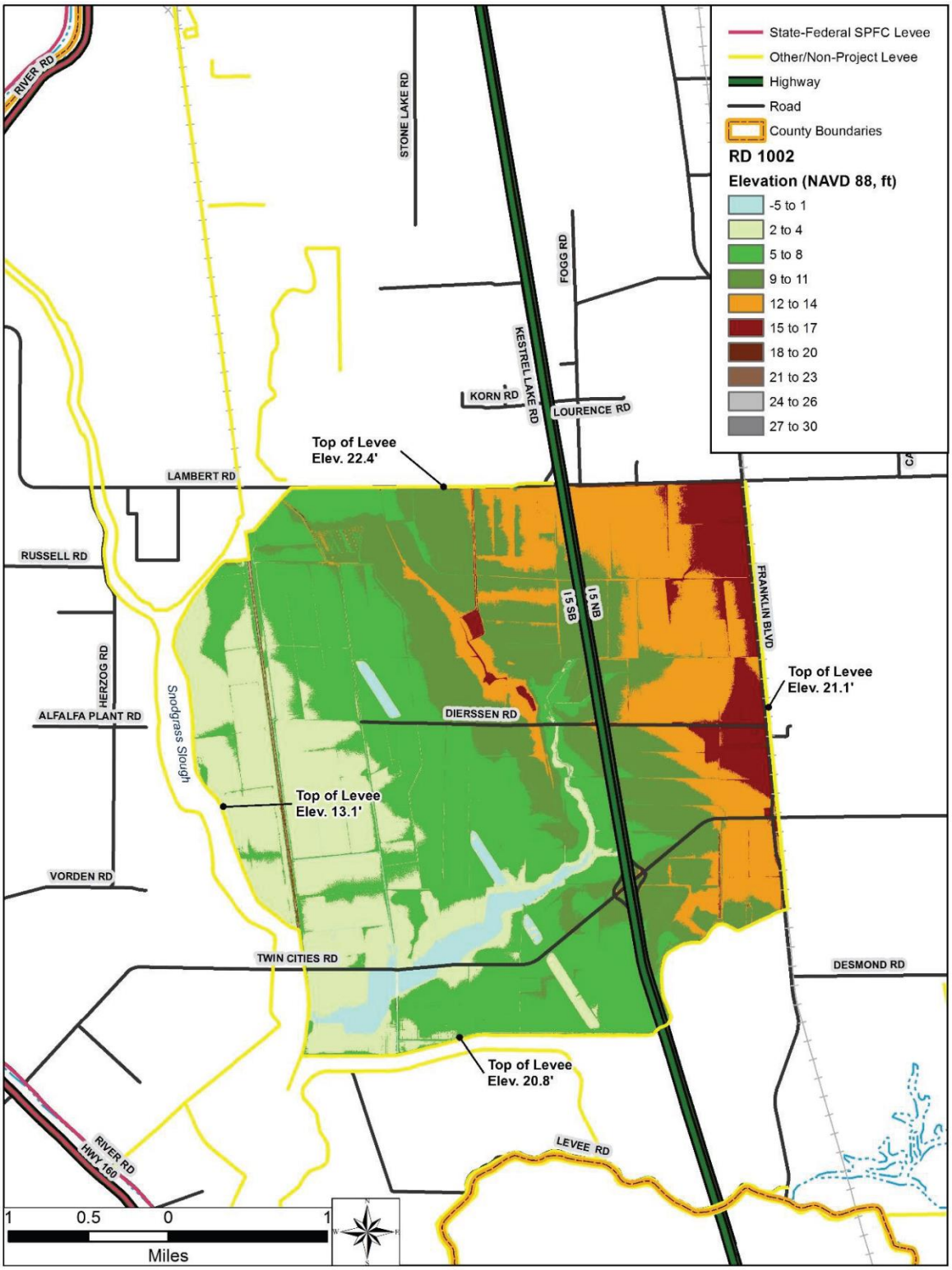
Name	Position/Title	How Participated
Emily Pappalardo	Project Manager	Attended meetings, collected data, drafted text, reviewed draft docs
Gilbert Labrie	District Engineer	Collected data, reviewed draft docs

Source: RD 1002

10.3 Community Profile

The community profile for RD 1002 is detailed in the following sections. Figure 10-1 displays a map and the location of RD 1002 boundaries within Sacramento County.

Figure 10-1 Reclamation District 1002



10.3.1. RD 1002 Overview, Background, and History

Glanville Tract, Reclamation District 1002 (RD 1002 or District) was established in May 6, 1912 under water code Section 50000 et. seq. It has three trustees that are elected in 4-year, staggered terms. The Board of Trustees meets on an as needed basis. Glanville Tract is 6,829 acres and is surrounded by Snodgrass Slough on the south and west. Glanville Tract is located in Sacramento County in the Primary and Secondary Zone of the Delta. Approximately 13.4 miles of levees surround RD 1002 and are non-project levees.

As described in the Glanville Tract Flood Emergency Safety Plan, Reclamation District 1002 is responsible for maintenance, repair, and improvements of its nearly than 13.4 miles of levees and drainage system providing flood protection. The District maintains canals and ditches that provide drainage to the property owners. The levees protect the District, which is predominantly agricultural land, from flooding. Alfalfa, grain, orchards, tomatoes, potatoes, vineyards are the primary crops grown on the island; there is also a significant amount of irrigated pasture for cattle and goats.

There are 15 households on the Tract with a changing population of no more than 59 people. The maintenance of the levee system is critical to the economy supported by acres of prime agricultural land. Interstate 5 runs through the middle of the Tract, Lambert Road on the north, Franklin Boulevard on the east, and Twin Cities Road on the south.

10.4 Hazard Identification

RD 1002's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 1002 (see Table 10-2).

Table 10-2 RD 1002—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Significant	Occasional	Critical	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Limited	Occasional	Negligible	Low
Dam Failure	Extensive	Unlikely	Catastrophic	Medium
Drought and Water Shortage	Significant	Likely	Critical	Medium
Earthquake	Limited	Occasional	Limited	Low
Earthquake: Liquefaction	Significant	Occasional	Limited	Low
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Significant	Highly Likely	Medium	High
Landslides	Limited	Unlikely	Limited	Low
Levee Failure	Limited	Occasional	Critical	High
River/Stream/Creek Bank Erosion	Limited	Highly Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Limited	Low
Severe Weather: Fog	Extensive	Highly Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Critical	Medium
Severe Weather: Wind and Tornadoes	Extensive	Highly Likely	Limited	Medium
Subsidence	Limited	Occasional	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 10020 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

10.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 1002's hazards and assess the District's vulnerability separate from that of the planning area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the planning area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 1002 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

10.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 10.5, includes a description as to how the hazard affects the RD 1002 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the planning area.

10.5.2. Vulnerability Assessment

This section identifies RD 1002's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 10-3 lists critical facilities and other District assets identified by the RD 1002's planning team as important to protect in the event of a disaster. RD 1002's physical assets, valued at over $120 million, consist of the buildings and infrastructure to support the RD 1002 operations.

Table 10-3 RD 1002's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address/ Coordinates	Replacement Value	Hazard Info
Levee	Infrastructure	n/a	$115,000,000	
Pumping Station	Infrastructure	38° 16' 08.40"	$5,000,000	

Name of Asset	Facility Type	Address/ Coordinates	Replacement Value	Hazard Info
		121° 29' 05.24"		

Source: RD 1002

Natural Resources

There is a significant amount of riparian vegetation along Snodgrass Slough which is approximately 7 miles in length on the western and southern ends of Glanville Tract. There are also areas of freshwater marsh on the south east corner of the district.

Historic and Cultural Resources

There are several homes and structures that house the farmers and support agricultural activities on the island.

Growth and Development Trends

Due to zoning and floodplain restrictions, essentially no growth has occurred on the island in recent history. For this reason no growth is expected.

10.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 10-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 1002 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the base plan for more detailed information about these hazards and their impacts on the Sacramento County planning area). Methodologies for calculating loss estimates are the similar to those described in Section 4.1002 of the base plan and are based on data provided by the District as described further below. In general, the most vulnerable District assets include the levees and supporting structures that the District owns. Of the 13.4 miles of levee that surrounds the district 7 miles of that system border Snodgrass Slough. The levee system is subject to riverine flooding and storm water run-off. The levee system could fail due to overtopping or seepage. A high water situation could increase the hydraulic gradient within the levee that could result in under or through seepage. Seepage, if left unchecked, can result in levee failure and subsequent flooding.

An estimate of the vulnerability of RD 1002 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

While unlikely, it is possible that dam failure can create a high water situation in the adjacent channels that could put the levee system at risk of failure from overtopping, under seepage, through seepage or debris impact. Given the distance from the dam system, a dam surge could dissipate prior to reaching this point in the Delta and result in a minor change in water elevation.

Past Occurrences

There are no past occurrences of dam failure.

Vulnerability to Dam Failure

Assets/Critical Facilities at Risk

The levees and pumping station are at the highest risk to this hazard.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to erosive forces of high flows from dam failure.

Historic and Cultural Resources at Risk

Homes and agricultural facilities could be lost as a result of flooding due to dam failure.

Future Development

While future development may occur in the areas protected by levee, which could be compromised by an upstream dam failure, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Drought and Water Shortage

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

This hazard could disrupt crop irrigation. Prolonged disruption could result in the loss of a crop that year. In the event that orchards or vineyards experience disruption in irrigation, they could be lost for multiple years until they are replanted and begin producing a crop between 3 to 5 years. Agriculture is the primary industry on the island. Agricultural users pay assessments for levee maintenance and improvements. If agriculture is lost the District will not be able to cover levee maintenance or make any necessary improvements.

Past Occurrences

Although California did recently experience an extended drought, agriculture in this District remained largely unaffected due to senior water rights and riparian water rights. Some farmers voluntarily cut water use by 25% in the Delta in response to the drought in the Summer of 2015.

Vulnerability to Drought and Water Shortage

Assets/Critical Facilities at Risk

None.

Natural Resources at Risk

None.

Historic and Cultural Resources at Risk

None.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

A 100/200/500-year flood event could cause flooding within the District. A high water event, depending on the water elevation, could cause failure due to overtopping and/or could increase hydraulic gradients within the levee section resulting in landside seepage or boils. Continued seepage, if left unaddressed, could erode the levee and result in failure. Heavy flows could also cause erosion and scour on the waterside bank that could undermine the levee and cause failure.

Past Occurrences

The District has had to implement the use of sandbags in high water years. The District experienced flooding in 1986 and 1997 due to events that were closest to a 100-year flood event.

Vulnerability to Flood: 100/200/500-year

Assets/Critical Facilities at Risk

The levee system is very vulnerable to a 100/200/500-year flood. Riverine floods and storm water run off lows could exceed the capacity of the levee system. The flood could also overtax the District's flooding system that could cause even further flooding.

Natural Resources at Risk

Riparian habitats that border the channel can be lost due to erosive forces of high flows from 100/200/500-year flows.

Historic and Cultural Resources at Risk

Homes and agricultural facilities could be lost as a result of flooding due to a 100/200/500 year flood event.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–High

Hazard Profile and Problem Description

Localized stormwater flooding can occur during heavy rains or seepage events that exceed the District's drainage capabilities. Lower areas around the island may be subject to flooding.

Past Occurrences

Some form of localized stormwater flooding occurs during most heavy rains. The most likely time this could have occurred in the past was during the wet years of 2011, 2006, 1997 and 1986. The District must address storm water runoff with sandbags to provide ample freeboard.

Vulnerability to Flood: Localized Stormwater Flooding

Assets/Critical Facilities at Risk

Localized flooding can overtax the Districts drainage and levee system and create for a more hazardous situation involving the levee system by limiting the ability for inspection.

Natural Resources at Risk

None.

Historic and Cultural Resources at Risk

Homes and agricultural facilities and crops could be damaged as a result of localized flooding.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Levee failure could result in inundation of the District.

Past Occurrences

1986, through an intentional levee break.

Vulnerability to Levee Failure

For RD 1002 the problematic areas are near the south-western end of the district near the packing house where boils have occurred in the past. Also the eastern levee near the Cosumnes River Preserve was intentionally broken in 1986 and has been problematic since.

Assets/Critical Facilities at Risk

Levees are the most at risk of this hazard. An island inundation can create an open water situation where a large fetch could develop and erode the interior of other levees within the District. The pumping station if inundated can also be damaged from a levee break.

Natural Resources at Risk

Waterside habitat that is adjacent to the break could be lost due to the erosive forces of the water flowing through the break.

Historic and Cultural Resources at Risk

Homes and agricultural facilities could be lost as a result of flooding due to a levee failure.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

River/Stream/Creek bank erosion could destabilize the levee slope and, if left unaddressed, cause levee failure through undercutting.

Past Occurrences

Bank erosion is currently occurring on the District levees and must be remedied.

Vulnerability to Erosion

Assets/Critical Facilities at Risk

The District's levees are at risk of erosion.

Natural Resources at Risk

Riparian benches exist along the District's levee and are at risk of being lost due to bank erosion.

Historic and Cultural Resources at Risk

None.

Future Development

While future development may occur in the areas protected by levees, which can be compromised from severe erosion, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, Lightning)

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Heavy rains and storms can result in higher flood flows that could increase the hydraulic gradients within the levee section and result in seepage or if great enough, possibly overtopping. They can also increase flows and result in erosion of the waterside bank.

Past Occurrences

The last heavy rain and storm event the District experienced was in 2006, 1997 and 1986. No significant damages occurred due to these high water events.

Vulnerability to Heavy Rain and Storms

Assets/Critical Facilities at Risk

The District levees and pumping plant are at risk of damage from heavy rains and storms.

Natural Resources at Risk

Riparian benches could be lost from high flows as a result of heavy rains and large storms.

Historic and Cultural Resources at Risk

None.

Future Development

While future development may occur in the areas protected by levee, which can be compromised by severe weather events, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

A wildfire could destroy private property and other such structures on the island as well as the pumping plant.

Past Occurrences

None.

Vulnerability to Wildfire

Assets/Critical Facilities at Risk

The vegetation on the District levees could be burned leaving bare soil that could be subject to erosion.

Natural Resources at Risk

Riparian, shrub scrub and freshwater marsh vegetation could be lost in a wildfire.

Historic and Cultural Resources at Risk

Homes, agricultural facilities and crops could be lost as a result of flooding due to wildfire.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and the ongoing maintenance of these levees.

10.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

10.6.1. Regulatory Mitigation Capabilities

Table 10-4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 1002.

Table 10-4 RD 1002's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	In development	While this plan is being developed, there is unofficial protocol of those that live on the island have used over time to respond to flooding related hazards.
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: CBC 2013
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	

Land Use Planning and Ordinances	Y/N	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning ordinance	Y	Yes, the District is mostly zoned agriculture which limits development
Subdivision ordinance	N	
Floodplain ordinance	Y	Yes, Sacramento County Floodplain Ordinance restricts development in the floodplain
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	Y	Zone AE
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
The District must develop a strategy to resolve erosion issues.		

Source: RD 1002

10.6.2. Administrative/Technical Mitigation Capabilities

Table 10-5 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 1002.

Table 10-5 RD 1002's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	Must develop vegetation management strategy
Mutual aid agreements	N	
Other	N	
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	Y	Determined via the Emergency Operations Plan (in development)
Emergency Manager	Y	Determined via the Emergency Operations Plan (in development)

Community Planner	N	
Civil Engineer	Y	Staff is trained to coordinate with agencies and perform tasks in an emergency situation
GIS Coordinator	N	
Other	N	
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Reverse 911, phone tree
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
The District must develop a better warning system to alert residents.		

Source: RD 1002

10.6.3. Fiscal Mitigation Capabilities

Table 10-6 identifies financial tools or resources that the RD 1002 could potentially use to help fund mitigation activities.

Table 10-6 RD 1002's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	N	
Authority to levy taxes for specific purposes	Y	Proposition 218 provides the District with the ability to raise assessments through a vote
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	Y	Assessments for drainage
Incur debt through general obligation bonds and/or special tax bonds		
Incur debt through private activities	Y	Bonds can be obtained from the Bank of Rio Vista
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
The District could apply to become a part of the Delta Levees Subventions Program to aide in funding levee improvement projects.		

Source: RD 1002

10.6.4. Mitigation Education, Outreach, and Partnerships

Table 10-7 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 10-7 RD 1002's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		
The District could develop a public outreach program it inform residents of disaster related issues.		

10.6.5. Other Mitigation Efforts

The District plans on removing dense vegetation along Snodgrass Slough to reveal areas with significant erosion. Once these areas are determined the District will develop a multi-year plan to address problematic areas.

10.7 Mitigation Strategy

10.7.1. Mitigation Goals and Objectives

RD 1002 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

10.7.2. Mitigation Actions

The planning team for RD 1002 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Geotechnical Investigation

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3

Issue/Background: The District has problematic areas in Snodgrass Slough that require a geotechnical investigation to determine the best steps to take to resolve.

Project Description: District will have CPT tests done and analyzed to determine soil stability in the effort to design the appropriate solution to resolve levee issues

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: $30,000

Benefits (Losses Avoided): Aides in providing information for projects that will reduce in flood risk from levee failure, bank erosion, 100/200/500-year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Winter 2018

Action 2. Snodgrass Slough Levee Improvements

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind

Goals Addressed: 1, 2, 3, 4

Issue/Background: Erosion areas have been hidden by dense vegetation and have not been addressed due to a lack of funding.

Project Description: Once erosion areas would are revealed the district can create designs to repair and maintain the levee system to meet Bulletin 192-82 standards. The levees will be graded to accommodate a 3:1 waterside and 2:1 landside slope.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: In planning stages, unknown.

Benefits (Losses Avoided): Aides in providing information for projects that will reduce in flood risk from levee failure, bank erosion, 100/200/500 year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Summer 2020

Action 3. Snodgrass Slough Vegetation Management

Hazards Addressed: Levee Failure, Earthquake: Liquefaction, River Bank Erosion, Flood 100/200/500-year, Severe Weather: Heavy Rains, Severe Weather: Wind, Wildfire

Goals Addressed: 1, 2, 3

Issue/Background: Limited funding has resulted in deferred maintenance of the levees vegetation. The vegetation is so dense it covers any potential erosion areas on the levee system.

Project Description: Trim trees and remove dense vegetation in accordance with the Central Valley Flood Protection Plan

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Reclamation District Board of Trustees and District Engineer Gilbert Labrie

Project Priority: High

Cost Estimate: $200,000

Benefits (Losses Avoided): Aides in providing information for projects that will reduce in flood risk from levee failure, bank erosion, 100/200/500-year flood and heavy rains.

Potential Funding: District assessments and Delta Levees Subventions Program

Timeline: Fall 2017

Delta Annex Chapter 11 Reclamation District 1601

11.1 Introduction

This new chapter of the Delta Annex details the hazard mitigation planning elements specific to the Reclamation District 1601 (RD 1601), a new 2016 participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by RD 1601. This chapter of the Delta Annex provides additional information specific to RD 1601, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

11.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 1601 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 11-1. Additional details on plan participation and RD 1601 representatives are included in Appendix A.

Table 11-1 RD 1601 Planning Team

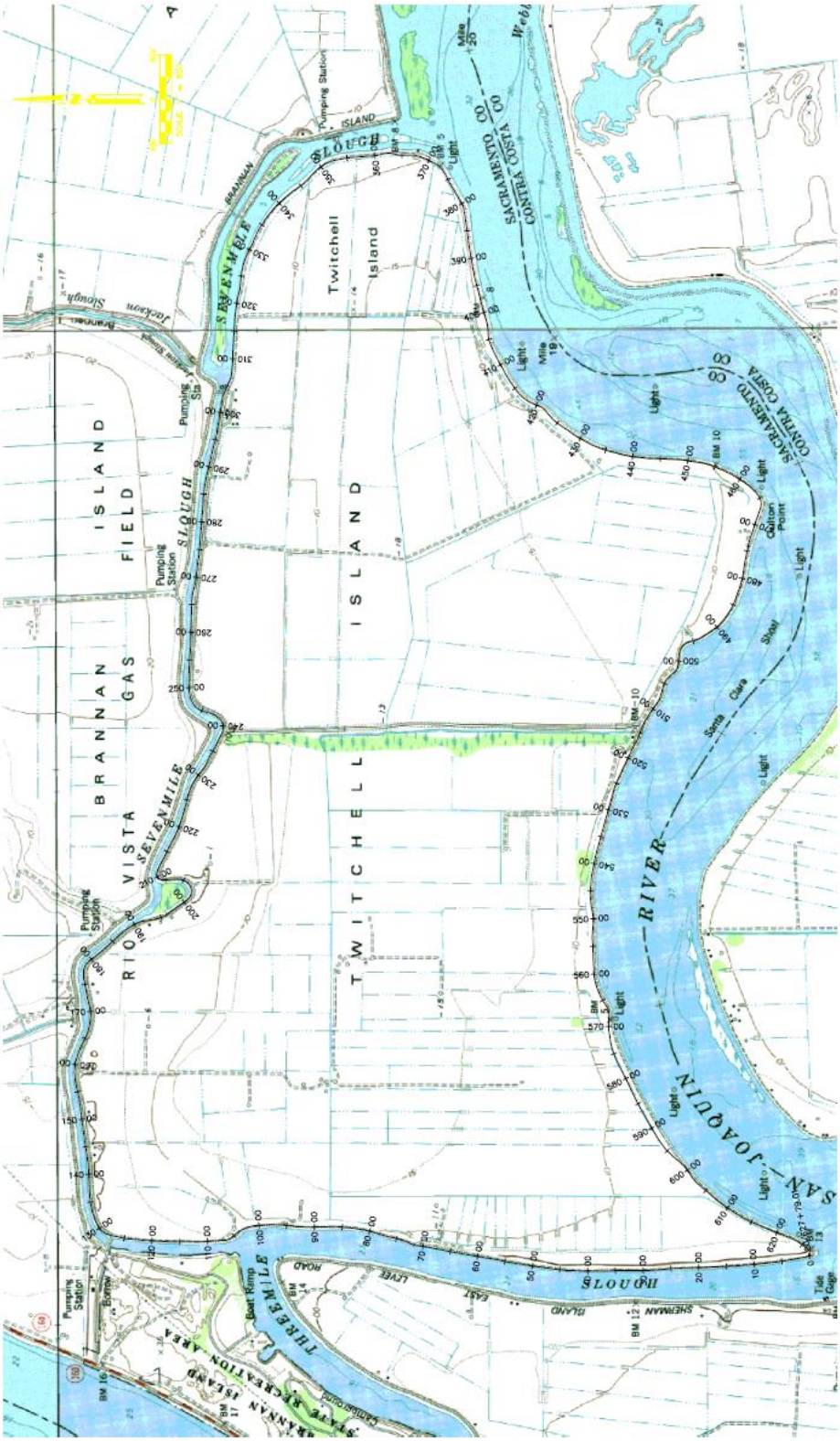
Name	Position/Title	How Participated
Chris Neudeck, KSN, Inc	District Engineer	Attended meetings, collected data, drafted text, reviewed draft docs
Bill Darcie, KSN, Inc.	Project Manager	Attended meetings, collected data, drafted text, reviewed draft docs
Brenna Howell, KSN, Inc.	Emergency Planner	Attended meetings, collected data, drafted text, reviewed draft docs

Source: RD 1601

11.3 Community Profile

The community profile for RD 1601 is detailed in the following sections. Figure 11-1 displays a map and the location of RD 1601 boundaries within Sacramento County.

Figure 11-1 Reclamation District 1601



Source: RD 1601 2010 5 Year Plan

11.3.1. RD 1601 Overview

Reclamation District No. 1601, also known as Twitchell Island, maintains 11.9 miles of levee made up of 2.5 miles of Federal Flood Control Project levee and 9.4 miles of non-project levee. The District is bordered by Sevenmile Slough, Threemile Slough and the San Joaquin River. Sacramento County maintains a paved road along Sevenmile Slough from levee station 127+50 to 303+00. The county road provides emergency evacuation to the East via Brannan-Andrus Island and State Highway 12 or to the West via State Highway 160.

11.3.2. District History and Background

The lands within the District were privately owned up until 1991 when the State of California purchased the majority of the property within the island. The State's interest in the island is primarily to ensure that the levees would be improved to protect against flooding of the island. Flooding in the Western Delta could severely degrade water quality within the Delta and impact the operations of the State and Federal water projects due to salt intrusion from areas downstream. Following the State's purchase of property on the island, the State, being the largest landowner, appointed the majority of the Trustee positions on the District's Board.

Continuous routine maintenance activities have occurred on the levees throughout the history of the island and include smaller projects not listed here. Types of work performed on a routine basis include erosion repairs, road repairs, debris removal, minor core trenching, ditch cleaning, pump repair and maintenance, vegetation control, and rodent control.

11.4 Hazard Identification

RD 1601's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 1601 (see Table 11-2).

Table 11-2 RD 1601—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Extensive	Occasional	Limited	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Extensive	Occasional	Limited	Low
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Extensive	Occasional	Critical	Low
Earthquake	Extensive	Occasional	Limited	Medium
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Extensive	Occasional	Critical	High
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Extensive	Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Limited	Unlikely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Likely	Limited	Low
Severe Weather: Fog	Extensive	Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Likely	Critical	Medium
Severe Weather: Wind and Tornadoes	Extensive	Likely	Critical	High
Subsidence	Extensive	Likely	Critical	Medium
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Unlikely	Negligible	Low

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

11.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 1601's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 1601 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

11.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 11.5.3, includes a description as to how the hazard affects RD 1601 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

11.5.2. Vulnerability Assessment

This section identifies RD 1601's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 11-3 lists particular critical facilities and other District assets identified by RD 1601's planning team as important to protect in the event of a disaster. RD 1601's physical assets, valued at over $4.3 million, consist of the buildings and infrastructure to support RD 1601 operations.

Table 11-3 RD 1601's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Pump Station #1 (including all station components)	Essential Services	–	$2.0 mil	Flood, Levee Failure, Liquefaction

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Pump Station #2 (including all station components)	Essential Services	–	$2.0 mil	Flood, Levee Failure, Liquefaction
Drainage Conveyances	Essential Services	–	#350 K	Flood, Levee Failure, Liquefaction, Severe Weather
Underground Electric Crossing*	Essential Services	–	–	Flood, Levee Failure, Liquefaction
Overhead Electric Crossings*	Essential Services	–	–	Flood, Levee Failure, Liquefaction
Siphons*	Essential Services	–	–	Flood, Levee Failure, Liquefaction
Electric Pullbox Underground Docs	Essential Services	–	–	Flood, Levee Failure, Liquefaction

Source: RD 1601

* These assets are not owned by the District, but are protected by its levees. No replacement value was available to the District Planning Team

The 2010 5-year plan noted that the total estimated value of the 3,634.88 acres of land within the District is $16,338,771.

Natural Resources

Twitchell Island has established a total of 15.12 acres of valuable permanent habitat and mitigation sites. Much of the habitat provided is riverine or palustrine, providing essential habitat for flora and fauna native to the Delta. The habitat areas provide a permanent, undisturbed environment for sensitive Delta species, as well as providing habitat, food and resting areas for migratory wildlife. The value of these habitat areas is undefined, but the loss of these areas could greatly impact the species that depend upon these valuable ecosystem components.

A habitat assessment was done in 2001 for the District. Findings from that were:

- One special-status plant (Blue Elderberry) was observed along the levee during the field survey.
- No special status animals were observed during field work;
- The Shaded Riverine Aquatic Habitat was found to total 1,642 lineal feet;
- The Riparian Forest habitat on the waterside of the levee consisted of individual trees or extensive reaches of continuous canopy. The Riparian Forest was found to total 3,285 lineal feet;
- The Shrub/Scrub habitat consists of willow, and blackberry on the waterside of the levee. The Shrub/Scrub was found to total 7,917 lineal feet;
- The Freshwater Marsh habitat of tules along the levee waterside toe was found to total 7,781 lineal feet;
- The landside levee slopes consisted of bare ground, ruderal vegetation, urbanized environment with cultivated plants, small areas of Shrub/Scrub habitat, and Riparian Forest of individual trees or continuous canopy with varying amounts of understory;
- The landside Riparian Forest along the levee was found to cover 465 lineal feet. The majority of this habitat was found along levee station 38+959 to39+396 in the toe ditch;
- The landside Shrub Scrub habitat along the levee was found to cover 177 lineal feet.

In 1993, a 4.04 acre habitat mitigation site was established and planted from Stations 545+00 to 560+00 and Stations 570+00 to 600+00, with a Conservation Easement established specifically for the mitigation site between stations 545+00 and 560+00. The overall mitigation site was designed to consist of 1.12 acres of palustrine emergent (freshwater marsh) habitat, 1.92 acres of lacustrine (open water) habitat, 2.3 acres of palustrine forest (riparian woodland) habitat, and 0.65 acres of annual grassland habitat. The flora planted were predominantly tule and cattail in the freshwater marsh, and white alder, red willow and sandbar willow in the riparian woodland. Two ponds totaling 1.92 acres were excavated to approximately 6 feet deep with approximately 1:1 side slopes to provide the open water habitat. The open water and annual grassland did not require plantings.

In 1999, an 8.08 acre habitat mitigation site was transferred to the Department of Fish and Game via a Transfer of Control and Possession and Conservation Agreement. The site runs parallel to the drainage canal at the District Pump station, reaching 5,440 feet northward along the canal from approximately Station 585+00, and provides various types of protected habitats, including palustrine shrub and scrub, palustrine forest, and fresh water marsh habitats. The site was initially established to mitigate 5.78 acres of palustrine emergent habitat lost due to levee repairs and rehabilitation at Stations 0+00 to 127+00 and 360+00 to 396+00. Much of the mitigation site was originally planted with feed corn). The site was enhanced in 2007 when 35 black willow trees were planted along the canal.

In 2000, a 3.0 acre habitat site was planted between levee Stations 570+00 and 600+00 that provides 1.4 acres of emergent tidal marsh habitat and 1.6 acres of shaded riverine aquatic habitat. This habitat area was created between the original levee and a new setback levee.

Openings were cut into the original levee, allowing water to circulate between the levees. The levee crown and landside slope of the old levee was re-vegetated, and the tidal bench and waterside slope of the setback levee were planted with native woody and herbaceous vegetation. Woody plants included willows, ash, box elder, alder, cottonwood, valley oak, dogwood, button willow, wild rose, wild blackberry, blue elderberry, and wild grape. Herbaceous plants included California hibiscus, grasses, sedges, rushes, and tules. The setback levee slope was planted with grasses only for maintenance purposes.

The habitat mitigation sites on Twitchell Island provide a variety of protected habitats. In general, Delta lands provide forage and cover for local and migratory populations of birds and terrestrial wildlife including many special status species. The levees also provide important waterside habitat and shoreline for various fisheries that includes several special status species.

Historic and Cultural Resources

The District Planning Team noted that there are no known historic and or cultural resources in the District at this time.

Growth and Development Trends

The District Planning Team noted that there has been no growth and development in the District since the last planning period.

11.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 11-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 1601 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable District assets include the levees and supporting structures that the District owns such as the two pump stations, the drainage conveyances and the natural resources within the island.

An estimate of the vulnerability of RD 1601 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Earthquake

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable.

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicenter location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per

second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

Past Occurrences

After the most recent Napa Earthquake the District performed levee inspections and verified the continued operation of the pump stations around the island to check the levee integrity and ensure there was no damage to District assets as a result of the earthquake.

Vulnerability to Earthquake

Assets/Critical Facilities at Risk

The District Planning Team noted that the levees structures, pump stations and drainage conveyances are potentially at risk to an earthquake

Natural Resources at Risk

The District Planning Team noted that All natural resources could be affected by an earthquake causing damage to the levee structure should the island flood due to an earthquake.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levees, which may be compromised by an earthquake event the District does not control this development. The District only can control whether the levees meet certification standards.

Earthquake: Liquefaction

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Earthquake is discussed in the section above, but is primarily focused on the vulnerability of buildings and people from earthquake shaking. This section deals with a secondary hazard associated with earthquake – the possible collapse of structural integrity and the possible collapse of delta levees, due to liquefaction.

Past Occurrences

The District Planning Team noted that there are no known past occurrences of liquefaction to have affected the District.

Vulnerability to Liquefaction

Assets/Critical Facilities at Risk

The U.S. Geological Survey estimates that an earthquake of magnitude 6.7 or greater has a 62 percent probability of occurring in the San Francisco Bay Area between 2003 and 2032. Such an earthquake is capable of causing multiple levee failures in the Distict which could result in fatalities, extensive property damage and the interruption of water exports from the Delta for an extended period of time. Potential earthquakes on the Hayward, Calaveras or San Andreas faults pose the highest risk to Delta Region levees. All assets in the District are at risk to the effects of liquefaction.

Natural Resources at Risk

All natural resources in the District would be at risk to liquefaction of the levee foundations and associated levee failures.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levees, which may be compromised by an earthquake event the District does not control this development. The District only can control whether the levees meet certification standards.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

The District is bordered by Sevenmile Slough, Threemile Slough and the San Joaquin River. Flooding on any of these waterways could cause problems for RD 1601.

Past Occurrences

The 5-Year Plan for RD 1601 included a history of flooding in the District.

- 1986 Flood event. Poor levee performance, with several instances of boils that were treated with sandbag coffer dams. Individual boils were sandbagged on the landward levee slope at Stations 361+81, 365+50, 373+98, 405+87, 406+39, 408+49, 414+83, and 502+22, and groups of boils were sandbagged on the landward levee slope at Stations 500+64 to 501+69 and 534+94 to 536+52. Dredged fill material was placed on the waterward levee slope and the bottom of the slough in an attempt to seal a boil at Station 363+39 to 366+56. The State of California updated its flood Hazard Mitigation Plan (HMP), establishing both short-term and long-term guidelines for levee rehabilitation, including

minimum requirements for levee geometry that were required to be met by 1991 in order to receive future federal disaster assistance.

- 1997 Flood Event. USACE made emergency repairs by placing a 250 foot long gravel blanket extending 60 feet past the landside levee toe at approximately Station 59+00. Further emergency repairs were made by the District by pulling rock up from the waterside toe of the levee to form two berms on the levee crown at the juncture of Sevenmile Slough and the San Joaquin River, and on the PL 84-99 levee along Threemile Slough, approximately Station 380+00 to 385+00.
- 1998 Flood Event. During the flood event of 1998, riprap was placed on waterside slopes to mitigate damage by high water and high winds,
- 2005 to 2006 Flood Event. A storm event starting on December 30, 2005 required emergency action beginning on January 1, 2006. Four long reach excavators were used to restore the rock slope protection at Stations 363+74 to 565+00 and 580+00 to 628+74 that was lost as a result of the extreme high water and winds along the San Joaquin River. The construction involved pulling the slipped rock up along the waterside slope from the waterside levee toe. Two angle blade bulldozers were used to clear debris on the levee crown and restore eroded sections of levee due to the high water and wind-generated waves splashing over the levee to the landside slope, including portions of the levee road that were no longer passable. The San Joaquin reach of the Twitchell Island levee was nearly overtopped. 25,000 feet of existing riprap was repositioned to form a break wall by Dutra Construction in 40 consecutive hours to protect the levee from extreme wind and wave wash.

Vulnerability to Flood

Assets/Critical Facilities at Risk

Flooding of Delta islands has the potential to negatively impact water quality both locally and statewide. The largest of California's drinking water sources is the Sacramento-San Joaquin Delta and its tributaries. The Delta provides water throughout the state via the State and Federal water projects. During a flood, there is a higher potential for the waters in the Delta to be exposed to chemicals, fuel, oil, and multiple other constituents of concern that can quickly degrade water quality. Flooding can also disturb soil and soil-borne materials such as mercury and organic matter that can degrade water quality.

Additionally, maintaining the current configuration of Delta levees and channels is critical to insure Delta salinity standards are met and salt water intrusion from the bay into the Delta does not occur. Twitchell Island is one of the eight western islands, which collectively form a crucial group of islands which, if breached, could each individually greatly degrade water quality in the Delta from the transportation of tidal salt water through the major Delta channels where fresh and salt waters mix. Additionally, if the island did flood, the evaporative losses from the flooded island would have an additional detrimental impact to the overall water quality in the surrounding Delta waterways.

Should a flood breach the levees, the entirety of the assets of RD 1601 would be at risk. Levee failure is discussed later in this section. Flooding also causes erosion, which is discussed later in this section.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levees, the District does not control this development. The District only can control whether the levees meet certification standards.

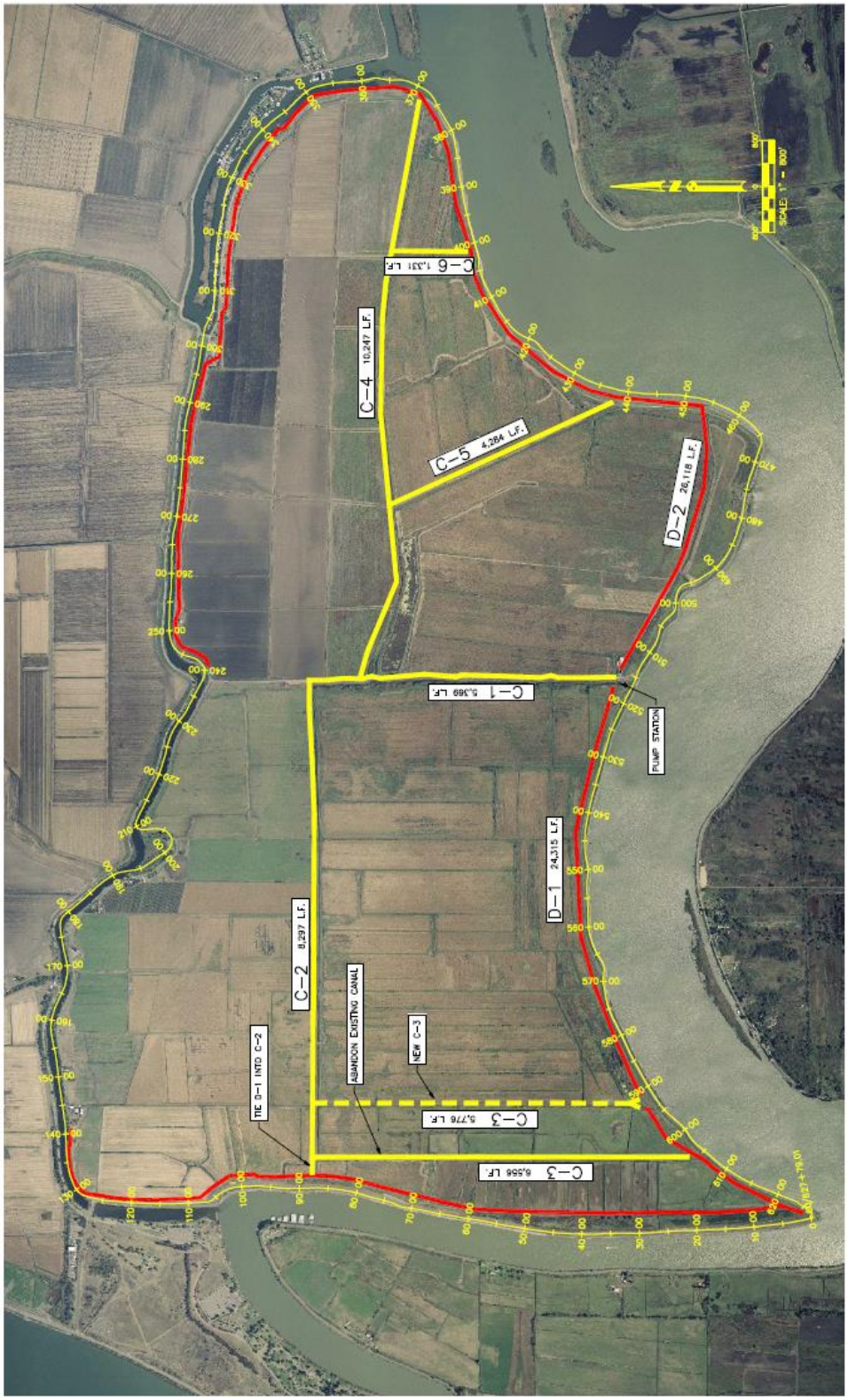
Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Historically, RD 1601 has been at risk to flooding primarily during the spring months when river systems in the County swell with heavy rainfall. Localized flooding also occurs throughout the Planning Area at various times throughout the year with several areas of primary concern unique to the District. The District has a drainage system set up deal with localized flooding. This is shown on Figure 11-2.

Figure 11-2 RD 1601 Drainage System



Source: RD 1601 2010 5-Year Plan

Past Occurrences

The District Planning Team noted that in the last planning period there were no past occurrences.

Vulnerability to Localized Flood

Assets/Critical Facilities at Risk

The District Planning Team noted that all District assets are at risk to localized flooding; however, this flooding is likely to be a nuisance-type of flood, and would not have lasting impacts on the District.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levees, the District does not control this development. The District only can control whether the levees meet certification standards.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will

collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters

Past Occurrences

The 5-Year Plan documented the history of levee failures in RD 1601.

- 1906, 1907 & 1909: Flooding of entire island occurred from levee failure or overtopping.
- 1964: Levee at approximately Station 390+00 cracked and/or dropped in December 1964, requiring immediate repair.
- 1980: A large settlement crack occurred in the levee crown at Station 376+00 to 380+00, arcing from the landward to the center of the crown and back to the landward. Crack width was from 1 to 4 inches, with a vertical settlement of 3 to 6 inches. Rock revetment was added to the waterward levee slope. Dredged material was placed on the landward levee slope as the crack gradually opened further and settlement increased. The dredge material was moved off the slope to create a 25 foot wide by 1.5 foot high stability berm at the landward toe of the levee. A core trench was constructed at Station 415+00 to 421+00 to cut off seepage. Riprap placement and dredging occurred in response to a high water and wind event, and was funded by the Federal Disaster Assistance Administration (FDAA) in the amount of $100,550. The levee crown in was low at Station 530+00 to 532+00, and required sandbags to be placed along the waterward shoulder during high tides and high winds from the south in February. A crack occurred near the landward toe of the levee, with a width of 3 inches and length of 150 feet. Dredged material was placed in the low areas on the landside of the levee, on the landward slope, and in limited amounts on the levee crown. Boils occurred on the landward levee slope at Station 415+00 to 421+00, located 5 to 6 feet below the crown. High tides at this time were 5 feet below the levee crown. A backhoe was brought in to dig a core trench in the levee crown between 6 and 7 feet deep and 18 inches wide. The trench was dug in 8 to 10 foot segments, with each segment being inspected, backfilled in layers, and tamped with the backhoe bucket before digging the next trench segment. A crack approximately 5 feet below the levee crown was discovered opposite two of the boils, and appeared to extend through the levee on a diagonal. The crack was 6 to 8 inches wide, and 1/2 inch high.
- 2006: Seepage at Stations 445+00 to 450+00, 480+00, 500+00 to 510+00, 530+00 to 540+00, and 600+00 was stopped by coring and sealing the levee with a Bentonite mix after a failed attempt at Stations 535+00 to 540+00 to stop seepage using a vibratory wall by DWR.

Vulnerability to Levee Failure

The two primary vulnerabilities that threaten the levee system on Twitchell Island involve levee stability and levee geometry.

The Twitchell Island levee system has a long history of levee stability problems including settlement, movement, seepage, and slope failure. Documentation of the levee's performance is extensive. GEI Consultants, a geotechnical, environmental and water resources engineering firm, obtained information from the California Department of Water Resources documenting these problems as far back as 1955 during

the course of research for the January 2009 "Geotechnical Investigation and Evaluation Report" performed for the San Joaquin River portion of the levees. The San Joaquin river levee reach has historically shown more problems relative to Stability. Deep organic soils and sands in conjunction with deep water and high winds cause this reach of levee to be extremely vulnerable to failure during high water and storm events. It should also be noted that the investigations did not locate an acceptable on-island borrow material suitable for levee projects As of the last complete profile survey of the island in 2008, and taking into account completed projects through fiscal year ending June 30, 2010, there remain several locations along Sevenmile Slough that do not meet the Hazard Mitigation Plan (HMP) standard for geometry.

This standard requires the levee to be one foot above base flood elevation, and 1.5:1 waterside and 2:1 Landside slopes. There is approximately 3000' (5%) of District levee below the HMP Standard and approximately 28,000' (45%) below the PL84 Standard. These values were calculated by analyzing a combination of the most current District surveys, including the 2009 District Aerial Survey for the San Joaquin River levee and the 2006 KSN GPS Survey for the Threemile Slough and Sevenmile Slough levees. Levee centerline profiles were cut through each of the modeled survey surfaces and compared to water surface elevation profiles from the US Army Corps of Engineers' 1992 Sacramento-San Joaquin Delta Special Hydrology Study.

Sevenmile Slough is isolated from tidal waters by water control structures that, along with the balance of the levee system, meet the HMP standard. Up until 2006, the District was considered to have met the HMP standard; however, in 2006 the Federal Emergency Management Agency determined that because the entire Sevenmile slough levee did not meet the geometry required in HMP, that the District was not eligible for Federal Disaster Assistance. Thus, the vulnerability to the District is both a flood threat due to overtopping caused by low levee crown elevations and a financial threat because no Federal Disaster Assistance would be available for damages resulting from a declared disaster event.

Assets/Critical Facilities at Risk

Should the levees fail, all District assets would be at risk.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levees, the District does not control this development. The District only can control whether the levees meet certification standards.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

Past Occurrences

The 5-Year Plan documented the history of erosion in RD 1601.

- 1981: Erosion on the waterward side of the levee was repaired and protected with riprap revetment at Station 625+00 to 628+74
- 1982-1983: The flood event FEMA 677 DR caused waterside erosion, multiple cracks on the landside slope along with sinkholes, subsidence areas, and seepage areas. Disaster claims totaled $1,818,160 $1,818,160 for construction of landside berms, raising levee crown, and riprap erosion protection.
- 2009: Riprap was installed on the levee waterside slope and crown on the setback levee at Stations 570+00 to 595+00 to mitigate erosion that had occurred in past years.

Vulnerability to Erosion

Assets/Critical Facilities at Risk

The entirety of the levee system in RD 1601 is at risk to erosion.

Natural Resources at Risk

The District Planning Team noted that stream bank erosion in the Delta islands can possibly destroy habitat, kill species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levees, which can be compromised by severe erosion, the District does not control this development. The District only can control whether the levees meet certification standards.

Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning)

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the District. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

The 5-Year Plan for RD 1601 included a history of heavy rains in the District.

- 2005 to 2006. A storm event starting on December 30, 2005 required emergency action beginning on January 1, 2006. Four long reach excavators were used to restore the rock slope protection at Stations 363+74 to 565+00 and 580+00 to 628+74 that was lost as a result of the extreme high water and winds along the San Joaquin River. The construction involved pulling the slipped rock up along the waterside slope from the waterside levee toe. Two angle blade bulldozers were used to clear debris on the levee crown and restore eroded sections of levee due to the high water and wind-generated waves splashing over the levee to the landside slope, including portions of the levee road that were no longer passable. The San Joaquin reach of the Twitchell Island levee was nearly overtopped. 25,000 feet of existing riprap was repositioned to form a break wall by Dutra Construction in 40 consecutive hours to protect the levee from extreme wind and wave wash.

Vulnerability to Heavy Rains and Storms

Assets/Critical Facilities at Risk

Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees. However, it is the secondary effects of heavy rain and storms that are of concern to RD 1601. Heavy rains can cause flooding, levee failure, and stream bank erosion. Flooding, levee failure, and stream bank erosion can cost RD 1601 millions in damages.

Natural Resources at Risk

The District Planning Team noted that all natural resources could be at risk from heavy rains on the district.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levees, which can be compromised by severe weather events, the District does not control this development. The District only can control whether the levees meet certification standards.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

According to historical hazard data, severe weather (including high winds) is an annual occurrence in the District. Tornadoes occur much less frequently. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

The 5-Year Plan for RD 1601 included a history of wind and tornadoes in the District.

- 1998 Flood Event. During the flood event of 1998, riprap was placed on waterside slopes to mitigate damage by high water and high winds.
- 2006 Flood Event. Rip rap was placed on waterside slopes to mitigate damage caused from high winds.

Vulnerability to Wind and Tornadoes

Assets/Critical Facilities at Risk

The District Planning Team noted that the entirety of the levee structures are at risk from wind.

Natural Resources at Risk

The District Planning Team noted that all natural resources in the District are at risk if winds caused a levee failure in the District.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levees, which can be compromised by high wind events, the District does not control this development. The District only can control whether the levees meet certification standards.

Subsidence

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

For over a century, subsidence of the organic soils in portions of the Delta has led to an increasing need for subsurface drainage. Aerobic oxidation of organic carbon, the primary cause of subsidence, began in the late 1800s as the nutrient-rich organic soils were cleared and farming began. Peat fires, lit to level agricultural fields prior to 1950, and wind erosion are also significant causes of subsidence throughout the Delta. Since reclamation of the island began, elevations have fallen to as much as 20 feet below sea level, requiring protection by over 1,125 miles of man-made levees throughout the Delta. Drainage is provided by a network of ditches that collect and transport shallow groundwater, irrigation runoff, and levee seepage to pump stations that discharge back into the Delta waterways. These ditches create an unsaturated root zone for crops, and provide a more stable levee foundation.

Past Occurrences

The 5-Year Plan documented the history of subsidence in RD 1601.

- 1982-1983: The flood event FEMA 677 DR caused waterside erosion, multiple cracks on the landside slope along with sinkholes, subsidence areas, and seepage areas. The levee was found to have problems with subsidence and seepage, and had cracks in the landward slope at Stations 374+00 to 378+00, 384+00 to 387+00, 405+00 to 409+00, 419+00 to 436+00, 526+00 to 530+00, 550+00 to 554+00, and 567+00 to 569+50. Import fill material was placed on the landward levee slope to flatten the slope, and a landside berm fill was constructed, with Mirafi fabric placed under the berm fill, except at Stations 384+00 to 387+00, 534+00 to 536+25, and 567+00 to 569+50. Sink holes were located at the landward toe of the levee at Stations 448+00, 550+00, and were filled with import fill material.
- 1985 to 1986: The levee was found to have problems with subsidence and seepage, and had cracks in the landward slope at Stations 363+39 to 367+00 and 582+00 to 588+34.

The District Planning Team noted that, in addition to the 5-Year Plan history, a 2006 storm event caused subsidence in the District. An area on the west side of Pump Station #1 suffered from subsidence.

Vulnerability to Subsidence

Assets/Critical Facilities at Risk

The management issues raised by land subsidence range in scale from those faced by individual farmers to the possible global-scale issue posed by the carbon-dioxide flux, with its possible link to climate change. At the most local level, individual farmers or reclamation districts must maintain drainage networks on the

islands and pump the agricultural drainage back into waterways. These costs increase gradually as subsidence progresses. The District Planning Team noted that all levee structures in the District are at risk to subsidence.

Natural Resources at Risk

The District Planning Team noted that all natural resources in the District are at risk to subsidence.

Historic and Cultural Resources at Risk

The District Planning Team noted that there are no known historic and or cultural resources at risk on the island.

Future Development

While future development may occur in the areas protected by levees, which can be compromised by subsidence activity, the District does not control this development. The District only can control whether the levees meet certification standards.

11.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

11.6.1. Regulatory Mitigation Capabilities

Table 11-4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 1601.

Table 11-4 RD 1601's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y 2010	5 Year Plan identifies hazards that may affect RD 1601. Some mitigation strategies are proposed. An Evacuation Plan is detailed, as well as an Emergency Response Plan.
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	In progress at the time of the development of this plan will be completed by December 2016
Continuity of Operations Plan	N	

Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 1601

11.6.2. Administrative/Technical Mitigation Capabilities

Table 11-5 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 1601.

Table 11-5 RD 1601's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	

Mitigation Planning Committee	Y	RD 1601 staff and KSN, Inc. staff
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	
Mutual aid agreements	Y	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y	KSN, Inc.
Community Planner	N	
Civil Engineer	Y	KSN, Inc.
GIS Coordinator	Y	KSN, Inc.
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	Y	KSN, Inc.
Grant writing	Y	KSN, Inc.
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 1601

11.6.3. Fiscal Mitigation Capabilities

Table 11-6 identifies financial tools or resources that the RD 1601 could potentially use to help fund mitigation activities.

Table 11-6 RD 1601's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	
Authority to levy taxes for specific purposes	Y	Levy Assessment Program but not taxes
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Storm water utility fee	Y	Part of our Levy Assessment Program
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	Y	USACE PL84-99
State funding programs	Y	DWR Levee Subventions and Special Projects Program
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 1601

11.6.4. Mitigation Education, Outreach, and Partnerships

Table 11-7 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 11-7 RD 1601's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

11.6.5. Other Mitigation Efforts

The entire Twitchell Island levee system consists of 2.5 miles of Federal Project Levee and 9.4 miles of Non-Project levee and is inspected daily by District staff who are familiar with all aspects of its function. The District engineer typically performs an inspection once a month or more frequently when warranted. The Federal Project Levee along Threemile Slough is inspected in the Fall and Spring by the Department of Water Resources levee inspectors. Reports are compiled and submitted to the District. The District staff also inspects the Federal Project Levee in the Winter and Summer, and submits reports back to the Department of Water Resources. During high water or severe weather events, inspection frequency is increased to meet the demand. The entire levee is inspected continuously at one hour intervals.

11.7 Mitigation Strategy

11.7.1. Mitigation Goals and Objectives

RD 1601 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

11.7.2. Mitigation Actions

The planning team for RD 1601 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Levee Improvement Project

Hazards Addressed: EQ, EQ Liquefaction, Flood: 100/200/500-year, Flood: Localized Stormwater Flooding, Levee Failure, River/Stream/Creek Bank Erosion, Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning), Severe Weather (Wind and Tornadoes), Subsidence

Goals Addressed:

Issue/Background: The goal of this Mitigation Action is to improve the Twitchell Island levees over the next five years to a level of protection that meets, or exceeds, the U.S. Army Corps of Engineers' (USACE) PL84-99 Levee Standard.

Project Description: The District would like to bring portions of the RD 1601 Twitchell Island levee currently below the HMP Criteria to six inches above the PL 84-99 Standard using 2:1 landside slopes. If sufficient funding is available, the segments of levee improved during this phase will include portions of the levee that meet the HMP Criteria, but do not meet the design template for this project, due to the many relatively short stretches of levee that do not meet the PL 84-99 Standard in close proximity to longer stretches of levee that do not meet the HMP Standard. After the entire levee meets or exceeds the HMP Criteria, the District will bring any remaining portions of levee below the PL 84-99 Standard to six inches above the PL 84-99 Standard.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: Permitting process, Finalizing the EIR, CEQA Design Process

Responsible Office/Partners: RD 1601

Cost Estimate: $90 -100 million

Project Priority: High

Benefits (Losses Avoided): Preservation of 563 levee structures, Ecosystem Restoration and Habitat Enhancement Component, Reversing Land Subsidence, Ensuring Adequate and Effective Emergency Response Plans, Benefitting Water Quality, Improving Water Supply Reliability

Potential Funding: Prop 1 and 1E, 84 Funds, HMGP Grant Programs, seeking cost sharing partners for project.

Timeline: 1-10 years depending on regulatory process and funding

Delta Annex Chapter 12 Reclamation District 2111

12.1 Introduction

This new chapter to the Delta Annex details the hazard mitigation planning elements specific to the Reclamation District 2111 (RD 2111), a new 2016 participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This chapter of the Delta Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by RD 2111. This chapter of the Delta Annex provides additional information specific to RD 2111, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

12.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 2111 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table 12-1. Additional details on plan participation and RD 2111 representatives are included in Appendix A.

Table 12-1 RD 2111 Planning Team

Name	Position/Title	How Participated
Daniel Wilson	President	Attended meetings, collected data, drafted text and reviewed draft documents
Chiles Wilson	Trustee	Attended meetings, collected data, drafted text and reviewed draft documents
Dixie Wilson	Trustee	Attended meetings, collected data, drafted text and reviewed draft documents
Bill Darcie	Project Manager	RSN, Inc.

Source: RD 2111

12.3 Community Profile

The community profile for RD 2111 is detailed in the following sections. Figure 12-1 displays a map and the location of RD 2111 boundaries within Sacramento County.

Figure 12-1 Reclamation District 2111 Map

Source: RD 2111

12.3.1. RD 2111 Overview and Background

Reclamation District No. 2111, Dead Horse Island is near the town of Walnut Grove, several miles to the west of Interstate 5 between Sacramento and Stockton. The District is protected by approximately 13,650 feet of non-project levee. The District has one landowner, who holds all of the lands within. Dead Horse Island is surrounded by Dead Horse Cut to the east, the North Mokelumne River to the south, and Snodgrass Slough to the north and west. The island is accessible by bridge from Staten Island, which connects to the southwest most portion of Dead Horse Island. The levee crown road is an all-weather gravel surface, and in one portion of the Island veers off the crown to avoid an existing structure; the levee crown is still accessible to truck traffic if necessary in a flood event, and the required levee crown width for access is provided adjacent to the structure.

Reclamation District No. 2111 is responsible for maintaining the levee and drainage system that provides flood protection for Dead Horse Island, shown in Figure 12-1. The District was formed in 1980, and encompasses an area of 211 acres, surrounded by 2.58 miles of non-project levee, all located within Sacramento County. The District's Board of Trustees is made up of three Trustees who meet annually, or as necessary.

Dead Horse Island is located in the North Delta and is bordered by Dead Horse Cut to the east, the North Mokelumne River to the south, and Snodgrass Slough to the north and west. The District is located within the boundaries of the North Delta Water Agency. Emergency ingress and egress routes are via a private road on Staten Island off North Walnut Grove Road immediately east of the bridge over the North Fork of the Mokelumne River.

Dead Horse Island is located just downstream of the Delta Cross Channel. Water from the Sacramento River flows into both the South Fork and North Fork of the Mokelumne Rivers around the perimeter of Dead Horse Island as it flows toward the State and Federal Water Project Pumps near the City of Tracy. The Reclamation District No. 2111 levees provide the conduit for this water to enter both the North Fork and South Fork of the Mokelumne River, and are important to the proper function of the State and Federal Water Projects.

None of the waterways immediately surrounding Dead Horse Island is a significant commercial marine transportation route, but every waterway around Dead Horse Island is navigable during certain times of the year. A private dock and lagoon serve the Island at approximately Station 6+00. There are also two marinas across the waterways from the Island: a marina called "Wimpy's" near the southeast corner of the Island, and Walnut Grove marina across from the westernmost point of the Island. These marinas are major hubs for recreational boating in the area, and there is substantial boat traffic in the channels surrounding Reclamation District No. 2111, which increases the erosion to which the District levees are subject. The waterways surrounding Reclamation District No. 2111 are used extensively by recreational boaters and by marine contractors that perform levee maintenance, flood fight response and other construction activities.

12.4 Hazard Identification

RD 2111's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 2111 (see Table 12-2).

Table 12-2 RD 2111—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Extensive	Unlikely	Limited	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Extensive	Unlikely	Limited	Low
Dam Failure	Extensive	Unlikely	Limited	Low
Drought and Water Shortage	Extensive	Occasional	Critical	Low
Earthquake	Extensive	Unlikely	Negligible	Low
Earthquake: Liquefaction	Significant	Unlikely	Negligible	Low
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Limited	Likely	Limited	Low
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Significant	Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Limited	Unlikely	Negligible	Low
Severe Weather: Extreme Temperatures – Heat	Limited	Unlikely	Negligible	Low
Severe Weather: Fog	Limited	Unlikely	Negligible	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Limited	Unlikely	Negligible	Low
Severe Weather: Wind and Tornadoes	Limited	Unlikely	Negligible	Low
Subsidence	Limited	Unlikely	Critical	Low
Volcano	Extensive	Unlikely	Catastrophic	Low
Wildfire:(Burn Area/Smoke)	Limited	Unlikely	Negligible	Low

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

12.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 2111's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 2111 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

12.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section 12.5.3, includes a description as to how the hazard affects RD 2111 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

12.5.2. Vulnerability Assessment

This section identifies RD 2111's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table 12-3 lists particular critical facilities and other District assets identified by RD 2111's planning team as important to protect in the event of a disaster. RD 2111's physical assets, valued at over $150,000, consist of the buildings and infrastructure to support RD 2111 operations.

Table 12-3 RD 2111's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Drain Pump 10	Essential Services		$50,000	Out of floodplain
Drain Pumps	Essential Services		$100,000	Out of floodplain

Source: RD 2111

Natural Resources

The Reclamation District No. 2111 levee provides protection for valuable habitat essential for many threatened and endangered species. In general, Delta lands, including those protected by the District's levees, provide forage and cover for local and migratory populations of birds and terrestrial wildlife including many special status species. The levees also provide important waterside habitat and shoreline for various fisheries that includes several special status species. Flooding of Delta islands destroys habitat and kills most terrestrial species present.

Historic and Cultural Resources

Per the 2015 Five-Year Plan, there are not historic or cultural resources in the District.

Growth and Development Trends

According to the District in 2011, Dead Horse Island currently supports three permanent residences and several small structures which are generally not occupied. Three fulltime residents live on the Island. The permanent residences are above the required HMP levee crown elevation. The Planning Team for the District noted that futued development is limited in secondary zone of the Delta from the Delta Protection Plan.

12.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table 12-2 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 2111 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable District assets include the levees and supporting structures that the District owns.

An estimate of the vulnerability of RD 2111 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

The Reclamation District No. 2111 levee is generally overtopped or the levee is breached during large flood events due to a confluence of several waterways in the vicinity of Dead Horse Island, which is located just downstream of where the Cosumnes and Mokelumne Rivers and Dry Creek merge with Snodgrass Slough. The island is separated from the Sacramento River by one reclamation district and the flood gates for the Delta Cross Channel. Flooding of the island occurs primarily because the island is located in a hydraulic choke point in the river system that is impacted by the timing of storms, the unrestricted flows from the Cosumnes River and Dry Creek as well as the management of reservoir releases on the Mokelumne River.

Historically, flooding in the Delta has resulted from levee failures caused by the separate or coincidental occurrence of very high tides, high runoff, and river outflow through the Delta region. Strong onshore winds associated with low pressure storms increase flood potential by causing an additional rise of the water surface elevations, and can cause severe erosion on levees in a short period of time. Flood events resulting from high tides and/or high river outflow cannot be reliably predicted, and must be expected to occur in the future.

Past Occurrences

Past occurrences of flooding are detailed in the levee failure section below.

Vulnerability to Flood

Assets/Critical Facilities at Risk

Flooding of Delta islands has the potential to negatively impact water quality both locally and statewide. The largest of California's drinking water sources is the Sacramento-San Joaquin Delta and its tributaries. The Delta provides water throughout the state via the State and Federal water projects. During a flood, there is a higher potential for the waters in the Delta to be exposed to chemicals, fuel, oil, and multiple other constituents of concern that can quickly degrade water quality. Flooding can also disturb soil and soil-borne materials such as mercury and organic matter that can degrade water quality.

Dead Horse Island is located just downstream from the confluence of the Mokelumne and Cosumnes Rivers. The Cosumnes River is one of the few remaining rivers that does not have any dams, and flows are unrestricted upstream of Dead Horse Island. The Mokelumne River is controlled by several dams, with Camanche Dam being the principal flood control reservoir. McCormack Williamson Tract, located upstream to the northeast and adjacent to Dead Horse Island, has a restricted elevation levee on the upstream

end of the tract that overtops and fills McCormack Williamson Tract when the Mokelumne and Cosumnes Rivers reach an elevation of 20.0 feet (NAVD 88 datum). The flood water that is contained within McCormack Williamson Tract builds up within the Tract until it overtops and breaches the levee on the downstream end of the Tract, adjacent to Dead Horse Island. When the McCormack Williamson Tract downstream levee fails, all of the water accumulated from upstream is released in a very short time, and given the narrow channels surrounding Dead Horse Island, causes an immediate short term rise in the water surface elevations in the channels surrounding Dead Horse Island. The majority of the recent flood events on Dead Horse Island can be attributed to this type of hydraulic event that commonly occurs during flood flows on the Mokelumne and Cosumnes Rivers.

Based on past history, the District Planning Team noted that the island's levees are sufficient to protect against a 100-year flood. A 200- or 500-year flood would likely overwhelm or overtop the levees. The District Planning Team also noted that both marinas are unstable – they will break and block bridges during high water.

Should a flood breach the levees, the entirety of the assets of RD 2111 would be at risk. Levee failure is discussed later in this section. Flooding also causes erosion, which is discussed later in this section.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The Planning Team for the District noted no historic or cultural resources at risk to flooding.

Future Development

There is only one building site in the District. It is above the floodplain.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from

high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters

Past Occurrences

The 2015 Five-Year Plan contained detail of past occurrences of levee failure and how it affected the District. Those details are here below:

- 1900 – Dead Horse Island was initially reclaimed. The levee on the east side of the Island was constructed by dredgers, which separated the Island from McCormack Williamson Tract.
- 1907 – A flood event breached the levee on nearby Tyler Island, and likely flooded Reclamation District No. 2111 as well.
- December 1955 – Rainfall on a deep Sierra snowpack caused flooding at Reclamation District No. 2111. Levee failed and the District was inundated.
- 1957 – A flood event caused inundation at Dead Horse Island. The levee failed and the District was inundated.
- 1980 – Levee failure at approximately Station 96+00 to 97+00. Due to hydraulic conditions in this portion of the Delta, the levee was overtopped by rising floodwaters causing the failure along Snodgrass Slough opposite the Walnut Grove Marina. Reclamation District No. 2111 was inundated. The levee was temporarily repaired so that the Island could be dewatered. Complete repair of the failed levee section occurred during the following summer months and the full levee section was restored. A FEMA claim was filed, and helped to defer the costs of the repair.
- February 1986 – The east end of the Island was overtopped. In the words of one of the District trustees, this flood event caused overtopping simultaneously "all over" the District. The location of the District at the confluence of the of the Mokelumne and Cosumnes Rivers caused a huge volume of water to overwhelm the District in a very short time, and the elevation of the levee was insufficient to protect the District against this rapid floodwater rise. The levee prism also failed as a result in the rapid pressure increase from the high water. In addition to the increased flow throughout the Delta, floodwaters around the District rose even further due to an unexpected flow restriction in the North Fork of the Mokelumne River at the New Hope Bridge, where several house boats had broken loose of their moorings and lodged against the bridge (see photo). The house boats had been docked at the New Hope Marina, located upstream of the split between the North Fork and South Fork of the Mokelumne River, near the western portion of the District levee. Note the marina blocking water that caused the RD 2111 levees to fail.

Source: 2015 Five-Year Plan for RD 2111

- January 1997 – The District levee failed at approximately Station 107+00 to 110+00 just as the levee was about to be overtopped. Consequences: A levee break occurred opposite the Walnut Grove Marina during a flood event. The District was fully inundated. Several boats and sections of the dock from the Walnut Grove Marina were pulled through the levee breach into the interior of the island. Other recreational boats, house boats, and sections of dock were also pulled into the Millers Ferry Bridge, including a two story floating home which particularly threatened to reduce flows down the North Fork of the Mokelumne River, increase the flood threat to adjacent islands, and possibly destroy the bridge, cutting off one of the few available emergency evacuation routes (see photo). The large house boat was eventually destroyed and the debris was sucked under the bridge.

Source: 2015 Five-Year Plan for RD 2111

In earlier flood events, there are reports that the McCormack Williamson Tract levee was purposely breached on Dead Horse Cut prior to its overtopping, successfully attenuating the flood impacts previously anticipated to affect neighboring islands. These planned levee breaches also limited damage to the interior of the McCormack Williamson levees as the size and location of the planned breaches can be controlled, and the water surface elevation within the tract does not increase beyond the downstream high water surface elevations.

It should be noted that since 1986, significant portions of the levee system within the Legal Delta have been rehabilitated and improved, which has significantly reduced the number and frequency of levee breaches and failures during post-1986 Delta flood events.

Vulnerability to Levee Failure

Levee failures from collapse of rodent dens, seepage, falling trees, or some other mechanical failure are unpredictable and relatively uncommon. Routine levee inspections are the primary preventative measure against these types of levee failure events.

There are several standards that the levees in the Delta must meet in order to remain eligible for certain State and Federal disaster assistance programs. These include the Hazard Mitigation Plan (HMP) criteria and the Public Law 84-99 Flood Control and Coastal Emergency Act (PL 84-99) Standard for agricultural levees. The assessment below is based on the District's 2012 Hazard Mitigation Plan (HMP) Survey, performed by KSN Inc., and is corroborated by the State of California Department of Water Resources (DWR) 2007 Light Detection and Ranging (LiDAR) Survey. As of 2012, the District meets the following standards shown in Table 12-4.

Table 12-4 Reclamation District 2111 Levee Standards of Protection

Delta Agricultural Levee Standard	Feet of Levee	Percentage of Levee
Total Levee Length	13,642 feet	–
Meets HMP Standard	11,856 feet	87%
Meets PL 84-99 (Public Law 84-99 Flood Control and Coastal Emergency Act) Standard	1,786 feet	13 %

Source: 2015 Five Year Plan for RD 2111

Assets/Critical Facilities at Risk

Should the levees fail, all District assets would be at risk.

Natural Resources at Risk

Flooding of Delta islands destroys habitat, kills most species present, and can entrain and strand large populations of native and non-native fish species.

Historic and Cultural Resources at Risk

The Planning Team for the District noted no historic or cultural resources at risk to levee failure.

Future Development

There is only one building site in the District. Future development in the District is unlikely.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

Past Occurrences

There is erosion that occurs every year on RD 2111 levees. These may worsen depending on water and wave conditions.

Vulnerability to Erosion

Assets/Critical Facilities at Risk

The entirety of the levee system in RD 2111 is at risk to erosion.

Natural Resources at Risk

The Planning Team for the District noted no natural resources at risk to flooding.

Historic and Cultural Resources at Risk

The Planning Team for the District noted no historic or cultural resources at risk to flooding.

Future Development

There is only one building site in the District. Future development is unlikely

12.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

12.6.1. Regulatory Mitigation Capabilities

Table 12-5 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 2111.

Table 12-5 RD 2111's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	In progress.

Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y 2015	Five-Year Plan
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 2111

12.6.2. Administrative/Technical Mitigation Capabilities

Table 12-6 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 2111.

Table 12-6 RD 2111's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	Y	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	
Mutual aid agreements	Y	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y	
Community Planner	N	
Civil Engineer	Y	
GIS Coordinator	Y	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	Y	
Grant writing	Y	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 2111

12.6.3. Fiscal Mitigation Capabilities

Table 12-7 identifies financial tools or resources that the RD 2111 could potentially use to help fund mitigation activities.

Table 12-7 RD 2111's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	N	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	RD taxes
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 2111

12.6.4. Mitigation Education, Outreach, and Partnerships

Table 12-8 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 12-8 RD 2111's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

12.6.5. Other Mitigation Efforts

The District Planning Team noted no other mitigation efforts.

12.7 Mitigation Strategy

12.7.1. Mitigation Goals and Objectives

RD 2111 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

12.7.2. Mitigation Actions

The planning team for RD 2111 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Rock Slope Protection Project

Hazards Addressed: EQ, EQ Liquefaction, Flood: 100/200/500-year, Flood: Localized Stormwater Flooding, Levee Failure, River/Stream/Creek Bank Erosion, Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning), Severe Weather (Wind and Tornadoes), Subsidence

Goals Addressed: 1, 2, 3, 4

Issue/Background: The goal of this Mitigation Action is to improve the Dead Horse Island levees over the next five years to a level of protection that meets, or exceeds, the U.S. Army Corps of Engineers' (USACE) PL84-99 Levee Standard.

Project Description: The District would like to ensure the protection of the existing levee by adding supplementary quarry stone riprap above the existing riprap to any portions of the waterside slope of the levee requiring supplementary rock slope protection. This will prevent erosion and avoid ongoing repairs to the levee structure.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: Permitting process, Finalizing the EIR, potential CEQA Design Process

Responsible Office/Partners: RD 2111

Project Priority: High

Cost Estimate: $813,000

Benefits (Losses Avoided): Preservation of 2111 levee structures, Ecosystem Restoration and Habitat Enhancement Component, Reversing Land Subsidence, Ensuring Adequate and Effective Emergency Response Plans, Benefitting Water Quality, Improving Water Supply Reliability

Potential Funding: Prop 1 and 1E, 84 Funds, HMGP Grant Programs, seeking cost sharing partners for project ongoing.

Timeline: 1-10 years depending on regulatory process and funding

Action 2. HMP and PL-8499 Levee Improvement Projects

Hazards Addressed: EQ, EQ Liquefaction, Flood: 100/200/500-year, Flood: Localized Stormwater Flooding, Levee Failure, River/Stream/Creek Bank Erosion, Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning), Severe Weather (Wind and Tornadoes), Subsidence

Goals Addressed: 1, 2,3, 4

Issue/Background: The goal of this Mitigation Action is to improve the Dead Horse Island levees over the next five years to a level of protection that meets, or exceeds, the U.S. Army Corps of Engineers' (USACE) PL84-99 Levee Standard.

Project Description: The District would like to bring portions of the RD 2111 levee currently below the HMP Criteria to six inches above the PL 84-99 Standard using 2:1 landside slopes. If sufficient funding is available, the segments of levee improved during this phase will include portions of the levee that meet the HMP Criteria, but do not meet the design template for this project, due to the many relatively short stretches of levee that do not meet the PL 84-99 Standard in close proximity to longer stretches of levee that do not meet the HMP Standard. After the entire levee meets or exceeds the HMP Criteria, the District will bring any remaining portions of levee below the PL 84-99 Standard to six inches above the PL 84-99 Standard.

Other Alternatives: none

Existing Planning Mechanism(s) through which Action Will Be Implemented: Permitting process, Finalizing the EIR, CEQA Design Process

Responsible Office/Partners: RD 2111

Project Priority: High

Cost Estimate: $16,000,000

Benefits (Losses Avoided): Preservation of 2111 levee structures, Ecosystem Restoration and Habitat Enhancement Component, Reversing Land Subsidence, Ensuring Adequate and Effective Emergency Response Plans, Benefitting Water Quality, Improving Water Supply Reliability

Potential Funding: Prop 1 and 1E, 84 Funds, HMGP Grant Programs, seeking cost sharing partners for project.

Timeline: 1-10 years depending on regulatory process and funding

Annex H Cosumnes Community Services District Fire Department

H.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Cosumnes Community Services District Fire Department (Cosumnes Fire Department or CFD), a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the CFD. This Annex provides additional information specific to CFD, with a focus on providing additional details on the risk assessment and mitigation strategy for this community.

H.2 Planning Process

As described above, the CFD followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), the CFD formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table H-1. Additional details on plan participation and CFD representatives are included in Appendix A.

Table H-1 CFD Planning Team

Name	Position/Title	How Participated
Troy Bair	Deputy Chief	Reviewed and provided input and updates on all areas of annex.
Kris Hubbard	Battalion Chief	Reviewed and provided input and updates on all areas of annex. Attended HMPC meetings.
John Ebner	Financial Analyst	Reviewed and provided input and updates on all areas of annex.

Source: CFD

Coordination with other community planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the CFD integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, the CFD incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table H-2.

Table H-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
District Emergency Operations Plan / Continuity of Operations Plan	The LHMP was utilized to develop an up to date emergency operations plan that will provide for a coordinated response before, during, and after a disaster incident affecting the District.
Hazard Specific Appendices	Hazard specific annexes created to identify hazard-specific risk areas and evacuation routes, specify provisions and protocols for warning the public and disseminating emergency public information and specifiy the types of protective equipment and detection devices for responders.

H.3 Community Profile

The community profile for the CFD is detailed in the following sections. Figure H-1 displays a map and the location of CFD boundaries within Sacramento County.

Figure H-1 CFD Boundaries

H.3.1. Department Overview, History and Background

The Cosumnes Community Services District Planning Area encompasses the former territory of six Plains Miwok tribelets along the Cosumnes River drainage and two, possibly three tribelets along the Sacramento River. In 1850, Elk Grove was established as a hotel stop and a stop for the stage. It is located about 15 miles south of historic Sutter's Fort and thus became a crossroads for business, entertainment, mail service and agriculture, and acted as home base for gold miners in nearby communities.

The roots of the Cosumnes Community Services District Fire Department date back to 1893, when the Elk Grove Fire Department started with a single hose cart and a small group of volunteers, and 1921, when the all-volunteer Galt Fire Protection district was formed. Today, the two fire departments operate as one, servicing growing communities with progressive, modern firefighter practices and equipment.

The Cosumnes CSD Fire Department is the product of two mergers. The first occurred in 1985 when the Elk Grove Fire Department merged with the Elk Grove Parks and Recreation District, one of the oldest park districts in the state, to become the Elk Grove Community Services District. The second merger was in 2006, when the CSD merged its fire services with the Galt Fire Protection District forming the Cosumnes Community Services District.

Initially, the town of Elk Grove developed around a stage stop on the Monterey Trail, though after the railroad passed by east of town, Elk Grove's center shifted to its present location. "Old Town" Elk Grove is located about a mile east of State Route 99 (formerly U.S. Route 99, the north-south artery of the California Central Valley).

America's first transcontinental highway, the Lincoln Highway, ran through Galt until it was ultimately replaced by State Route 99. Lincoln Way in central Galt is a remnant of this historic route. Galt grew around the rail depot and State Route 99 throughout the first half of the twentieth century. Improvements to State Route 99 in recent years have made Galt more accessible, which has resulted in increased population and growth to the west and northeast.

The original 1850 Spanish land grant, Rancho del los Moquelumnes, was purchased in 1861 by Dr. Obed Harvey, considered today as Galt's founder. His purchase included much of the Dry Creek Township which was later established as the town of Galt in 1869 by the Western Pacific Railroad company. A prominent early settler, John McFarland, named the town after his former home in Ontario, Canada, which was named after a Scottish novelist, John Galt. The combination of favorable land for agriculture and the proximity to the railroad provided Galt with the economic support to continue to grow.

With the decline of gold mining in the Sierra Nevada foothills by the end of the eighteenth century, Galt, like many other Central Valley towns, saw the arrival of miners looking to start anew in agriculture. The City's proximity to several major rivers and the water resources of the Sacramento-San Joaquin River Delta made Galt ideal for the establishment of agriculture early in California's history.

Today, Galt is at a strategic location between the growing areas of Sacramento and Stockton. The city's proximity to I-5 and SR 99 provides Galt excellent access to the rest of the Central Valley and California.

Despite fast growth in the region, the city continues to maintain its small-town character while balancing the needs for housing and acknowledging its important agricultural heritage.

Cosumnes Fire Department provides all risk emergency services to the cities of Elk Grove, and Galt. Additionally, services are provided to the communities of Sheldon, Pleasant Grove Laguna, Laguna West, and Franklin.

H.3.2. Geography and Climate

The District has a Mediterranean climate, characterized by damp to wet, mild winters and hot, dry summers. The wet season is generally October through April, though there may be a day or two of light rainfall in June or September. The mean annual temperature is 61.1°F, with monthly means ranging from 45.8°F in December to 75.4°F in July. Summer heat is often moderated by a sea breeze known as the "delta breeze" which comes through the Sacramento-San Joaquin River Delta from the San Francisco Bay.

On average, 96 days in the year experience some degree of fog, which usually occurs in the morning (tule fog). The foggiest months are December and January. Tule fog can be extremely dense, lowering visibility to less than 100 feet and making driving conditions extremely hazardous. Chilling tule fog events have been known to last for several consecutive days or weeks. During tule fog events temperatures do not exceed 50 degrees.

Snowfall is exceptionally rare in the District (at an elevation of only 45 to 47 feet above sea level). The all-time record snowfall was 3.5 inches on January 4, 1888. Dustings occur every 5–10 years, with up to an inch accumulation in outlying areas. During especially cold winter and spring storms, intense showers do occasionally produce a significant amount of hail, which can create hazardous driving conditions. Significant snow accumulations occur each year in the foothills located 40 miles (65 km) east of the city.

On average, there are 74 days where the high exceeds 90°F, and 15 days where the high exceeds 100°F; on the other extreme, freezing nights occur 16 nights per year. At Sacramento International Airport, extremes have ranged from 18°F on December 22, 1990 to 115°F on June 15, 1961.

The average annual precipitation is 21.45 inches. On average, precipitation falls on 62 days each year in Sacramento region, and nearly all of this falls during the winter months. Average January rainfall is 3.84 inches, and measurable precipitation is rare during the summer months. In February 1992, Sacramento region had 16 consecutive days of rain, resulting in an accumulation of 6.41 inches for the period. A record 7.24 inches of rain fell on April 20, 1880. On rare occasions, monsoonal moisture surges from the Desert Southwest can bring upper-level moisture to the Sacramento region.

H.3.3. Economy

Studies for foreseeable future point to slow growth in the labor markets which directly impacts the Cosumnes Fire Department. The Department, which includes the cities of Elk Grove and Galt, was affected by the subprime mortgage crisis and the decrease in new home construction which has historically played an important part in the overall local economy. Of the region's five largest job sectors (government, trade,

transportation, utilities, and leisure), three continue to struggle which in effect has slowed the region's recovery.

H.3.4. Population

As of 2010-2014, the total population of Elk Grove is 158,455. The Elk Grove population density is 3,751.40 people per square mile, which is much higher than the state average density of 232.55 people per square mile and is much higher than the national average density of 82.73 people per square mile.

H.4 Hazard Identification

CFD's planning team identified the hazards that affect the Department and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to CFD (see Table H-3).

Table H-3 CFD—Hazard Identification Table

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Likely	Negligible	Medium
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change				
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Significant	Likely	Limited	Medium
Earthquake	Significant	Likely	Negligible	Low
Earthquake: Liquefaction				
Flood: 100/200/500-year	Limited	Likely	Limited	High
Flood: Localized Stormwater Flooding	Significant	Likely	Limited	Medium
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Limited	Occasional	Limited	Low
River/Stream/Creek Bank Erosion	Limited	Occasional	Negligible	Low
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Heat	Extensive	Likely	Limited	Medium
Severe Weather: Fog	Extensive	Likely	Negligible	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Likely	Limited	Medium
Severe Weather: Wind and Tornadoes	Limited	Occasional	Limited	Low
Subsidence	Limited	Unlikely	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Highly Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

H.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile CFD's hazards and assess the Department's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Section 4.3 Vulnerability Assessment in the main plan. The hazard profile discusses the threat to the Planning Area and describes previous occurrences of hazard events and the likelihood of future occurrences. The vulnerability assessment analyzes the population, property, and other assets at risk to hazards ranked of medium or high significance that may vary from other parts of the Planning Area. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

H.5.1. Hazard Profiles

At the beginning of each hazard vulnerability assessment in Section H.5.3, a brief statement is given as to how the hazard affects the CFD, as well as past occurrences. The intent of this section is to provide jurisdictional specific information on hazards.

H.5.2. Vulnerability Assessment and Assets at Risk

This section identifies CFD's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, economic assets, and growth and development trends.

Assets at Risk

Table H-4 lists particular critical facilities and other community assets identified by the CFD's planning team as important to protect in the event of a disaster. CFD's physical assets, valued at over $64 million, consist of the buildings and infrastructure to support the CFD operations.

Table H-4 CFD's Critical Facilities, Infrastructure, and Other Department Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Cosumnes Fire Administration Campus	Administration/Apparatus support, and training	10573 E. Stockton Blvd. Elk Grove, CA 95624	$17,000,000	
Cosumnes Fire Stations (8)	Emergency Response		$40,000,000	
Cosumnes CSD Administration	CSD Administration	9355 E. Stockton Blvd. Elk Grove, CA 95624	$7,000,000	

Source: CFD

Critical Facilities

For purposes of this plan, a critical facility is defined as:

Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, (3) Hazardous Materials Facilities.

This definition was refined by separating out three categories of critical facilities as further described in Section 4.3.1 of the Base Plan. An inventory of critical facilities in the CFD is provided in Table H-5 and shown in Figure H-2 and Figure H-3.

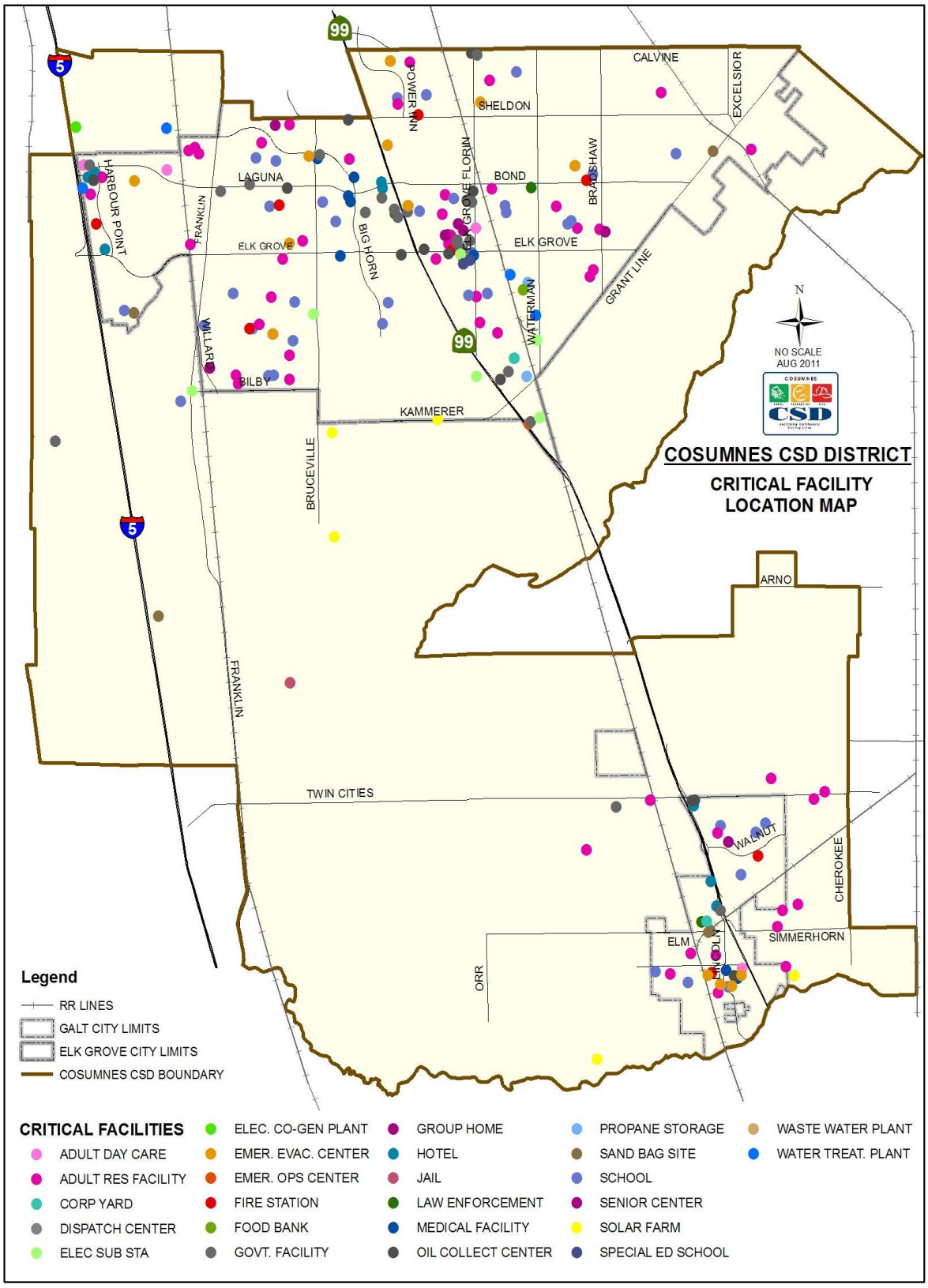
Table H-5 CFD Critical Facilities: Summary Table

CF Definition Category	Type	Total by Location
Essential Services Facilities	Corporation Yard	2
Essential Services Facilities	Detention Basin	24
Essential Services Facilities	Dispatch Center	2
Essential Services Facilities	Emergency Evacuation Shelter	12
Essential Services Facilities	Emergency Operations Center	2
Essential Services Facilities	Fire Station	9
Essential Services Facilities	Government Facilities	20
Essential Services Facilities	Medical Health Facility	10
Essential Services Facilities	Law Enforcement	3
Essential Services Facilities	Sand Bag	7
Essential Services Facilities	Jail	1
Essential Services Facilities	State And Fed Facilities	4
Essential Services Facilities	Wastewater Treatment Facility	2
Essential Service Facilities	Electrical Sub -Stations	12
Essential Service Facilities	Water Treatment Facility	5
Essential Service Facilities	Co-Generation Plant	1
Essential Service Facilities	Photovoltaic Farm	5
Essential Service Facilities	Food Bank	1
Essential Service Facilities	Senior Center	1
Essential Service Facilities	Cal Trans Service Center	1
At Risk Population Facilities	Adult Residential	54
At Risk Population Facilities	Assisted Living Centers	57
At Risk Population Facilities	Day Care Center	37
At Risk Population Facilities	Group Home	6
At Risk Population Facilities	Hotel	8
At Risk Population Facilities	Infant Center	1
At Risk Population Facilities	Public and Private Schools	45
At Risk Population Facilities	Adult Day Care	6

CF Definition Category	Type	Total by Location
At Risk Population Facilities	Special Education School	1
Hazardous Materials Facilities	Oil Collection Centers	1
Hazardous Materials Facilities	Large Propane Storage	1
Total		**341**

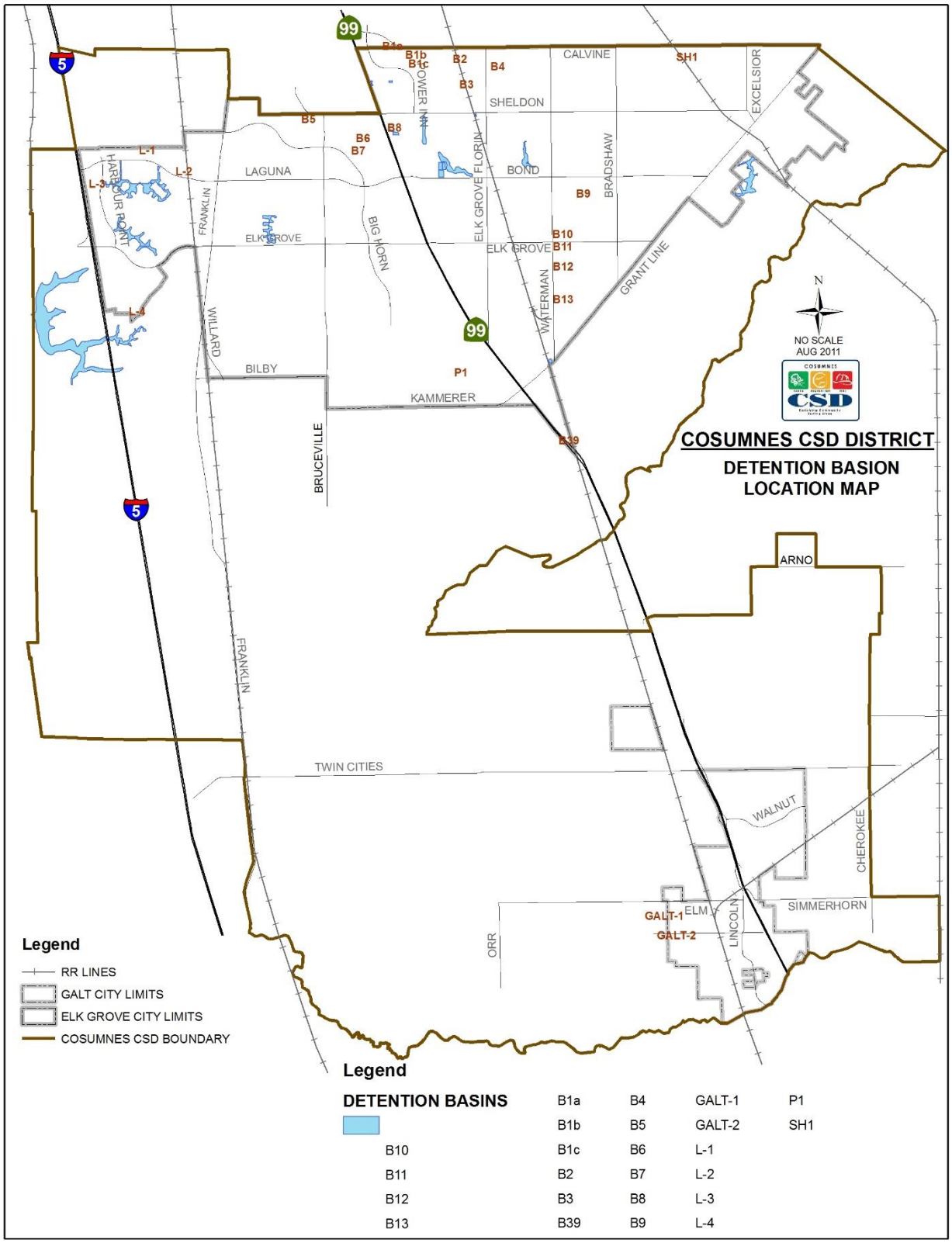
Source: CFD

Figure H-2 CFD Critical Facilities



Source: CFD

Figure H-3 CFD Critical Facilities (Detention Basins)



Natural Resources

The CFD has a variety of natural resources of value to the community: habitat types are listed below, detailed in Table H-6. Table H-7 delineates the special status species that can be found in the CFD.

- Annual Grassland (including both disturbed and vernal pool grasslands)
- Cropland
- Orchard
- Freshwater Marsh
- Open Water (including both lacustrine and riverine habitats)
- Riparian (Scrub or Woodland)
- Urban/Developed Areas
- Vernal Pools
- Vineyards

Table H-6 Habitat Types within the CFD

Habitat Types	Acres (Approximate)	Percent Study Area
Annual Grassland	7,550	30%
Cropland	9,276	37%
Disturbed	21	<1%
Freshwater Marsh	135	<1%
Open Water	767	3%
Orchards	51	<1%
Other	10	<1%
Riparian (Scrub or Woodland)	320	1%
Seasonal Wetland	431	2%
Urban	5,232	21%
Vernal Pools	258	1%
Vineyards	954	4%
Total	**25,006**	**100%**

Note: "Other" includes those areas designated as recreational areas, the TNC Reserve, and roads.
Source: Draft South Sacramento County Habitat Conservation Plan – vegetation data interpreted from 1997-1998 aerial photos (minimal ground-truthing)

Table H-7 Special-Status Species Potentially Occurring in the CFD

Common Name	Scientific Name	Regulatory Status	Potential for Occurrence
Plants			
Ahart's Dwarfrush	*Juncus leiospermus var. ahartii*	SC; --; 1 B	Yes
Amador Rush-Rose	*Helianthemum suffrutescens*	SCL; --; 3	No
Antioch Dunes Evening Primrose	*Oenothera deltoids ssp. Howellii*	FE; CE; 1 B	No
Boggs Lake Hedge- hyssop	*Gratiola heterosepala*	--; CE; 1 B	Yes

Common Name	Scientific Name	Regulatory Status	Potential for Occurrence
Delta Tule-pea	*Lath yrus jepsonii var. jepsonii*	SC; --; 1 B	Yes
Dwarf Downingia	*Downingia pusilla*	--; --; 2	Yes
Legenere	*Legenere limosa*	SC; --; 1 B	Yes
Mason's Lilaeopsis	*Lilaeopsis masonii*	SC; CR; 1 B	Yes
Northern California Black Walnut	*Juglans californica var. hindsii*	SC; --; 1 B	Yes
Pincushion navarettia	*Naverretia myersii spp. Myersii*	SC; --; 1 B	Yes
Rose Mallow	*Hibiscus lasiocarpus*	SC; --; 1 B	Yes
Sacramento Orcutt Grass	*Orcuttia viscida*	FE; CE; 1 B	Yes
Sacramento Orcutt Grass Critical Habitat	*Orcuttia viscida Critical Habitat*	--	Yes
San Joaquin Saltbrush	*Atriplex joaquiniana*	SC; --; 1 B	Yes
Sanford's Arrowhead	*Sagittaria sanfordii*	SC; --; 1 B	Yes
Slender Orcutt Grass	*Orcuttia tenuis*	FT; CE; 1 B	Yes
Slender Orcutt Grass Critical Habitat	*Orcuttia tenuis Critical Habitat*	--	Yes
Soft Bird's-Beak	*Cordylanthus mollis ssp. mollis*	FE; CR; 1B	No
Stinkbells	*Fritillaria agrestis*	SCL; --; 4	No
Suisun Marsh Aster	*Aster lentus*	SC; --; 1 B	No
Tuolomne Coyote-thistle	*Eryngium pinnatisectum*	SC; --; 1 B	No
Wildlife			
Invertebrates			
Antioch Dunes anthicid beetle	*Anthicus antiochensis*	SC; --; --	No
California linderiella	*Linderiella occidentalis*	SC; --; --	Yes
Conservancy fairy shrimp	*Brachinecta conservation*	FE; --; --	Yes
Curved-foot hygrotus diving beetle	*Hygrotus curvipes*	SC; --; --	No
Delta Green ground beetle	*Elaphrus viridis*	FT; --; --	No
Midvalley Fairy Shrimp	*Branchinecta mesovallensis*	SC; --; --	Yes
Sacramento Anthicid beetle	*Anthicus sacramento*	SC; --; --	No
San Joaquin Dune beetle	*Coelus gracilis*	SC; --; --	No
Valley Elderberry Longhorn beetle	*Desmocerus californicus dimorphus*	FT (PX); --; --	Yes
Vernal Pool Fairy Shrimp	*Branchinecta lynchi*	FT; --; --	Yes
Vernal Pool Tadpole Shrimp	*Lepidurus packardi*	FE; --; --	Yes
Amphibians/Reptiles			
California Horned Lizard	*Phrynosoma coronatum frontale*	SC; CSC (protected full species); --	Yes

Common Name	Scientific Name	Regulatory Status	Potential for Occurrence
California Red-legged Frog	*Rana aurora draytonii*	FT; CSC (protected full species); --	No
California Tiger Salamander	*Ambystoma californiense*	C; CSC (protected); --	Yes
Giant Garter Snake	*Thamnophis gigas*	FT; CT (protected); --	Yes
Foothill Yellow-legged Frog	*Rana boylii*	SC; CSC (protected); --	No
Northwestern Pond Turtle	*Clemmys marmorata marmorata*	SC; CSC; --	Yes
Silvery Legless Lizard	*Anniella pulchra pulchra*	SC; CSC; --	Yes
Western Spadefoot Toad	*Scaphio pus hammondii*	SC; CSC (protected); --	Yes
Fish			
Central Valley Fall/Late Fall-run Chinook Salmon and Critical Habitat	*Oncorhynchus tshawytscha*	C; CSC; --	Yes
Central Valley Spring-run Chinook Salmon	*Oncorhynchus tshawytscha*	FT; CT; --	Yes
Central Valley Winter – run Chinook Salmon and Critical Habitat	*Oncorhynchus tshawytscha*	FE; CE; --	Yes
Central Valley Steelhead	*Oncorhynchus mykiss*	FT; --; --	Yes
Delta Smelt	*Hypomesus transpacificus*	FT; CT; --	Yes
Green Sturgeon	*Acipenser medirostris*	SC; CSC; --	Yes
Kern Brook Lamprey	*Lam petra hubbsi*	SC; CSC; --	No
Longfin Smelt	*Spirinchus thaleichthys*	SC; CSC; --	No
Pacific Lamprey	*Lam petra trident ata*	SC; --; --	Yes
River Lamprey	*Lam petra ayresi*	SC; CSC; --	Yes
Sacramento Perch	*Arc hoplites interruptus*	--; CSC; --	No
Sacramento Splittail	*Pogonichthys macrolepidotus*	FT; CSC; --	Yes
Birds			
Aleutian Canada Goose	*Branta Canadensis leucopareia*	FD; --; -- (Wintering)	Yes
American Bittern	*Botaurus lentiginosus*	SC; --; --	Yes
American Peregrine Falcon	*Falco peregrinus anatum*	D; CE (fully protected); -- (nesting)	No
Bald Eagle	*Haliaeetus leucocephalus*	FT (PD); CE (fully protected); -- (nesting and wintering)	No
Bank Swallow	*Riparia riparia*	--; CT; -- (nesting)	Yes
Black Rail	*Laterallus jamaicensis coturniculus*	SC; CT (fully protected); --	Yes
Black Tern	*Chlidonias niger*	SC; CSC; -- (nesting colony)	Yes
Brewer's Sparrow	*Spizella breweri*	SC; --; -- (nesting)	No
California Thrasher	*Toxostoma redivivum*	SC; --; --	No

Common Name	Scientific Name	Regulatory Status	Potential for Occurrence
Common Loon	*Gavia immer*	SC; CSC; -- (nesting)	No
Cooper's Hawk	*Accipiter cooperi*	--; CSC; -- (nesting)	Yes
Double-crested cormorant	*Phalacrocorax aurit us*	--; CSC; -- (rookery site)	No
Grasshopper Sparrow	*Ammodramus savannarum*	SC; --; -- (nesting)	Yes
Great Blue Heron	*Ardea herodias*	--; CDF (sensitive); -- (rookery)	Yes
Great Egret	*Ardea alba*	--; CDF (sensitive); -- (rookery)	Yes
Greater Sandhill Crane	*Grus Canadensis tabida*	--; CT (fully protected); --	Yes
Lawrence's Goldfinch	*Carduelis lawrencei*	SC; --; -- (nesting)	No
Lewis' Woodpecker	*Melanerpes lewis*	SC; --; -- (nesting)	No
Little Willow Flycatcher	*Empidonax traillii brewsteri*	SC; --; -- (nesting)	No
Loggerhead Shrike	*Lanius ludovivianus*	SC; CSC; -- (nesting)	Yes
Long-billed Curlew	*Numenius americanus*	SC; CSC; -- (nesting)	No
Mountain Plover	*Charadrius montanus*	FPT; CSC; -- (wintering)	Yes
Nuttall's Woodpecker	*Picoides nuttallii*	SLC; --; --	Yes
Oak Titmouse	*Baeolophus inornatus*	SLC; --; --	Yes
Rufous hummingbird	*Selasphorus rufus*	SC (MNBMC); --; -- (nesting)	No
Short-eared Owl	*Asio flammeus*	SC; --; -- (nesting)	No
Snowy Egret	*Egretta thula*	SC; --; -- (rookery)	Yes
Swainson's Hawk	*Buteo swainsoni*	--; CT; --	Yes
Tricolored Blackbird	*Agelaius tricolor*	SC; CSC; -- (nesting colony)	Yes
Western Burrowing Owl	*Athene cunicularia hypugea*	SC; CSC; -- (burrowing sites)	Yes
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	SC; CE (fully protected); -- (nesting)	Yes
White-faced Ibis	*Plegadis chihi*	SC; CSC; -- (rookery site)	No
White-tailed Kite	*Elanus caeruleus*	SC; (fully protected); - - (nesting)	Yes
Mammals			
Fringed Myotis	*Myotis thysanodes*	SC; --; --	Yes
Greater Western Mastiff bat	*Eumops perotis californicus*	SC; CSC; --	Yes
Long-eared Myotis	*Myotis evotis*	SC; --; --	Yes
Long-legged Myotis	*Myotis volans*	SC; --; --	Yes
Pacific Western Big- eared bat	*Corynorhinus townsendii townsendii*	SC; CSC (full species); --	Yes
Pale Townsend's Big- eared bat	*Corynorhinus townsendii pallescens*	SC; CSC (full species); --	Yes

Common Name	Scientific Name	Regulatory Status	Potential for Occurrence
San Francisco Dusky-footed woodrat	*Neotoma fuscipes annectens*	SC; CSC; --	No
San Joaquin Pocket Mouse	*Perognathus inornatus*	SC; --; --	Yes
San Joaquin Woodrat	*Neotoma fuscipes riparia*	FE; CSC; --	No
Small-footed Myotis	*Myotis ciiolabrum*	SC; --; --	Yes
Yuma Myotis	*Myotis yumanensis*	SC; --; --	Yes

FE = federally endangered FT = federally threatened
SC = federal species of concern
C = candidate FPT = federal proposed threatened FPE = federal proposed endangered SLC = Species of Local Concern
CE = state endangered
CT = state threatened CR = state rare
CSC = California species of special concern
C = candidate for listing
1 B = CNPS list plants rare, threatened, or endangered in California or elsewhere
2 = CNPS list plants rare, threatened, or endangered in California, but more numerous elsewhere * = not enough information available on this species
3 = CNPS list plants about which CNPS needs more information
4 = CNPS list plants of limited distribution – a watch list

Source: Foothill Associates, 2002

Historic and Cultural Resources

The CFD has 4 has registered federal historic sites:

- William Ehrhardt House (Elk Grove)
- Elk Grove Historic District (Elk Grove)
- Brewster Building (Galt)
- Brewster House (Galt)

In addition to the registered sites, there are several assets within CFD that define the community and represent the area's history. Some additional historical sites of importance are listed below.

- Old Town Elk Grove Shopping District.
- Rhodes School - first constructed in 1872, now located in Elk Grove Park.
- Murphy's Corral site of the beginning of the conquest of California by the United States on June 10, 1846.
- Galt Historic Business District.

Economic Assets

The largest employers with the CFD include: The Elk Grove Unified School District, Kaiser Permanente, and Apple Computers.

Growth and Development Trends

As of 2010 the growth within the CFD has been at 2.51%. The Regional Mall on Promenade Parkway and the Wilton Miwok Tribe Casino and Hotel will be developed in the near future.

Development since the 2011 Plan

The CFD has seen an increase in their service area population since the 2011 plan. Specifically, this includes:

CFD implemented a development project since 2011 increasing the numbers and capacity of District assets. New development tracked by totals and hazard risk areas are shown in Table H-8. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people living in District service areas potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the District to identified priority hazards.

Table H-8 CFD Development by Year and Hazard Areas since 2011

Asset Type	Year Built	Outside of Known Hazard Area	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Fire Station	2012		X			Landslide area
Total						

Source: CFD

[1]Moderate or higher wildfire risk area

H.5.3. Estimating Potential Losses

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table H-3 as high or medium significance hazards. Impacts of past events and vulnerability of the CFD to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the Base Plan. In general, the most vulnerable structures are those located within the floodprone areas, WUI areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of the CFD to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.

- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Agricultural Hazards

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Agricultural cropland occurs interspersed throughout the rural residential areas in the City of Elk Grove, and throughout the Planning Area, with the majority occurring within the western portion of the Planning Area. More information on agricultural hazards of concern may be found in their annex (Annex B) to this Plan.

Past Occurrences

The CFD Planning Team noted that there have been no past occurrences of agricultural hazards in the City.

Vulnerability to Agricultural Hazards

Because this habitat is intensively managed, vegetation is limited to cultivated crops, predominately grains, orchards, and vineyards, with ruderal (weedy) vegetation along the margins. Ruderal species observed include Italian ryegrass (*Lolium multiforum*), ripgut brome (*Bromus diandrus*), and yellow star-thistle (*Centaurea solstitialis*).

Future Development

Future development in the District is not expected to be affected by ag hazards.

Drought

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water. A review of wildfire threat zones in the District based on fuel type, density, and percent of slope range from moderate to high – some of this is based upon the current drought situation. The Department's response plan has been designed to deliver the right mix of structural and wildland engines capable of rough terrain firefighting.

Past Occurrences

The District Planning Team noted that drought has been an ongoing issue in the past 5 years.

Vulnerability to Drought

Based on historical information, the occurrence of drought in California, including the Cities of Elk Grove and Galt, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users. The vulnerability of Elk Grove and Galt to drought is City-wide, but impacts may vary and include reduction in water supply and an increase in dry fuels.

Future Development

The District Planning Team noted that drought would not necessarily be a limiting or contributing factor to future growth within the district. Economy will be the driving force on expansion and building within the area.

Flood 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Major surface waters in the area of the District include the Morrison Creek Stream Group, and include Elder, Elk Grove, Laguna (and tributaries), Morrison, Strawberry, and Whitehouse Creeks near Elk Grove. Badger Creek, Willow Creek, Laguna Creek, Skunk Creek, Deadman Gulch, and Dry Creek, which drain to the Cosumnes River are near Galt. These can be seen on Figure H-4.

Figure H-4 CFD Major Waterways and Sources of Flooding

Source: CFD

Past Occurrences

The CFD experienced a significant flood specifically in January 1997. During this time period major transportation corridors, Interstate 5 and Highway 99 were shut down due to rising water levels. The loss of transportation corridors had a major impact on emergency services delivery to quickly respond to routine and flood related emergencies. The rising waters from the Cosumnes River essentially divided the district into two separate areas

Vulnerability to Flood

Elk Grove

Elk Grove area is part of the Sacramento River watershed, which covers approximately 27,000 square miles, with 400 miles of river from Lake Shasta to the convergence of the Sacramento-San Joaquin Delta. The City is also a part of this larger watershed. More specifically, surface water resources in Elk Grove are a part of the Morrison Creek Stream Group, and include Elder, Elk Grove, Laguna (and tributaries), Morrison, Strawberry, and Whitehouse Creeks. Florin, Gerber, and Union House creeks are located close to the City. Deer Creek is located in the eastern portion of the City, parallel to the Cosumnes River. The Cosumnes River is the eastern border of the City; however, all of the creeks in the area drain into the Morrison Creek Stream Group, then eventually into the Sacramento River. Runoff from precipitation and snowmelt from the Sierra Nevada mountains are the main sources of surface water supply in the City.

Laguna Creek, the Cosumnes River, and the Sacramento River are the main surface hydrological features in the City. The Morrison Creek Stream Group drainage basin covers 192 square miles. The nine creeks that drain into Morrison Creek flow southwest and eventually drain into the Beach Stone Lakes area west of Interstate 5.

Laguna Creek, the main creek that flows through the City of Elk Grove, has been altered by development. There have been channels, levees, and culverts created to alleviate the possibility of flooding, as well as to accommodate different development scenarios. Some of the other creeks in the City have also been altered to accommodate development or alleviate flooding potential. Structures and assets at risk, population at risk, and critical facilities at risk for Elk Grove can be found in their annex (Annex B) to this plan.

Galt

Although the City is located outside of the major flood plain area, the City experiences two types of flooding. The first is associated with local water courses. The second is associated with localized flood events resulting from inadequate surface flow. Heavy rainfall causes these types of flooding events.

Runoff from the City's study area is drained by a variety of local streams and creeks including Badger Creek, Willow Creek, Laguna Creek, Skunk Creek, Deadman Gulch, and Dry Creek, which drain to the Cosumnes River. The areas near the confluence of these smaller water courses with the Cosumnes River includes large areas of flood plain, which absorb excess flows from local watersheds during heavy rains and spring floods. Much of the storm water of this floodplain is maintained through a complex system of levees and dikes. Structures and assets at risk, population at risk, and critical facilities at risk for Galt can be found in their annex (Annex D) to this plan.

Assets at Risk

Parks and Greenbelts may be impacted within the flood prone areas. Buildings and infrastructure may have minimal impact.

Natural Resources at Risk

The District Planning Team noted that a wildlife preserve may be at risk to flooding.

Historic and Cultural Resources at Risk

The District Planning Team noted no historic or cultural assets at risk.

Future Development

The District Planning Team noted that flooding would not necessarily be a limiting or contributing factor to future growth within the District. Economy will be the driving force on expansion and building within the area.

Flood: Localized/Stormwater

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Localized flooding occurs at various times throughout the year and there are several areas of concern unique to the cities within the District. Historically, they have been at risk of flooding primarily during the spring months when the waterway/creek systems swell with heavy rainfall. This may produce local street flooding due to high water in the waterway/creek systems causing outfalls to back-up into the drainage inlets.

Past Occurrences

The District does not track localized flooding for the District.

Vulnerability to Localized Flood

Elk Grove

Historically, the City of Elk Grove has been at risk to flooding primarily during the spring months when river systems in the County swell with heavy rainfall. Localized flooding also occurs at various times throughout the year with several areas of primary concern unique to the City of Elk Grove. In the "Sheldon" area of Elk Grove, local flooding is widespread but generally minor; the flat land causes floodwaters to spread out, reducing threats to life. These areas of concern are shown in Annex B: City of Elk Grove of this plan.

Galt

Flooding events can occur any time during the rainy season (November to April). These events result from prolonged, heavy rainfall and are characterized by high peak flows of moderate duration and large volumes of runoff. Flooding is more severe when prior rainfall has resulted in saturated ground conditions. Other localized flooding hazards are caused by obstacles to natural drainage flows, such as small creek dams and dikes formed by freeway and railroad fills.

Cloudburst storms, sometimes lasting as long as three hours, can occur any time from the late fall to early spring, and may occur as an extremely severe sequence within a general winter rainstorm. Flooding from cloudburst activity is characterized by high peak flow, short duration of flood flow, and a small volume of runoff.

Potential issues of concern include a general lack of curbs and gutters in portions of the City of Galt. The lack of curb and gutters along with inadequate or incomplete storm drains can result in standing water that is both a public health nuisance and a potential hazard. Other sources of flooding concern are the size and capacity of small agricultural drainage structures that do not accommodate large storm flows.

More information on localized flooding in the City of Galt can be found in Annex D: City of Galt of this plan.

Assets at Risk

The District noted no specific District assets at risk to localized flooding.

Future Development

The District Planning Team noted that localized flooding would not necessarily be a limiting or contributing factor to future growth within the District. Economy will be the driving force on expansion and building within the area.

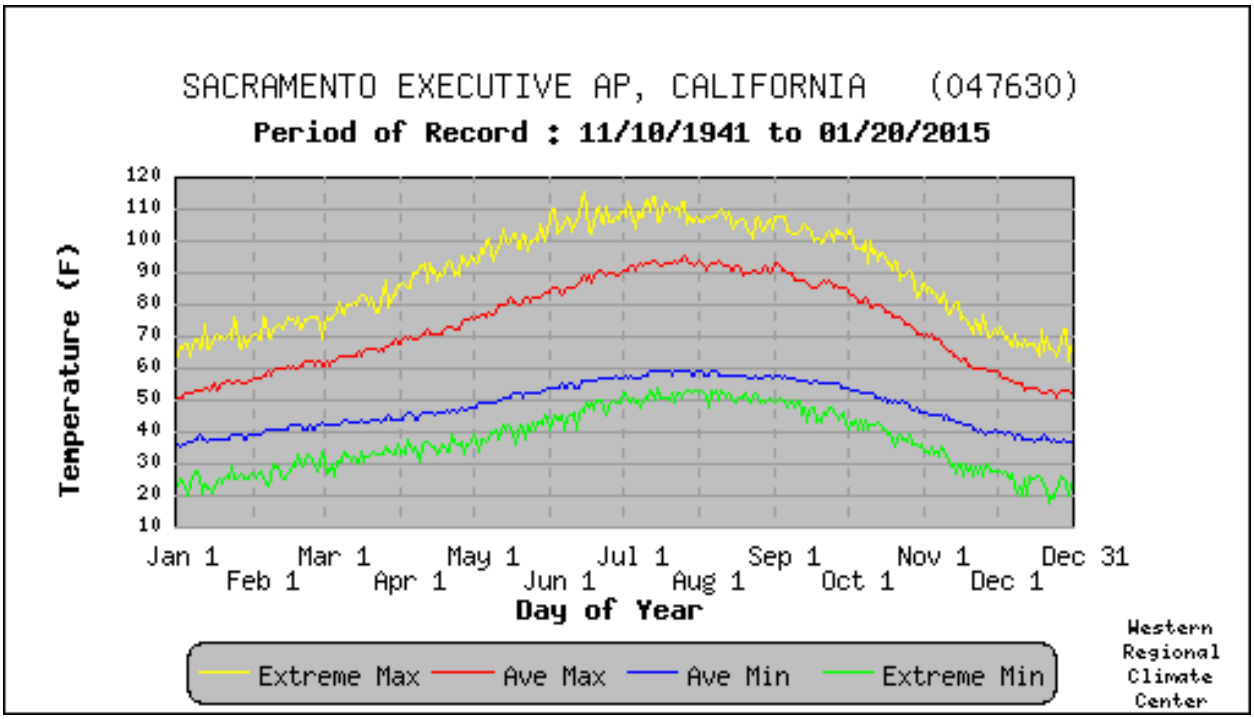
Severe Weather: Extreme Temperatures – Heat

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The Cosumnes Fire Department experiences temperatures in excess of 100 degrees during the summer and fall months. The temperature moves to 105-110°F in rather extreme situations (see Figure H-5). Many months see a high number of days where daily high temperatures exceed 90°F. Generally, people who live and work in this weather are prepared to cope with the extremes in that they dress appropriately and stay in air conditioned buildings during the peak temperature periods of the day.

Figure H-5 Daily Temperatures Averages and Extremes for the Cosumnes Fire Department



Source: Western Regional Climate Center, Sacramento FAA Airport Station

Past Occurrences

Record high temperatures in the District are shown in Table H-9.

Table H-9 Record Temperatures in the Cosumnes Fire Department

Month	Temperature	Date	Month	Temperature	Date
January	74°	1/12/2009	July	114°	7/13/1972
February	76°	2/19/1964	August	110°	8/10/1996
March	88°	3/26/1988	September	108°	9/01/1950
April	95°	4/30/1996	October	104°	10/02/2001
May	105°	5/28/1984	November	87°	11/01/1960
June	115°	6/15/1961	December	72°	12/28/1967

Source: Western Regional Climate Center, Sacramento FAA Airport Station

Vulnerability to Heat

Health impacts are the primary concern with this hazard, though economic impacts are also an issue. The elderly and individuals below the poverty level are the most vulnerable to extreme temperatures. Nursing homes and elder care facilities are especially vulnerable to extreme heat events if power outages occur and air conditioning is not available. In addition, individuals below the poverty level may be at increased risk to extreme heat if use of air conditioning is not affordable.

Reliance on air conditioning can cause a strain on the electrical energy in the Cosumnes Fire Department operational area. Occasionally peak demands outweigh supply and a condition known as brown-out occurs. This is an extremely dangerous situation for electrical equipment as it operates without the needed electricity causing damage to the systems. Days of extreme heat have been known to result in medical emergencies, civil unrest, and unpredictable human behavior. Periods of extended heat and dryness (droughts) can have major economic, agricultural, and water resources impacts.

Future Development

The District Planning Team noted that heat would not necessarily be a limiting or contributing factor to future growth within the District. Economy will be the driving force on expansion and building within the area.

Severe Weather: Fog

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The Sacramento Valley can produce some extremely dangerous fog in the winter and early spring months. These are a type of radiation fog called "tule fog." Tule Fog forms on cold and clear nights, when the ground is moist and there is very little wind. Under such conditions the ground cools quickly and thus cools the air above it as well. The moisture in this cooled air condenses and can create extremely dense fog. Since the air may be stagnant and there is little evaporative effect from the sun in winter months, tule fogs can last for several days and, in some instances, over a week. Under these conditions, visibility is often reduced to 600 feet, but can drop to less than 10 feet.

Past Occurrences

The District noted no past occurrences of fog in the past 5 years.

Vulnerability to Fog

When tule fog forms, a severe risk is posed to traffic with the potential for multi-car pileups, especially on freeways such as Highway 99 and Interstate 5. This may have an economic impact on the communities of Elk Grove, and Galt due to delays in transportation times or even the shutting-down of the major freeways of Interstate 5 and Highway 99. The same dense and lingering fog can also produce adverse health effects in the population with respiratory ailments. The Sacramento Air Quality Management District on occasion will impose burning restrictions on county residents to minimize the poor air quality as a result of the fog which traps the smoke at ground level and prevents the smoke from rising during tule fog events.

Assets at Risk

The District noted no assets at risk to fog.

Future Development

The District Planning Team noted that fog would not necessarily be a limiting or contributing factor to future growth within the District. Economy will be the driving force on expansion and building within

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the communities served by the Cosumnes Fire Department.

Past Occurrences

The District noted no past occurrences of heavy rains in the past 5 years.

Vulnerability to Heavy Rain and Storms

Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future. Heavy rains and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage. Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees and power outages.

Assets at Risk

The District noted no assets at risk to heavy rains. However, calls for service may increase due to heavy rainfall events. The likelihood of increase of vehicle related incidents during the event and timing may have a limited duration impact on the District.

Future Development

The District Planning Team noted that heavy rains would not necessarily be a limiting or contributing factor to future growth within the District. Economy will be the driving force on expansion and building within the area.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Wildland fires are common in open space areas with vegetation that exhibits low fuel moisture. The threat for wildland fires is increased during the warmer months which are typically from late May until late October of every year. High winds can also contribute to the spread and severity of the fire. Specifically winds from the north which is drying winds they will support extreme wildland fire behavior, as opposed to winds from the west which have the ability to add moisture to fuels minimizing extreme fire behavior.

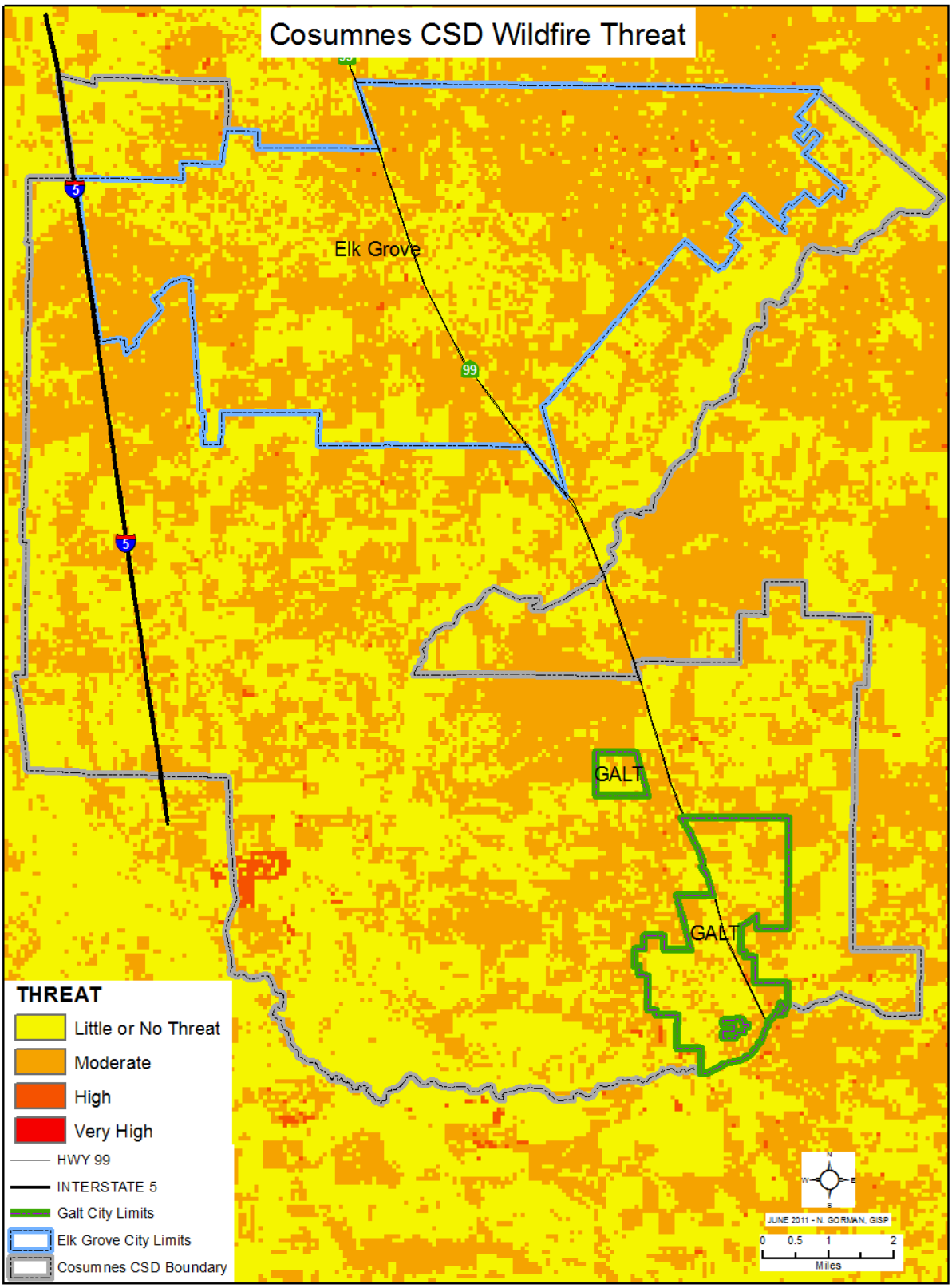
Past Occurrences

The District noted no large wildfires have occurred in the past 5 years.

Vulnerability to Wildfire

Generally, the undeveloped portions of the Cosumnes Fire Department do not pose a high risk due to existing agricultural practices on the land. Most lands are actively cultivated with irrigated crops that have minimal fire fuel. However, grass fires can occur on uncultivated lands, particularly where there is native vegetation, such as the riparian corridors near local water courses. Fire hazards also exist in urbanized areas of the Cosumnes Fire Department. Residential and Commercial structure fires can occur particularly in neighborhoods where you have a mix of undeveloped parcels adjacent to developed parcels which requires a higher level of emergency resources for suppression activities. Additionally, in the rural setting the use of propane gas is commonly used for heating and cooking by residents. The propane is stored in large tanks ranging in size from 300 gallons up to 1,000 gallons and will create additional safety concerns for responding fire personnel in the wildland urban interface environment. Figure H-6 depicts the wildfire threat in the Cosumnes Fire Department.

Figure H-6 Wildfire Threat in the CFD



Assets at Risk

The District has assets at risk to wildfire. The District maintains the ability to protect the District facilities from wildfires.

Natural Resources at Risk

The District noted no specific natural resources at risk to wildfire.

Historic and Cultural Resources at Risk

The District noted no specific historic or cultural resources at risk to wildfire.

Future Development

As future development occurs, the threat of wildfire within the incorporated areas will continue to decrease. As drought conditions continue an increased threat remains to open land areas. A measurable impact can be seen in certain areas that meet urban interface conditions.

H.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

H.6.1. Regulatory Mitigation Capabilities

Table H-10 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the CFD.

Table H-10 CFD's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	Y	Discusses potential hazards and outlines mitigation strategies.
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	Y	

Engineering Studies for Streams	N	
Community Wildfire Protection Plan	Y	Weed abatement and Prevention Plans
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year: Under revision
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	Y	Rating: 3/9 (urban/rural)
Site plan review requirements		
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: CFD

H.6.2. Administrative/Technical Mitigation Capabilities

Table H-11 identifies the department(s) responsible for activities related to mitigation and loss prevention for CFD.

Table H-11 CFD's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	

Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	
Mutual aid agreements	Y	Local and State
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y	
Community Planner	N	
Civil Engineer	N	
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	
Hazard data and information		
Grant writing	Y	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: CFD

H.6.3. Fiscal Mitigation Capabilities

Table H-12 identifies financial tools or resources that the CFD could potentially use to help fund mitigation activities.

Table H-12 CFD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	N	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	
Storm water utility fee	N	

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	N	
Community Development Block Grant	Y	
Other federal funding programs		
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: CFD

H.6.4. Mitigation Education, Outreach, and Partnerships

Table H-13 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table H-13 CFD's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	CERT
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Community Outreach Programs through the Fire Department
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

H.6.5. Other Mitigation Efforts

The District noted no other mitigation efforts.

H.7 Mitigation Strategy

H.7.1. Mitigation Goals and Objectives

CFD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

H.7.2. Mitigation Actions

The planning team for CFD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Flood Response Equipment

Hazards Addressed: Flood Response Personnel Equipment

Goals Addressed: 1, 2, 3, 4

Issue/Background Statement: When the threat of flooding is imminent to the citizens, the CFD will stage equipment and personnel to best serve the cities of Elk Grove, Galt, and the unincorporated areas of Sacramento County that lie within the Fire Protection District. It is the goal to continually maintain water rescue capability through on-going training to maintain skills, stay current with respect to safety gear which allows personnel to operate safely in a dangerous and dynamic environment.

Other Alternatives: One alternative is to develop automatic aid agreements with neighboring jurisdictions both police and fire to share resources. These agreements complement each other when flooding is more localized. If flooding is widespread, throughout the region, then the ability to count on neighboring jurisdictions is diminished because resources are deployed to respond to emergencies within their response areas reducing the amount of available resources.

Another alternative is to deploy and staff the departments flood boats adding an increased flood response capability to the response area.

Existing Planning Mechanisms through which Action will be implemented: Personnel will continually review flood boat operations, conduct assessments of safety gear to ensure that all of the dry and wet suits are safe for emergency responders and that the suits provide a barrier from contaminated water. Perform site evaluations of flood prone areas, and continue to work with neighboring emergency responders to strengthen working relationships in the area of emergency response.

Responsible Office: Deputy Chief of Operations

Priority: High

Cost Estimate: To purchase water rescue safety gear for 20 emergency responders is $20,000. The water rescue safety gear is a combination of gear which includes:

- a personal floatation device(lifejacket)
- a whistle used to communicate during water rescue operations,
- a dry suit to be used during sustained rescue operations
- a helmet
- All Terrain Booties
- Swimfins
- Gloves
- Knife
- Rope bag with a minimum of 75' of polypropylene rope. Polypropylene rope is designed float and is water resistant
- The cost is approximately $1,000 for a complete set per employee.
- Benefits (Losses Avoided):
- Immediate response to life threaten emergencies
- Better response capabilities through the use of flood rescue boats, and properly trained and equipped fire personnel.
- Greater operating capability, with proper equipment.
- Potential Funding:
- Grant opportunities to purchase personnel safety equipment to properly staff the 8 flood rescue boats and 2 swiftwater rescue boats.
- Donations from private parties, looking to support emergency operations
- General fund request from the CFD budget process

Schedule: Proper safety gear will allow personnel to continually perform site evaluations of high risk flood prone areas. Furthermore, meet and train with neighboring emergency service providers to review their response capability, and any additional changes in their operations from the previous year.

Action 2. Flood Response Training

Hazards addressed: Flood Response Personnel Training

Goals Addressed: 1, 2, 3, 4

Issue/Background Statement: Flood rescue operations are very unpredictable and inherently dangerous to all emergency personnel who operate in this environment. The skill sets required to operate safely and effectively take time to acquire and demonstrate proficiency. The flood rescue environment also contains many unknowns as it pertains to water quality, and underwater hazards that can impact rescue operations by trained personnel. Continual investment in fire personnel training will minimize the risk to the public and fire personnel as they operate in an unpredictable flood environment.

Existing Planning Mechanisms through which Action will be Implemented: Working through the CFD Training Division, personnel will continually review flood boat operations, conduct assessments of safety

gear to ensure that all of the dry and wet suits are safe for emergency responders and that the suits provide a barrier from contaminated water. Perform site evaluations of flood prone areas, and continue to work with neighboring emergency responders to strengthen working relationships in the area of emergency response.

Responsible Office: Deputy Chief of Operations and the Battalion Chief of Training for the Cosumnes Fire Department.

Priority: High

Cost Estimate: These course descriptions and costs were provided by Rescue 3 International. It would be the intent to provide these courses every other year as part of ongoing skills maintenance for all fire line personnel.

Swiftwater Rescue Technician: The SRT1 course provides fire personnel with the fundamentals of survival in moving water and training to affect in-water rescues. Fire personnel gain knowledge in hydrology and river classifications, size-up, and site control and scene management. Practical skills include self-rescue, swiftwater swimming and the fundamentals of shore, boat and in-water rescues. Additionally fire personnel are introduced to the basics of boat handling and the fundamentals of rope rescue including mechanical advantage and anchor systems.

Swiftwater Rescue Technician Advanced: will challenge fire personnel beyond the emphasis on self-rescue to concentrate on victim rescue. Fire personnel are exposed to more complex water rescue situations including a mock night river rescue scenario. The three day course includes 4-6 hours of classroom instruction, followed by two and one-half days of hands-on skill development.

Fire personnel are introduced to the role and utilization of various skills in river and flood rescue, including:

- rope systems
- management of litter & patient raising systems
- highline systems
- advanced river search concepts
- performing rescues at night or in low visibility
- Basic flood disaster management.

Flood Rescue Boat Operator: this course is designed to train fire personnel in handling motorized boats during flood operations. Fire personnel are exposed to a number of topics including types of motorized boats suitable for water rescue, boat handling on still or slowly moving water, crew roles, boat safety and problem solving. Techniques are then put to work doing searches in flood environments, stranded victim and in-water retrieval, and rescue of conscious and unconscious persons

Swiftwater Rescue Boat Operator: this course is designed to introduce fire personnel to boat operations on swiftwater. During the course fire personnel gain experience reading moving water and operating boats in current. Using a motor and paddles, fire personnel will practice such skills as use and avoidance of hydraulics, ferrying across current, and obstacle navigation will be practiced in class I and II whitewater. Fire personnel then progress to operating both up and down stream in class III and above whitewater. Other exercises include night operation scenarios and multiple boat operations.

The total dollar amount to deliver this level of training to 140 line employees every other year is approximately $122,000 or $61 000 annually.

- $48,800 is allocated for boat operator training for approximately 50 personnel.
- $36,600 is allocated for Swiftwater Rescue Technician Unit 1 for 140 personnel.
- $36,600 is allocated for Swiftwater Rescue Technician Advanced for 140 personnel.

Benefits (Losses Avoided): The benefit to completing this training is that the Cosumnes Fire Department is able to field a trained and capable water rescue team to affect rescues for the citizens and members of the public who are in need of emergency assistance.

Potential Funding:

- Grant opportunities to fund training for fire personnel to properly staff the 8 flood rescue boats and 2 swiftwater rescue boats.
- Donations from private parties, looking to support training programs
- General fund request from the CFD budget process

Schedule: On a bi-annual basis the Cosumnes Fire Department will instruct all personnel on swiftwater survival skills. The Department will also deliver a focused review on boat operations with personnel assigned to 2 of the fire stations that specialize in water rescue emergencies. The training will allow personnel to safely perform site evaluations of high risk flood prone areas. Furthermore, meet and train with neighboring emergency service providers to review their response capability and any additional changes in their operations from the previous year.

LOS RIOS
COMMUNITY
COLLEGE
DISTRICT

Annex I Los Rios Community College District

I.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Los Rios Community College District (LRCCD), a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by LRCCD. This Annex provides additional information specific to LRCCD, with a focus on providing additional details on the risk assessment and mitigation strategy for this District.

I.2 Planning Process

As described above, the LRCCD followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), LRCCD or District formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table I-1. Additional details on plan participation and District representatives are included in Appendix A.

Table I-1 LRCCD Planning Team

Name	Position/Title	How Participated
Debbie Turner	General Service/Risk Mgmt Supervisor	Responsible for the plan update, coordinating meetings, collected data, and reviewed draft document. Attended (HMPC) meetings.
Vince Montoya	Director, Facilities Maintenance	Provided completed and future maintenance projects, attended committee meetings, provided input, provided mitigation projects, and reviewed draft document. Involved in the weekly planning meetings for short and long term maintenance and repair projects for LRCCD.
Joe Meyer	Supervisor, Facilities Planner	Responsible for providing information on completed and future construction projects, attended committee meetings, provided input, and reviewed draft document. Involved in the weekly planning meetings for short and long term capital improvement projects for LRCCD.
Daniel Broussard	Police Captain	Provided data, attended committee meetings, and reviewed draft document.
Jason Gregg	Director, IT	Provided information on IT systems and projects, provided input, and reviewed draft document. Involved in the weekly planning meeting for short and long term information technology projects for LRCCD.

I.2.1. Coordination with Other District Planning Efforts

Coordination with other community planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the LRCCD integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, LRCCD incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table I-2.

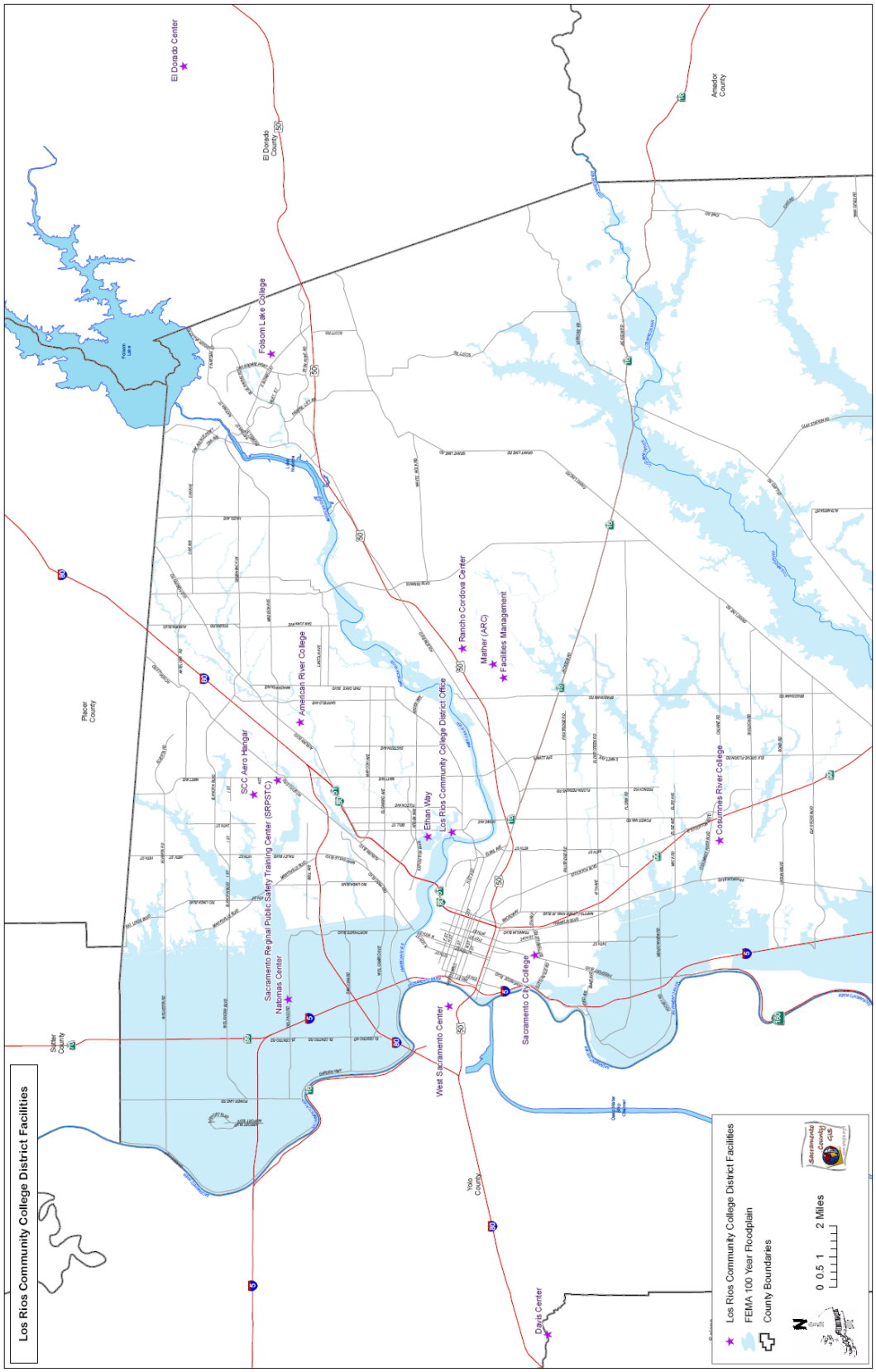
Table I-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
District Wide planning meetings for capital improvements and maintenance projects.	Provided information to assist in developing construction and maintenance projects.
Information Technology Planning Meetings	Resource for planning IT projects for continuing service and critical facilities.

I.3 Community Profile

The community profile for the LRCCD is detailed in the following sections. Figure I-1 displays a map and the location of LRCCD boundaries within Sacramento County.

Figure I-1 LRCCD Boundaries



I.3.1. College Overview, History, and Background

Los Rios Community College District is one of the nation's most respected learning institutions and the second-largest community college district in California. The College is a two-year public college district that serves the greater Sacramento region. Los Rios includes: American River, Cosumnes River, Folsom Lake and Sacramento City colleges; major education and outreach centers in Davis, Elk Grove, Natomas, Placerville, Rancho Cordova and West Sacramento; and specialized workforce and economic development programs for business, government and organizations throughout the region. The colleges offer AA/AS degrees, certificates and transfer education opportunities - students complete freshman and sophomore years and transfer to a four-year college or university - in more than 70 career fields.

The District's 2,400 square mile service area includes all of Sacramento County, most of El Dorado County and parts of Yolo, Placer and Solano counties. About 71,000 students are enrolled in the colleges and about 5,875 employees to include full-time, part-time, and temporary.

- American River College – 153 acres with 122 buildings
- Natomas Center – 1 building
- Cosumnes River College – 180 acres with 90 buildings
- Elk Grove Center – 1 building
- Folsom Lake College – 151 acres with 21 buildings
- El Dorado Center – 3 buildings
- Rancho Cordova Center – 1 building
- Sacramento City College – 72 acres with 38 buildings
- Aeronautics (McClellan) - 2 buildings
- Davis Center – 1 building
- West Sacramento Center – 1 building

Other sites support vocational programs include: Sacramento Regional Public Safety Center (1 building), Mather (2 buildings) for auto collision and bio-diesel program, and Pre-Apprenticeship training program (2 buildings).

Operational buildings include Facilities Management (1 building), District Office support (9 buildings) and Police Services and Workforce and Economic Development (1 building)

I.4 Hazard Identification

LRCCD's planning team identified the hazards that affect the district and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to LRCCD (see Table I-3).

Table I-3 LRCCD—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude / Severity	Significance
Agricultural Hazards	Limited	Unlikely	Negligible	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Limited	Unlikely	Negligible	Low
Dam Failure	Limited	Unlikely	Negligible	Low
Drought and Water Shortage	Limited	Unlikely	Negligible	Low
Earthquake	Limited	Unlikely	Negligible	Low
Earthquake: Liquefaction	Limited	Unlikely	Negligible	Low
Flood: 100/200/500-year	Limited	Unlikely	Critical	Medium
Flood: Localized Stormwater Flooding	Limited	Occasional	Critical	Medium
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Limited	Unlikely	Negligible	Low
River/Stream/Creek Bank Erosion	Limited	Unlikely	Negligible	Low
Severe Weather: Extreme Temperatures – Cold/Freeze	Limited	Unlikely	Negligible	Low
Severe Weather: Extreme Temperatures – Heat	Limited	Unlikely	Negligible	Low
Severe Weather: Fog	Limited	Unlikely	Negligible	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Limited	Likely	Limited	Medium
Severe Weather: Wind and Tornadoes	Limited	Likely	Limited	Low
Subsidence	Limited	Unlikely	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Limited	Unlikely	Negligible	Low

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

I.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile LRCCD's hazards and assess the vulnerability separate that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the College is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

I.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section I.5.3, includes a description as to how the hazard affects LRCCD and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

I.5.2. Vulnerability Assessment and Assets at Risk

This section identifies LRCCD's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk

Table I-4 lists particular critical facilities and other community assets identified by the LRCCD's planning team as important to protect in the event of a disaster. LRCCD's physical assets, valued at over $ 1 billion, consist of the buildings and infrastructure to support the LRCCD locations.

Table I-4 LRCCD's Critical Facilities, Infrastructure, and Other College Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
American River College (ARC)	Main Campus	4700 College Oak Dr. Sacramento 95841	$254,197,824	Flooding, Severe Weather: heavy rain, wind and tornadoes
Cosumnes River College (CRC)	Main Campus	8401 Center Parkway Sacramento 95823	$167,593,422	Severe Weather: heavy rain, wind, and tornadoes
Davis Center	Center under Sacramento City College	1720 Jade Street Davis 95616 (Yolo County)	$9,161,562	Severe Weather: heavy rain, wind, and tornadoes
District Office	Operational Support	1919 Spanos Court Sacramento 95825	$7,616,526	Flooding, Levee Failure, Severe Weather: heavy rain, wind and tornadoes

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Elk Grove Center	Center under Cosumnes River College	10051 Big Horn Blvd. Elk Grove 95757	$10,000,000	Severe Weather: heavy rain, wind, and tornadoes
El Dorado Center	Center under Folsom Lake College	6699 Campus Dr Placerville 95667 (El Dorado County)	$24,769,530	Severe Weather: heavy rain, wind & tornadoes, and wildfire
Ethan Way Center	Special services for business and industry	1410 Ethan Way Sacramento 95825	$7,824,282	Flooding, Levee failure, Severe Weather: heavy rain, wind & tornadoes
Facilities Management	Operational Support	3753 Bradview Dr. Sacramento 95827	$9,787,218	Severe Weather: heavy rain, wind and tornadoes
Folsom Lake College	Main Campus	10 College Parkway Folsom 95630	$164,452,008	Severe Weather: heavy rain ,wind and tornadoes
Mather Location (Leased)	Off site program for American River College	10150 Missile Way Mather 95655	$6,713,862	Severe Weather: heavy rain, wind and tornadoes
Natomas Center	Center under American River College	2221 Del Paso Rd Sacramento 95834	$6,972,960	Flooding, Severe Weather: heavy rain wind, and tornadoes
Rancho Cordova Center	Center under Folsom Lake College	10259 Folsom Blvd, Rancho Cordova 95670	$15,000,000	Severe Weather: heavy rain, wind and tornadoes
Sac Regional Public Safety Training Center	Center under American River College	5146 Arnold Ave McClellan 95652	$12,060,594	Severe Weather: heavy rain, wind and tornadoes
Sacramento City College (SCC)	Main Campus	3835 Freeport Blvd. Sacramento 95822	$321,608,676	Flooding, Severe Weather: heavy rain, wind and tornadoes
Sacramento City College Hangar (Leased)	Off site location for Sacramento City College	5803 Price Ave. Bld 1027 McClellan 95652	$4,230,342	Severe Weather: heavy rain, wind and tornadoes
Water Tower Complex	Operational Support	2100 Northrop Sacramento 95825	$4,599,288	Flooding, Levee Failure, Severe Weather: heavy rain, wind and tornadoes
West Sacramento Center	Center under Sacramento City College	1115 West Capitol Ave. West Sac 95691 (Yolo County)	$12,324,468	Severe Weather: heavy rain, wind and tornadoes

Source: LRCCD

Critical Facilities

For purposes of this plan, a critical facility is defined as:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, (3) Hazardous Materials Facilities.*

An inventory of critical facilities as determined by the LRCCD planning group as shown in Table I-5 and Table I-6.

Table I-5 LRCCD Critical Facilities: Summary Table

Location	Essential Services Facility	At Risk Population facility	Hazardous Material facility	Total by Location
ARC (American River College)	112	4	3	119
CRC (Cosumnes River College)	58	5	3	66
DO (District Office)	2	0	0	2
EDC (El Dorado Center)	5	1	1	7
Ethan Way	1	0	0	1
FLC (Folsom Lake College)	20	2	2	24
FM (Facilities Management)	1	0	1	2
SCC (Sacramento City College)	36	4	3	43
Total	**235**	**16**	**13**	**264**

Source: Los Rios Community College

Table I-6 LRCCD Critical Facilities: Detail Table

Facility	Type	Location	# of Buildings
Essential Services Facility	Business Operations	ARC	1
Essential Services Facility	Business Operations	CRC	1
Essential Services Facility	Business Operations	FLC	1
Essential Services Facility	Business Operations	SCC	1
Essential Services Facility	Business Service	District Office	1
Essential Services Facility	Central Plants (heat/air)	ARC	1
Essential Services Facility	Central Plants (heat/air)	CRC	1
Essential Services Facility	Central Plants (heat/air)	FLC	1

Facility	Type	Location	# of Buildings
Essential Services Facility	Central Plants (heat/air)	SCC	1
Essential Services Facility	Data Center with backup generator	District Office	1
Essential Services Facility	Data Center Alternate with backup generator	FLC	1
Essential Services Facility	Data Center with backup generator	ARC	1
Essential Services Facility	Data Center with backup generator (LRC Bld)	SCC	1
Essential Services Facility	Facilities Management	FM	1
Essential Services Facility	Instructional classrooms and labs	ARC	106
Essential Services Facility	Instructional classrooms and labs	CRC	54
Essential Services Facility	Instructional classrooms and labs	EDC	5
Essential Services Facility	Instructional classrooms and labs	FLC	15
Essential Services Facility	Instructional classrooms and labs	SCC	29
Essential Services Facility	IT Department	ARC	1
Essential Services Facility	IT Department	CRC	1
Essential Services Facility	IT Department	FLC	1
Essential Services Facility	IT Department	SCC	1
Essential Services Facility	Police Dispatch	Ethan Way	1
Essential Services Facility	Power Distribution (Hoos Pool)	SCC	1
Essential Services Facility	Red Cross Emergency Shelters (gym)	FLC	1
Essential Services Facility	Red Cross Emergency Shelters (gym)	ARC	1
Essential Services Facility	Red Cross Emergency Shelters (gym)	CRC	1
Essential Services Facility	Red Cross Emergency Shelters (gym)	SCC	1
Essential Services Facility	ARC Well (drinking and sewer water) 2 wells	ARC	1
Essential Services Facility	SCC Pumphouse (water for fire suppression system)	SCC	1
At Risk Population Facility	Adaptive PE	CRC	1
At Risk Population Facility	Adaptive PE	SCC	1
At Risk Population Facility	Child Dev. Center	ARC	1
At Risk Population Facility	Child Dev. Center	CRC	1
At Risk Population Facility	Child Dev. Center	SCC	1
At Risk Population Facility	DSP&S (Disability Support)	ARC	1
At Risk Population Facility	DSP&S (Disability Support)	CRC	1
At Risk Population Facility	DSP&S (Disability Support)	FLC	1
At Risk Population Facility	DSP&S (Disability Support)	SCC	1
At Risk Population Facility	Lab Techs (Chemistry and Biology)	ARC	2
At Risk Population Facility	Lab Techs (Chemistry and Biology)	CRC	1
At Risk Population Facility	Lab Techs (Chemistry and Biology)	EDC	1
At Risk Population Facility	Lab Techs (Chemistry and Biology)	FLC	1

Facility	Type	Location	# of Buildings
At Risk Population Facility	Lab Techs (Chemistry and Biology)	SCC	1
At Risk Population Facility	Veterinary Technology	CRC	1
Hazardous Material Facility	Above Ground Storage Tank (gas/diesel)	ARC	1
Hazardous Material Facility	Above Ground Storage Tank (gas/diesel)	CRC	1
Hazardous Material Facility	Above Ground Storage Tank (gas/diesel)	SCC	1
Hazardous Material Facility	Central Plants (heat/air)	ARC	1
Hazardous Material Facility	Central Plants (heat/air)	CRC	1
Hazardous Material Facility	Central Plants (heat/air)	FLC	1
Hazardous Material Facility	Central Plants (heat/air)	SCC	1
Hazardous Material Facility	Chemistry/Biology	ARC	1
Hazardous Material Facility	Chemistry/Biology	CRC	1
Hazardous Material Facility	Chemistry/Biology	EDC	1
Hazardous Material Facility	Chemistry/Biology	FLC	1
Hazardous Material Facility	Chemistry/Biology	SCC	1
Hazardous Material Facility	Facilities Management	FM	1

Source: Los Rios Community College

Economic Assets

LRCCD is one of the largest employers (5,875) within the local area and serving the largest student population (over 71,000).

Growth and Development Trends

Growth within LRCCD will include mostly infrastructure improvements, building modernization and a few additional buildings at current sites. Additional locations are not being added over the next five years.

Development since the 2011 Plan

The LRCCD has increased structures since the 2011 plan. Specifically, this includes opening a 28,480 square foot center in October 2015 valued at $15 million dollars within in the city of Rancho Cordova (Sacramento County) serving 2,500 students. Students can pursue their general education requirements or learn English as a second language. This central location will also respond to local and state business needs with programs focused on skills needed to work in the public sector.

LRCCD implemented several development projects since 2011 increasing the numbers and capacity of LRCCD assets. New development tracked by totals and hazard risk areas are shown in Table I-7. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more

people living in campus areas potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of LRCCD to identified priority hazards.

Table I-7 LRCCD Development by Year and Hazard Areas since 2011

Asset Type	Year Built	Outside of Known Hazard Area	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
ARC Life Science Modernization	2012	X				Severe Storm
ARC Student Center	2013	X				Severe Storm
ARC Parking Structure	2013	X				–
CRC Winn Center	2013	X				Severe Storm
CRC Parking Structure	2013	X				–
CRC Elk Grove Center	2013	X				Severe Storm
FLC Gym – New Building	2014	X				Severe Storm
FLC Rancho Cordova Center	2015	X				Severe Storm
SCC Student Services	2014		X			Localized flooding and severe storm
Total	**9**	**8**	**1**	**0**	**0**	**–**

Source: LRCCD

[1]Moderate or higher wildfire risk area

I.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table I-3 as high or medium significance hazards. Impacts of past events and vulnerability of LRCCD to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the same as those described in Section 4.3 of the Base Plan. In general, the most vulnerable structures are those located within the floodprone areas, wildland areas, unreinforced masonry buildings, and buildings built prior to the introduction of modern building codes.

An estimate of the vulnerability of LRCCD to each identified priority hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Flooding and Localized Flooding

Likelihood of Future Occurrence–Occasional (Flooding); Likely (Localized)
Vulnerability–Medium

Although flooding is a "medium" risk for LRCCD, the County plan has an emphasis on flood hazards. The below information reflects flood data for LRCCD. Currently, there is one specific LRCCD project planned to address localized flooding since this is considered a medium risk for LRCCD.

Hazard Profile and Problem Description

The flooding hazard is considered occasional with a medium hazard risk based on past assessments. Please see map of LRCCD facilities overlaid on the 100 year flood zone on Figure I-1 in Section I.3

Past Occurrences

On December 1, 2012 the water from Arcade Creek surpassed the bank flowing onto the south east end of American River College campus creating damages to multiple buildings at the Health & Education complex. The recovery cost was $122,671.44.

In 1995, the Arcade Creek flooding inundated the parking lot and track at American River College, the damages totaled $23,000. According to SAFCO (June 2011) the Arcade creek at the base of American River College is routinely maintained to keep the creek in good standing to avoid overflow. During any storm event the LRCCD Police Department and Facilities Maintenance monitors the creek level in case the parking lot needs to be evacuated.

In 1994 at Cosumnes River College, the parking lot flooded due to slow storm drains. There were no damages. As a mitigation project, the City of Sacramento built a detention pond on the north/west corner of the campus to prevent future flooding.

There is a 11.55% percent chance of occurrence in the next year. (Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100—this gives the percentage of the event happening in any given year.)

Vulnerability to Flood

Values at Risk

As shown in the Table I-8, the number of structures and the value are divided up between flood zones. According to the DFIRM maps by FEMA, there are 44 structures in the floodplain and a replacement value of approximately $336 million. However, the estimated loss would be approximately $67 million, which is 20% of the value.

Table I-8 LRCCD Properties in the FEMA Floodplain

DFIRM Zone	# of Structures	Value-Structure plus Content	Estimated Loss (20% of the value)*	Population (Students & Employees)
AE	2	$14,797,242	$2,959,448	3161
X (200 yr)	42	$321,608,676	$64,321,735	17,853
Total	**44**	**$336,405,918**	**$67,281,184**	**30,976**

*Estimated losses assume that a flood is unlikely to cause total destruction. Losses are related to a variety of factors, including flood depth, flood velocity, building type and construction. Using FEMA's recommendations, average damage is estimated to be 20 percent of the total building value.

The 42 structures are all within one campus location (Sacramento City College).

Population at Risk

For the two sites listed (Natomas Center and Ethan Way) in the AE Flood zone, the approximate occupancy is 5,122 (student enrollment plus employees).

Critical Facilities at Risk

The critical facilities at risk in the AE flood zone are classrooms and computer labs that would be relocated to a different location or campus. The District police dispatch location is located on the second floor of the Ethan Way building.

The critical facilities listed in Zone X (200 year flood zone) include 37 essential service facilities, 4 at risk population facilities, and 3 hazardous materials. These number were obtained from the above Table I-6.

Insurance Coverage, Claims Paid, and Repetitive Losses

LRCCD is self- insured up to $100,000 with insurance pool coverage up to $600 million per occurrence (excluding flood coverage). LRCCD has separate flood insurance policies for the Natomas and Ethan Way facilities. Both of these facilities fall in the AE flood zone. LRCCD has not experienced repetitive losses due to flooding.

Future Development

Our Natomas site in the AE zone has a future plan for two more multi-story buildings. Working with the City of Sacramento on future flood planning and mitigation would be a move in a positive direction for this area.

The Sacramento City College location has a shared storm water drain system and with any site improvements on campus may be an opportunity to team up with the City of Sacramento for flood mitigation or solutions that could potentially be added to project planning.

Severe Weather: Heavy Rains and Storms; Wind and Tornadoes

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

It is likely that each year we have a potential for storm damage and have identified this hazard as medium. There is a 23% percent chance of occurrence in the next year. (Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100—this gives the percentage of the event happening in any given year.)

When there are heavy rains and strong winds, it usually affects multiple locations within LRCCD. For example, the January 2008 storms caused damages at 7 locations incurring a cost of $48,000 in damages. This included 16 items listed on the claim form. The state reimbursed LRCCD $38,600. Majority of the replacement cost were for items that were outside of the buildings, such as bent fence post, ripped sun covers, ripped banners, damage to storage containers, fallen trees, debris cleanup, and a broken window. The Facilities Management building had part of the roofing system blown off which created a leak inside the building and the damages were over $8,000. This was the first occurrence of damages to this building.

Past Occurrences

Historically, LRCCD has suffered approximately $167,000 in damages of which approximately $136,000 was recovered through disaster assistance programs. The events took place in 1994, 1995, 1997, 2003, 2004, 2008.

Vulnerability to Severe Weather

Assets at Risk

LRCCD has 295 structures and contents with a value of over one billion dollars.

Population at Risk

The population district wide is approximately 77,000 people to include students and employees. Severe weather has the ability to cancel classes or close campuses.

Critical Facilities at Risk

The main data center at the District Office supports the LRCCD's software systems, computers operations, and student services. This center has a 22-hour diesel generator that will provide power to the data center during a power outage.

The District police dispatch center at Ethan Way site is at risk of losing power. To mitigate this facility being affected by power outage, in 2008 a backup dispatch center was included in the new Operations building design at the Cosumnes River College campus. A backup generator is in the planning stages to be added at the Ethan Way location for dispatch.

Future Development

A repetitive loss to any one building or infrastructure is not common for LRCCD. When analyzing past losses, LRCCD grouped the losses by type within the district from 1994 through 2011.

For damages to roofing systems, there were approximately $17,000 in damages due to the wind and the rain forcing water into the roofing system. A total of 25 buildings were affected and of those occurrences 20 buildings were damaged during the 1995 storm. These damages were in the 1995, 2004, 2008 events. There is a 11.5% chance of occurrence in the next year*.

For damages due to fallen trees, there were approximately $11,000 in damages and those events took place in 1995, 2003, 2004, 2008. There were a total of 9 different incidents and of those occurrences 3 incidents took place in the 2008 storm. There is a 15% chance of occurrence in the next year*.

*Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100—this gives the percentage of the event happening in any given year.

I.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

I.6.1. Regulatory Mitigation Capabilities

Table I-9 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place throughout LRCCD.

Table I-9 LRCCD's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y	Each campus has a master plan and mitigation actions are completed through capital improvement planning or maintenance and repair planning.
Capital Improvements Plan	Y	Hazards that are directly related to specific projects may be included within projects (individual).
Economic Development Plan	N	
Local Emergency Operations Plan	N	
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	California Building Code 2013—LRCCD is under the jurisdiction of the Division of the State Architect and use the code they deem appropriate.
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	
Fire department ISO rating:	N	
Site plan review requirements	Y	LRCCD has the state architect review projects site plans with respect to ADA Accessibility and Landscaping (water use).
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	

Erosion or sediment control program	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: LRCCD

I.6.2. Administrative/Technical Mitigation Capabilities

Table I-10 identifies the department(s) responsible for activities related to mitigation and loss prevention for LRCCD.

Table I-10 LRCCD's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	Y	To review hazards related to LRCCD
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Facilities Maintenance grounds department maintains drainage systems, roofing systems, and tree trimming to prevent damages to property and people.
Mutual aid agreements	N	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y	District police department works with multiple surrounding agencies to anticipate and respond to public safety issue, and natural disasters.
Community Planner	N	
Civil Engineer	N	
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	We use a mass notification system to address emergencies with employees and students.
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: LRCCD

I.6.3. Fiscal Mitigation Capabilities

Table I-11 identifies financial tools or resources that LRCCD could potentially use to help fund mitigation activities.

Table I-11 LRCCD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Capital Improvement funds for mitigation projects if they are directly related to a specific Capital Improvement project. For example, while renovating the athletic fields the main storm drain is going to be improved to reduce the risk of localized flooding.
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	Bond funding has been used for past projects—for example seismic retro fitting of Hughes Stadium which was first build in 1928.
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	Y	The State provided special maintenance and special repair (SMSR) funding for schools. With this funding, we were able to complete roofing renovations district wide.. This funding is not guaranteed to be part of the annual budget.
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: LRCCD

I.6.4. Mitigation Education, Outreach, and Partnerships

Table I-12 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information

Table I-12 LRCCD's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	Members of the LRCCD police department speak to campus groups (students and employees) up to 100 times per year providing public safety information that may include the 72-hour household preparedness.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Members of the LRCCD police department speak to campus groups to provide fire safety and fire response specific training up to 15 times per year as well as including household preparedness (72-hour) in multiple public safety presentations each year.
Natural disaster or safety related school programs	Yes	Continue to train employees on National Incident Management System (NIMS) emergency preparation, and Campus Community Emergency Response Team (C-CERT) and building evacuation training.
StormReady certification	No	
Firewise Communities certification	No	
Public-private partnership initiatives addressing disaster-related issues	No	
Other		
How can these capabilities be expanded and improved to reduce risk?		

LRCCD Police Department conducts emergency operation drills at various locations throughout the school year. Depending on the type of drill it may involve outside agencies. In the past, outside agencies included local fire, police, CalEma (California Emergency Management Agency), Center for Disease Control, Red Cross, and Sacramento County OES. The LRCCD Police Department continues to train employee on Campus Community Emergency Response Team C-CERT and train employees to evacuate a building or shelter in place using the ACES (Action Coordinator for Emergency Survival) program.

I.6.5. Other Mitigation Efforts

To sustain our services during and after a disaster, such as flooding and severe weather, there is a strong support to protect LRCCD against dating center failure including network and server infrastructure and access to the Internet. LRCCD is in the process of updating data centers at the District Office and Folsom Lake College. Currently the two data centers have generator backup power sources and each has a 10Gbps connection to the Corporation for Education Network Initiatives California (CENIC) for Internet access. Each of the connections connect at a different location on the CENIC backbone. LRCCD is in the process of projects at each of the data centers of upgrading to Liebert Smartrow technology. LRCCD

is also hopes to complete 4 additional 10Gbps circuits to create a 10Gbps Ring between the main campuses and District Office. LRCCD is also looking to install at least 1Gbps connection at the outreach centers and other district facilities. This is all in effort to improve connectivity for services including communications (phones, email, and others), and all Internet access.

LRCCD is also looking at architecture and deploying redundant WAN (Wide Area Network site to site) connectivity and on main campuses for the core and distribution LAN (Local Area Network with site building to building or floor to floor) networking. This will provide complete resiliency to failures of fiber and/or network electronics along either pathways, or data center, and failures at either of the CENIC connections, or the main data centers at LRCCD locations. The project continues with participation of CENIC, AT&T, SECC/Comcast and the LRCCD DO-IT Department. CENIC internet connections bandwidth was increased from 1Gbps each to 10Gbps (only one pathway is active at a time) and LRCCD will complete main campus WAN connectivity from single 1Gbps pathway to multiple 10Gbps pathways.

LRCCD purchased an emergency mass notification system in 2009 to alert students and employees for emergencies (such as disasters, shelter in place, campus closures, etc.) by sending text messages, email messages or calling a mobile phone. The system is in the process of being upgraded to improved features, ease of use, and aligns with technological advances for future options. With the upgrade, it will be easier to post to social media sites, and digital signage. The upgrades should be completed by October 2016.

The system can provide information to the majority of students and employees. The annual maintenance fees are funding by LRCCD.

In 2008, LRCCD established a Preparedness Assessment Team (PAT), to make on-going assessment of emergency management, preparedness and readiness in the district. The team assesses and makes recommendations for strategic actions to increase the capacity for and quality of disaster preparedness and management at all district locations. There are subcommittees for training, facility issues, communications, and building coordinator program. The Preparedness Assessment Team consists of 26 employees from various backgrounds and meet on a quarterly basis.

LRCCD District police have trained over 550 employees in the SEMS/NIMS program. This training is open to all employees and students but is mandatory for all employees who are an Emergency Operations Command member.

District police has trained 150 employees in the College Community Emergency Response Team (C-CERT) program district wide. Each year multiple trainings are offered across the district to update skills or certify staff. This program is self-funded by LRCCD.

I.7 Mitigation Strategy

I.7.1. Mitigation Goals and Objectives

LRCCD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

I.7.2. Mitigation Actions

The planning team for LRCCD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. District Wide Roofing Renovations

Hazards Addressed: Severe Weather: Heavy Rain, Wind, and Storms

Goals Addressed: 1, 2, 3

Issue/Background: In recent years, the State of California has stopped providing funds for public building maintenance. LRCCD used those funds for a roof maintenance program. Renovation to LRCCD roof systems will provide a proactive approach to minimize potential property damage and loss of equipment due to water damage from severe wind and rain. In looking at all the roofing systems District wide, this project would cover those roofing systems that are near the end of the roofs life cycle.

Project Description: To minimize cost, the project would include repairing the roof system to make it more weather resistant using a foam system that will integrate with the existing structure and equipment that is already in place.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Implementation and maintenance of the plan update is critical to the overall success of hazard mitigation planning.

Responsible Office: Los Rios Community College District-Facilities Maintenance

Priority (H, M, L): High

Cost Estimate: $1.3 million

Potential Funding: Infrastructure dollars

Benefits (avoided Losses): Mitigate damage to multiple buildings at the Health & Education complex.

Schedule: 1-3 years

Action 2. ARC Drainage at Arcade Creek

Hazards Addressed: Localized flooding from Arcade Creek onto campus

Goals Addressed: 1, 2, 3

Issue/Background: On 12/1/2012, the water from Arcade Creek surpassed the bank flowing onto the south east end of American River College Campus creating damage to multiple building at the Health & Education complex. The recovery cost was $122,671.44.

Project Description: Regrade the land to have the water flow back into the creek has already been completed. Local swell improved with recent program development for athletic fields.

Other Alternatives: Main storm drain extension around ARC stadium.

Existing Planning Mechanisms through which Action will be Implemented: Implementation and maintenance of the plan update is critical to the overall success of hazard mitigation planning.

Responsible Office: Los Rios Community College District-Facilities Maintenance

Priority (H, M, L): High

Cost Estimate: $1.3 million

Potential Funding: Infrastructure dollars

Benefits (avoided Losses): Mitigate damage to multiple buildings at the Health & Education complex.

Schedule: 1-3 years

Action 3. Protect District Property

Hazards Addressed: Localized Flooding

Goals Addressed: 1, 2, 3

Issue/Background: Localized flooding is a threat for property damage to buildings, parking lots, and road closures. In addition, flooding on our property has the potential of limiting student access to campus buildings, attending classes, and displacing employees. Based on the severity of damage and the duration, the classes may be moved to other buildings, another campus or may be cancelled for the semester creating a hardship for the student's educational goals.

Project Description: Mitigation projects may be addressed during infrastructure improvements and construction projects by our Facilities Planning team as opportunities arise. For example, while improving athletic fields, we were able to add an improved storm water drain system project to prevent flooding from the local stream.

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented: Through Capital Improvement planning, LRCCD would look for opportunities to improve against localized flood risk.

Responsible Office/Partners: Los Rios Community College District - Facilities Management

Project Priority: High

Cost Estimate: Varies

Benefits (Losses Avoided):

Potential Funding: Infrastructure dollars or mitigation grant

Timeline: When funding is available.

Annex J Sacramento Metropolitan Fire District

J.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Sacramento Metropolitan Fire District (Metro Fire), a new participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by Metro Fire. This Annex provides additional information specific to Metro Fire, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

J.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), Metro Fire formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table J-1. Additional details on plan participation and Metro Fire representatives are included in Appendix A.

Table J-1 Metro Fire Planning Team

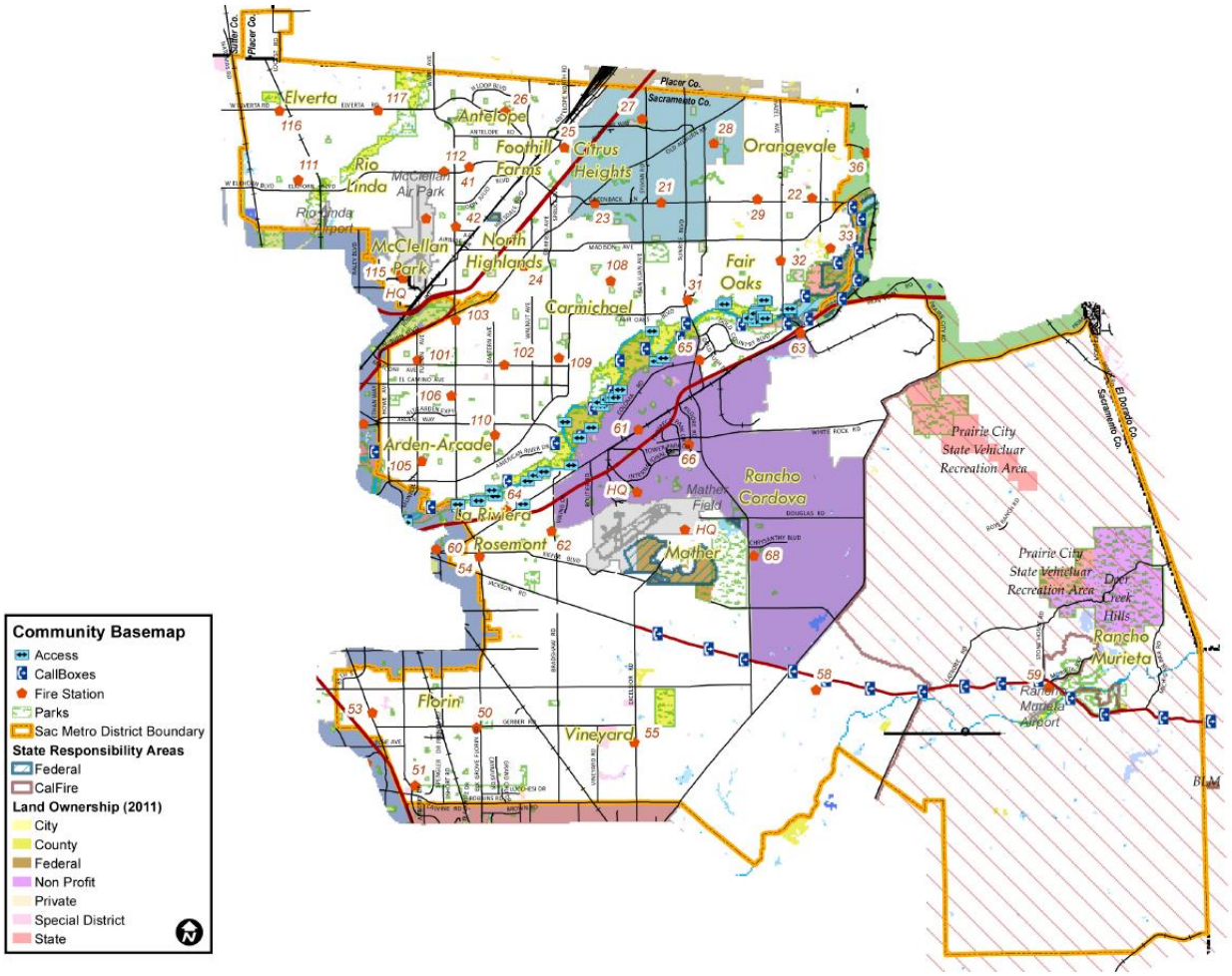
Name	Position/Title	How Participated
Greg Casentini	Asst. Chief/Fire Marshal	Program administration, reviewed draft documents. Attended HMPC meetings.
Michael Teague	Fire Captain	Research, Data collection, drafted documents. Attended HMPC meetings.

Source: Metro Fire

J.3 Community Profile

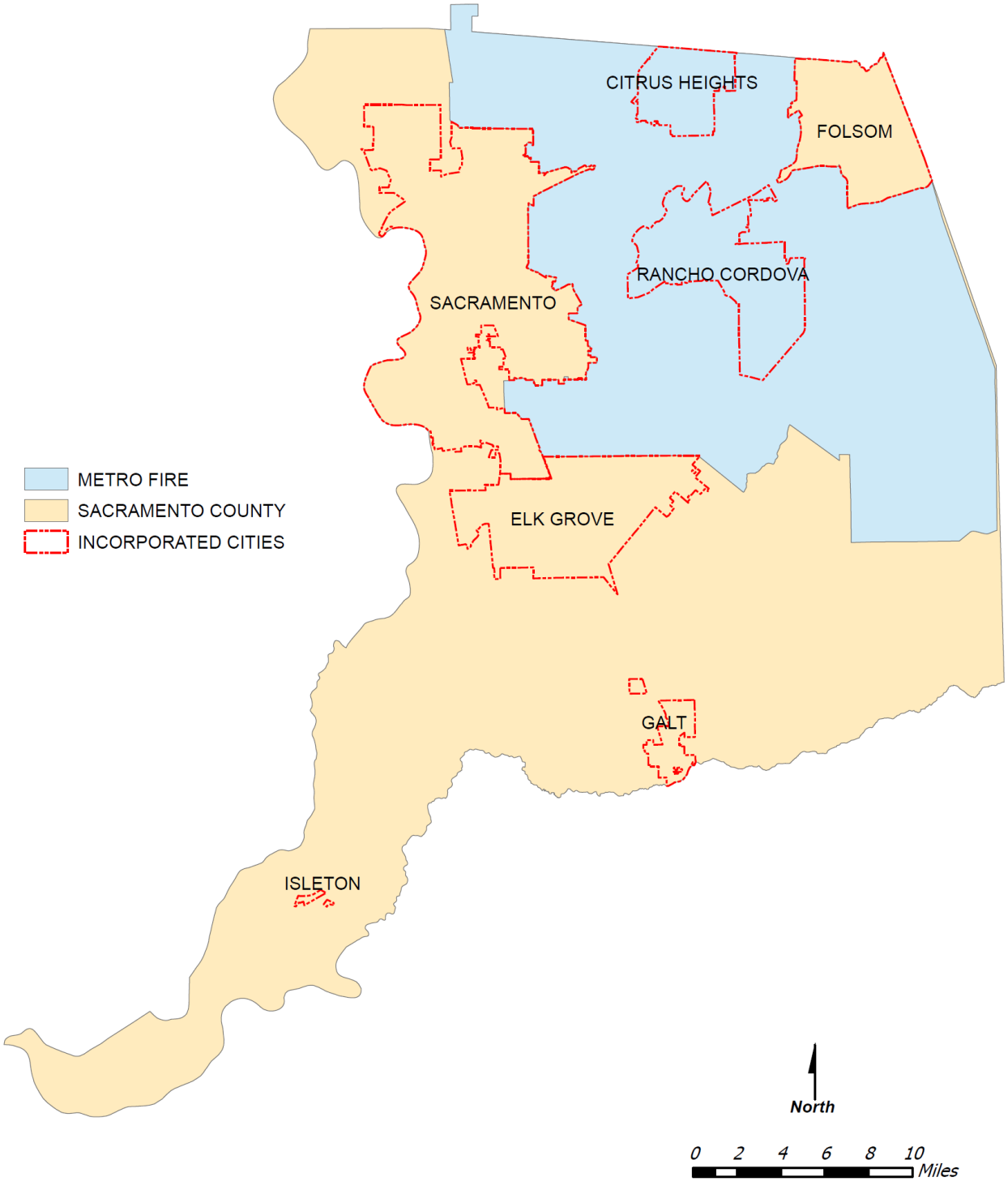
The community profile for Metro Fire is detailed in the following sections. Figure J-1 and Figure J-2 displays a map and the location of Metro Fire boundaries within Sacramento County.

Figure J-1 Sacramento Metropolitan Fire District Map



Source: American River Community Wildfire Protection Plan

Figure J-2 Location of Metro Fire in Sacramento County



Source: Sacramento Metro Fire District

J.3.1. District Overview, History, and Background

On September 25, 1999 by unanimous vote, the Board of Directors of the American River Fire District adopted an application for reorganization resolution with the Sacramento County Fire Protection District. On September 23, 1999, the Board of Directors of Sacramento County Fire adopted the application for reorganization with the American River Fire District. The adoptions of these resolutions officially called for the reorganization of both districts, which occurred on December 1, 2000.

The administration and membership of the District recognize the contribution and rich history of its predecessor departments. There are 16 prior fire departments represented in the Metro Fire organization. The predecessor agencies include:

- Arcade 1/26/42 to 6/30/86
- Arden 1/4/43 to 7/31/83
- Carmichael 1/30/42 to 7/31/83
- Citrus Heights 12/31/33 to 6/30/89
- Elverta 10/22/25 to 12/31/86
- Fair Oaks 3/27/28 to 11/2/93
- Florin 1/26/42 to 6/30/97
- Mather Field 1918 to 9/3/93
- McClellan Field 1937 to 4/1/01
- Michigan Bar 1/1/43 to 11/9/47
- Mills 6/8/22 to 11/1/59
- North Highlands 9/24/51 to 6/2/84
- Orangevale 3/2/36 to 12/1/45
- Rancho Cordova 11/2/59 to 6/30/89
- Rio Linda 6/23/23 to 12/31/86
- Sloughhouse 11/1/47 to 6/30/90

The Sacramento Metropolitan Fire District, serves a population of over 727,000 in a 417 square mile service area. Metro Fire is the 7th largest fire agency in the State of California.

Metro Fire is a combination of 16 smaller fire departments that, over the years, merged to create this California Special District. The last merger was in December 2000 when American River Fire Department and Sacramento County Fire Protection District merged to form the Sacramento Metropolitan Fire District, pursuant to Government Code Section 56839. As a special district, Metro Fire is governed by a Board of Directors; each member is elected by the voters within a geographical area, or division, of Metro Fire's operational area.

On any given day, there are 155 on-duty personnel to serve the District's communities. Routine and emergency operations are managed with five (5) Battalion Chiefs with oversight through an Assistant Chief assigned a 24-hour shift. Metro Fire is comprised of three branches - Operations, Administration, and Support Services.

- **Operations** includes Fire & Rescue, Emergency Medical, Training & Safety, Special Operations, Homeland Security, Fire Investigation, and Health & Wellness Divisions.
- The **Administration** Branch consists of Economic Development, Finance, Human Resources, and Information Technology Divisions.

- **Support Services** oversees Community Risk Reduction, Community Services, Facilities, Fleet Maintenance, and Logistics Divisions.

J.4 Hazard Identification

Metro Fire's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to Metro Fire (see Table J-2).

Table J-2 Metro Fire—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Occasional	Limited	Low
Bird Strike	Limited	Likely	Negligible	Low
Climate Change	Significant	Likely	Limited	Low
Dam Failure	Limited	Unlikely	Critical	Medium
Drought and Water Shortage	Extensive	Highly Likely	Limited	Medium
Earthquake	Significant	Likely	Limited	Medium
Earthquake: Liquefaction	Limited	Likely	Limited	Low
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding	Significant	Highly Likely	Limited	Low
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Limited	Occasional	Negligible	Medium
River/Stream/Creek Bank Erosion	Limited	Occasional	Negligible	Low
Severe Weather: Extreme Temperatures – Cold/Freeze	Significant	Likely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Significant	Highly Likely	Limited	Low
Severe Weather: Fog	Significant	Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Limited	Low
Severe Weather: Wind and Tornadoes	Significant	Likely	Limited	Low
Subsidence	Limited	Unlikely	Limited	Low
Volcano	Limited	Unlikely	Limited	Low
Wildfire:(Burn Area/Smoke)	Significant	Highly Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

J.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Metro Fire's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Hazard Profiles and Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to Metro Fire is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

J.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section J.5.3, includes a description as to how the hazard affects the Metro Fire and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

J.5.2. Vulnerability Assessment and Assets at Risk

This section identifies Metro Fire's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table J-3 lists particular critical facilities and other District assets identified by the Metro Fire's planning team as important to protect in the event of a disaster. Metro Fire's physical assets, valued at over $165 million, consist of the buildings and infrastructure to support the Metro Fire operations.

Table J-3 Metro Fire's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Fire Station 21	Essential	7641 Greenback Ln Citrus Heights, CA 95610	$5,000,000	Earthquake
Fire Station 22	Essential	6248 Chestnut Ave., Orangevale 95662	$3,000,000	Earthquake
Fire Station 23	Essential	6421 Greenback Ln., Citrus Heights 95621	$4,000,000	Earthquake
Fire Station 24	Essential	4942 College Oak Dr., Sacramento 95841	$3,000,000	Earthquake
Fire Station 25	Essential	7352 Roseville Rd., Sacramento 95842	$3,000,000	Earthquake
Fire Station 26	Essential	8000 Palmerson Dr., Antelope 95843	$3,000,000	Earthquake
Fire Station 27	Essential	7474 Grand Oaks Bl., Citrus Heights 95621	$3,000,000	Earthquake
Fire Station 28	Essential	8189 Oak Ave., Citrus Heights 95610	$3,000,000	Earthquake
Fire Station 29	Essential	8681 Greenback Ln., Orangevale 95662	$3,000,000	Earthquake
Fire Station 31	Essential	7950 California Ave., Fair Oaks 95628	$3,000,000	Earthquake
Fire Station 31	Essential	8890 Roediger Lane, Fair Oaks 95628	$3,000,000	Earthquake
Fire Station 33	Closed	5148 Main Ave., Orangevale 95662	$2,000,000	Earthquake, Wildfire
Fire Station 41	Essential	6900 Thomas Dr., North Highlands 95660	$3,000,000	Earthquake

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Fire Station 42	Essential	5608 North Haven, North Highlands 95660	$2,000,000	Earthquake
Fire Station 50	Essential	8880 Gerber Rd., Sacramento 95828	$3,000,000	Earthquake, Dam Failure
Fire Station 51	Essential	8210 Meadowhaven Dr., Sacramento 95828	$2,000,000	Earthquake, 500 year flood, Dam Failure
Fire Station 53	Essential	6722 Fleming Ave., Sacramento 95828	$2,000,000	Earthquake, 200 year flood, 500 year flood, Dam Failure
Fire Station 54	Essential	8900 Fredric Ave., Sacramento 95826	$1,500,000	Earthquake, 200 year flood, 500 year flood, Dam Failure
Fire Station 55	Essential	7776 Excelsior Rd., Sacramento 95829	$2,000,000	Earthquake, Wildfire
Fire Station 58	Essential	7250 Sloughhouse Rd., Elk Grove 95624	$2,000,000	Earthquake, Wildfire
Fire Station 59	Essential	7210 Murieta Drive, Rancho Murieta 95683	$2,000,000	Earthquake
Fire Station 61	Essential	10595 Folsom Bl., Rancho Cordova 95670	$3,000,000	Earthquake, 500 year flood, Dam Failure
Fire Station 62	Essential	3646 Bradshaw Rd., Sacramento 95827	$3,000,000	Earthquake, Dam Failure
Fire Station 63	Essential	12395 Folsom Bl., Rancho Cordova 95742	$1,500,000	Earthquake, Dam Failure
Fire Station 64	Essential	9116 Vancouver Dr., Sacramento 95826	$1,500,000	Earthquake, 500 year flood, Dam Failure
Fire Station 65	Essential	11201 Coloma Rd., Rancho Cordova 95670	$3,000,000	Earthquake, 500 year flood, Dam Failure
Fire Station 66	Essential	3180 Kilgore Rd., Rancho Cordova 95670	$2,000,000	Earthquake, Dam Failure

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Fire Station 68	Essential	4381 Anatolia Dr., Rancho Cordova, 95742	$2,000,000	Earthquake
Fire Station 101	Essential	3000 Fulton Ave., Sacramento 95821	$2,000,000	Earthquake
Fire Station 102	Essential	4501 Marconi Ave., Sacramento 95821	$1,500,000	Earthquake
Fire Station 103	Essential	3824 Watt Ave., Sacramento 95821	$2,000,000	Earthquake
Fire Station 105	Essential	2691 Northrop Ave., Sacramento 95864	$2,000,000	Earthquake, 200 year flood, 500 year flood, Dam Failure
Fire Station 106	Essential	2200 Park Towne Cir., Sacramento 95825	$3,000,000	Earthquake, Dam Failure
Fire Station 108	Essential	6701 Winding Way, Fair Oaks 95628	$2,000,000	Earthquake
Fire Station 109	Essential	5634 Robertson Ave., Carmichael 95608	$2,000,000	Earthquake
Fire Station 110	Essential	1432 Eastern Ave., Sacramento 95864	$2,000,000	Earthquake, Dam Failure
Fire Station 111	Essential	6609 Rio Linda Blvd., Rio Linda, CA 95673	$2,000,000	Earthquake, Dam Failure
Fire Station 112	Essential	6801 34th St., North Highlands 95660	$1,500,000	Earthquake
Fire Station 114	Essential	5824 Kelly Way, McClellan 95652	$2,000,000	Earthquake
Fire Station 115	Essential	4727 Kilzer Ave., McClellan 95652	$2,000,000	Earthquake

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Fire Station 116	Essential	7995 Elwyn Ave., Elverta 95626	$1,500,000	Earthquake, Dam Failure
Fire Station 117	Essential	7961 Cherry Brook Dr., Elverta 95626	$1,500,000	Earthquake, Dam Failure
Headquarters	Essential	10545 Armstrong Ave Mather, CA 95665	$20,000,000	Earthquake
Fleet Maintenance Facility	Essential	4425 Dudley Blvd McClellan Ca 95652	$20,000,000	Earthquake
Logistics/Training	Essential	3012 Gold Canal DR Rancho Cordova CA 95670	$5,000,000	Earthquake
Sacramento Regional Fire and EMS Communications Center	Essential	10230 Systems Parkway, Sacramento CA 95827	$20,000,000	Earthquake, Dam Failure

Source: Metro Fire

Natural Resources

Land uses within the District include urban, suburban, and undeveloped (natural or agricultural). The terrain throughout is primarily flat or composed of gently rolling hills, with the steepest terrain being located in the eastern portion of the District, where the Central Valley begins to transition into the Sierra Foothills, and along the American River.

The northern portion of the District is the most developed, and includes the urban and suburban development within the cities of Citrus Heights and Rancho Cordova, and surrounding unincorporated communities. Citrus Heights is located north of the American River, where it covers approximately 14 square miles immediately adjacent to Interstate 80. Rancho Cordova occupies nearly 34 square miles on the south side of the American River. A much larger area of urban and suburban development surrounds these communities, and is loosely circumscribed by Interstate 80 to the north and Highway 50 to the south. The American River runs between these two roadways, and forms a green belt through the developed area.

The southern portion of the District is occupied by scattered unincorporated communities, and extensive areas of grassland, pasture, and cropland. Other natural habitats include oak woodland, vernal pools, riparian habitat, and wetlands. There are numerous seasonal and perennial waterways within the District. The largest of the rivers is the American River, which traverses the northern portion of the District, and is bordered by riparian forest. It flows out of the man-made reservoir Folsom Lake, which is located just to the east of the District. The other primary river in the District is Cosumnes River, which flows across the

southern portion, roughly between the communities of Wilton and Rancho Murieta. Most rivers and streams are ephemeral, and dewater during the dry season.

There are many special-status plant species that have been documented in the CNDDB within a 5-mile radius around the District and are also included a USFWS quad search encompassing the District. These include:

- Big-scale balsamroot
- Peruvian Dodder
- Dwarf downingia
- Tuolumne Button-celery
- Boggs Lake hedge-hyssop
- Ahart's dwarf rush
- Northern California Black Walnut
- Legenere
- Pincushion navarretia
- Slender Orcutt grass
- Sacramento Orcutt grass

According to California Fish and Wildlife the following special status animals likely reside in Metro Fire's jurisdiction:

- Valley Elderberry Longhorn Beetle
- California Red-legged Frog
- Foothill Yellow-legged Frog
- Western Spadefoot
- Western Pond Turtle
- California Horned Lizard
- Bald Eagle
- Golden Eagle
- Peregrine Falcon
- Prairie Falcon
- Burrowing Owl
- Osprey
- Northern harrier
- Sharp-shinned hawk
- Cooper's hawk
- Ferruginous hawk
- Merlin (Falco columbarius)
- Long-eared owl
- Short-eared owl
- Loggerhead Shrike
- Tricolor blackbird
- Yellow-breasted Chat
- Yellow Warbler
- Greater Sandhill Crane
- Willow Flycatcher
- Purple Martin
- Pallid bat
- Townsends big-eared bat

- California mastiff bat

Historic and Cultural Resources

The Planning Team for the District put together a table of historic and cultural resources for the District. These were compiled by the District and are shown on Table J-4.

Table J-4 Points of Historical or Cultural Interest

Name of Asset	Address	Type of Landmark
American River Grange Hall N0 172	2720 Kilgore Rd, Rancho Cordova	National Register of Historic Places
Brighton School	3312 Bradshaw Road Sacramento	National Register of Historic Places
Indian Stone Corral	Orangevale	National Register of Historic Places
Nisenan Village Site	Carmichael	National Register of Historic Places
Old Fair Oaks Bridge	Bridge St Fair Oaks	National Register of Historic Places
Sacramento Air Depot Historic District	McClellan Air Force Base	National Register of Historic Places
Slocum House	7992 California Ave, Fair Oaks	National Register of Historic Places
Fifteen Mile House – Overland Pony Express Route	White Rock & Gold Valley Rd Rancho Cordova	California Historical Landmark
Sacramento Assembly Center- Camp Kohler	Walerga Park	California Historical Landmark
Sheldon Grist Mill	Meiss Rd and Hwy 16, Sloughouse	California Historical Landmark
Sloughhouse	Meiss Rd and Hwy 16 Sloughhouse	California Historical Landmark

Source: Metro Fire District

Growth and Development Trends

CITY OF CITRUS HEIGHTS

The City of Citrus Heights is a mostly built-out suburban city surrounded by similar development in unincorporated areas. A variety of commercial and office uses line the historic Auburn Boulevard commercial corridor and occupy small centers along a number of arterials including: Antelope Road, Fair Oaks Boulevard, Madison Avenue and San Juan Avenue. Although some of the older commercial centers along these arterials are beginning to show signs of deterioration, retail development has shifted over the past decades to the Sunrise MarketPlace, where Sunrise Mall and Marketplace at Birdcage serve as regional shopping centers.

The older residential area of the north-central city is comprised of primarily large lots and has retained a more rural setting, with large parcels accommodating hobby farming and livestock grazing. Smaller subdivisions and multi-family developments form the majority of the residential areas, with many of the denser multi-family neighborhoods surrounding the Sunrise MarketPlace.

Approximately 97 percent of the city is currently developed. Development of the remaining 3 percent of vacant land under the City of Citrus Heights General Plan could result in an increase of approximately 149

acres of residential development and 46 acres of commercial development. Future land uses consistent with the General Plan could result in an increase of approximately 3,577 residential dwelling units by 2035, which is an increase of approximately 10 percent over 2010 levels. Development of future land uses consistent with the General Plan could also result in an increase in population of approximately 15,880 or 18 percent from 2010 to 2035 (AECOM 2011).

The city was incorporated in 1997 with 88 percent of the homes built before 1989 and 36 percent were built in the 1970s. The majority of these homes were constructed as tract homes associated with the building boom of that decade. The majority of these homes were built quickly with inconsistent construction quality. Many of these homes are now experiencing failing roofs and HVAC systems. In addition, 861 homes were built prior to 1939, some of which lack complete plumbing and may be dilapidated. Most of these homes utilize electronic wiring and plumbing that can pose potential fire risk.

CITY OF RANCHO CORDOVA

The City of Rancho Cordova grew substantially after World War II, fueled by employment demand at Aerojet and Mather Air Force Base. The city contains relatively large amounts of undeveloped land, with even more undeveloped land within its Planning Area. Between 2003 and 2013, 5,000 new homes were built in the city. The city was incorporated in 2003. The City is currently working on four specific plans to guide development is several large undeveloped areas within the city, including: the Sunridge Specific Plan (10,000 dwelling units on 2,600 acres); Westborough Specific Plan (6,000 dwelling units on 1,700 acres); the Arboretum-Waegell Specific Plan (5,000 dwelling units on 1.350 acres); and the Mather Field Specific Plan. In addition, the completed Rio Del Oro Specific Plan allows 11,600 new dwelling units on 3,800 acres.

UNINCORPORATED COMMUNITIES

Antelope

Antelope is a residential community bounded by the Sacramento-Placer County line to the north, Antelope Road to the south, the Southern Pacific Railroad line to the east, and Dry Creek to the west. Antelope was established in the mid-1800s. Planning policies that have guided growth include the Antelope Community Plan, adopted in 1985 and the subsequent East Antelope Specific Plan, adopted in 1995. The community is nearly built out. One large vacant property remains undeveloped at the northwest intersection of Don Julio and Elverta Roads. The County's Housing Element projects construction of about 2,700 new dwelling units between 2005 and 2025.

Arden-Arcade

The Arden-Arcade community is located at the heart of Sacramento County and is marked by the convergence of several major freeways and thoroughfares. Arden-Arcade is bound by the American River to the south, Interstate 80 to the north, Ethan Avenue to the west and Mission Avenue on the east. Arden-Arcade includes nearly 40 distinct neighborhood areas and a number of shopping areas. The Arden-Arcade Community offers a range of housing options, everything from apartments to mansions. California State University, Sacramento (CSUS) is located just west of the Arden-Arcade boundary. Much of Arden-Arcade

began to develop in the 1940s with the Town and Country Village shopping center (the first suburban shopping center in Northern California). Most of the population growth in Arden-Arcade occurred up through the 1960s and 1970, when it is estimated that 75-80 percent of the community was developed with urban uses, and it is now one of the most fully developed areas of urban Sacramento. The County's Housing Element projects construction of about 200 new dwelling units between 2005 and 2025 in this community.

Carmichael and Old Foothill Farms

Carmichael and Old Foothill Farms is a fully developed community located 10 miles northeast of downtown Sacramento. It is bounded by Mission Avenue on the west, the American River on the south, San Juan Avenue on the east, and by the City of Citrus Heights on the north. The first settlers of Carmichael lived on 10-acre parcels, but following World War II, the community experienced rapid growth and its rural character began changing to a more suburban nature. Carmichael maintains its village feel, featuring a number of small shops, restaurants, and recreational activities. The community offers a complete range of homes, from apartments and townhouses to beautiful residences overlooking the American River and its parkway. Fair Oaks Boulevard is one of the community's major commercial corridors featuring shops, restaurants and services. A corridor plan was created for the boulevard (as well as a portion of Manzanita Avenue) that designates distinct local planning districts, including the creation of a SPA for the "Main Street District" that functions as the community's town center. The County's Housing Element projects construction of about 300 new dwelling units between 2005 and 2025 in this community.

Rancho Murieta

Rancho Murieta is a gated master planned community begun in the 1970s consisting of single family dwellings and townhouses. Rancho Murieta is surrounded by commonly-held open space and contains a small lake, golf course, and a few community services buildings (such as churches). It is located on eastern boundary of the District, and straddles the Jackson Highway (Highway 16). While Rancho Murieta itself is almost built to capacity, the Sacramento County Housing Element projects construction of about 3,000 new dwelling units between 2005 and 2025.

Fair Oaks

Fair Oaks is a well-established community of nearly 31,000 residents. The Fair Oaks community is bounded by the American River on the south, San Juan Avenue on the west, Madison Avenue on the north, and Blue Ravine on the east. It consists of a mix of small business district, suburban and semi-rural neighborhoods spanning over 11 square miles. The area is home to rolling hills and numerous native oaks. The County's Housing Element projects construction of about 300 new dwelling units between 2005 and 2025 in this community.

North Highlands - Foothill Farms

North Highlands is a diverse suburban community of 43,000 residents that is located approximately 10 miles northeast of downtown Sacramento. The North Highlands – Foothill Farms area is bounded by Antelope Road to the north, the city of Citrus Heights to the east, Arcade Creek and the city of Sacramento to the south, and on the west by Sacramento and McClellan Park, 28th Street, and Dry Creek. The community was formally established in 1952 and grew with the development of the McClellan Air Force

Base (now known as McClellan Business Park). McClellan Business Park is one of the largest business parks in California and will ultimately employ up to 34,000 individuals. The County's Housing Element projects construction of about 300 new dwelling units between 2005 and 2025.

Orangevale

Orangevale is a well-established community in northeastern Sacramento County. The Orangevale community is bounded by the Sacramento-Placer County line to the north, Madison Avenue to the south, Folsom to the east, and Kenneth Avenue and Fair Oaks Boulevard to the west. Most of the commercial property is in the southern portion of the community, along Greenback Lane. The northern portion of Orangevale is a rural and wildland island in the more densely developed portion of Sacramento County. This area also contains oak-covered Orangevale Community Park. Some residential properties are zoned to accommodate horses and orchards. The County's Housing Element projects construction of about 500 new dwelling units between 2005 and 2025 in this community.

Rio Linda and Elverta

The Rio Linda and Elverta community is located in the north-central section of Sacramento County and is bounded on the north by the Sutter and Placer County boundaries, on the west by the Western Pacific Railroad and Steelhead Creek, on the south by the City of Sacramento, and on the east by McClellan Park, 28th Street and Dry Creek. In addition to typical suburban and multi-family housing types, these two communities have large rural residential areas. The County's Housing Element projects construction of about 3,000 new dwelling units between 2005 and 2025.

Vineyard

The Vineyard area is located ten miles from downtown Sacramento in the geographic center of Sacramento County. It is bounded by Jackson Highway and Kiefer Boulevard on the north, Calvine Road on the south, Grantline Road on the east, Elk Grove-Florin Road on the west. Vineyard is currently home to over 24,000 residents, with many more expected once several planned new communities are built out. The northern border of the Vineyard area is shared with the former Mather Air Force Base. The Sacramento County General Plan Housing Element projects construction of about 16,000 new dwelling units between 2005 and 2025.

PROJECTED URBANIZATION

Future Growth Areas within the Urban Service Boundary

The County's General Plan contains objectives to encourage sustainability and accessibility while protecting valuable and sensitive environmental resources. To further these objectives, the plan has sustainable growth management policies including policies to limit new development to areas inside the Urban Service Description of Metro Fire Community Wildfire Protection Plan 6-26 Sacramento Metropolitan Fire District Boundary (USB) as shown on Figure 6-7. The General Plan also contains commercial corridor plans that will be implemented to provide multi-modal access along certain main corridors and revitalize some of the existing unincorporated communities. Future growth will occur as infill within the existing communities and development of currently undeveloped or lightly developed areas

within the adopted Urban Services Boundary (area as designated as Urban Service Areas). New Growth Areas identified by the County in 2012 include the Cordova Hills Master Plan area; the Mather Specific Plan area; New Bridge Master Plan area; Jackson Township Master Plan area. In addition, new development would continue in the other approved Master Plan areas shown on the attached figure showing Master Plan areas (e.g. Elverta Specific Plan area). As described previously, the County Housing Element projects substantial growth by 2025 in the community Vineyard (which likely includes the community of Cordova), moderate growth (2,500-3,000 new units) in Antelope and Rio Linda/Elverta. Little growth is projected in Arden-Arcade, Carmichael/Old Foothill Farms, Orangevale, North Highlands – Foothill Farms, and Fair Oaks.

Development Potential Outside the Urban Services Boundary

There is some potential for new development outside the USB. One of these potential growth areas is the eastern part of the county between Highway 50 and Rancho Murieta. This is the area that supports almost all the oak woodland in the District. Accordingly, it is the part of the District most at risk from wildfire. Other than the Rancho Murieta community area, this area is designated in the General Plan as Agriculture, 80-acre minimum parcel size. Future 80-acre ranchettes in or adjacent to the woodland areas could experience relatively high wildfire risk. It is noted that despite the General Plan land use designations for this area, the County Housing Element projects substantial growth (20,000 new dwelling units) in the Cosumnes and Rancho Murieta communities between 2005 and 2025.

In 2012, the City of Folsom annexed 3,585 acres for the Folsom South of U.S. Highway 50 Specific Plan, located between Highway 50 and White Road, Prairie City Road, and El Dorado County. Up to 11,000 residential units may eventually be developed in this area. The EIR/EIS prepared for that project noted that the land was within a State Responsibility Area and that the State has mapped the area as having a "moderate" fire hazard rating. On that basis, the EIR/EIS found that future development in the area would not be exposed to a substantial risk from wildfires.4 There are current plans to begin development of the area with one developer proposing in 2013 to build 900 new homes on 441 acres by 2015.

J.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table J-2 as high or medium significance hazards. Impacts of past events and vulnerability of the Metro Fire to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable structures are those located within the floodplain or within levee and dam inundation areas, such as older facilities that may be constructed with unreinforced masonry and buildings built prior to the introduction of modern building codes, or wildfire areas.

An estimate of the vulnerability of the Metro Fire to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on

past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

Dam failures can result from a number of natural or manmade causes such as earthquakes, erosion of the face or foundation, improper siding, rapidly rising flood waters, structural/design flaws, and deliberate human actions. Folsom Dam is the major dam which affects Metro Fire and the populations in the inundation areas. Folsom Dam is owned by the US Bureau of Reclamation. The flood waters from a dam failure would likely affect the District's service area.

The ability to warn downstream communities in the event of a flood event caused by a dam failure is generally dependent on conditions such as the frequency of inspections for the dam's structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate or take preventative actions to minimize damage to utilities or infrastructure. The existence and frequency of updating and exercising an evacuation plan that is site-specific assists in warning and evacuation functions.

A dam failure will cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path.

Past Occurrences

There have been no incidents of a dam failure that have affected Metro Fire Assets. In 1995 a failure of a flood gate resulted in an uncontrolled release of water from the Folsom Dam. The American River levee system was able to contain the water.

Vulnerability to Dam Failure

Assets/Critical Facilities at Risk

The Bureau of Reclamation provided several dam and dike failure scenarios. The worst case scenario would be the failure of Folsom Dam. The resulting inundation would affect 17 fire district facilities considered essential. Warning time would vary from 1 hour to 3 hours for these facilities. The following facilities are at risk of damage due to dam failure.

- Station 50
- Station 51
- Station 53
- Station 54
- Station 61
- Station 62
- Station 63
- Station 64
- Station 65
- Station 66
- Station 105
- Station 106
- Station 110
- Station 111
- Station 116
- Station 117
- Sacramento Regional Fire and EMS Communications Center

Natural Resources at Risk

Much of the American River Parkway would be damaged during a failure of Folsom Dam. This could destroy vital habitat for both special status plants and animals.

Historic and Cultural Resources at Risk

All of the Points of Historical and Culture Interest listed in Table J-4 would be at risk during a dam failure.

Future Development

Most of the development in Metro Fire's jurisdiction is occurring in the northwest portion (Elverta/Rio Linda) of Sacramento County, the south east portion of the City of Rancho Cordova and the Vineyard area. A failure of any of the dikes north of the Folsom Dam would inundate Elverta with flood waters causing damage to the new development in the area. The development in the southeast portion of Rancho Cordova is not threatened by dam failure.

Drought and Water Shortage

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue and is critical for manufacturing, tourism, recreation, and commercial and domestic use. As the population in the area continues to grow, so will the demand for water.

Drought is a significant hazard, especially to the forested areas of the District. Drought conditions stress and leave the forest susceptible to disease and insect infestation. As a result of recent drought conditions throughout California, infestations of the Pine Beetle are on the rise. Drought also stresses grasslands, and leaves them more susceptible to wildfire.

Past Occurrences

Droughts occur in California with regularity. The current drought started in 2011. Previous droughts occurred in 2007-2009, 1986-1991, and 1976-1977.

Vulnerability to Drought and Water Shortage

Assets a Risk

Unlike other natural disasters, drought does not affect individual properties. The effects of continued drought are felt area-wide. The greatest change to Metro Fire would be the decrease in the amount of training using water. During previous droughts, firefighting training using water was reduced to save this resources.

Natural Resources at Risk

Prolonged drought can cause an increase for wildfire occurrence and intensity. Drought can cause tree death which can create a significant increase in wildfire behavior.

Historic and Cultural Resources at Risk

No historic or cultural resources are at risk from drought.

Future Development

Prolonged drought could cause a reduction in future development due to the lack of water resources for new dwellings.

Earthquake

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction.

Past Occurrences

Since 1931 there have been 17 significant earthquakes within 30 miles of Sacramento. The US Geological Survey predicts that there is a 45% chance of a 5.0 earthquake over the next 50 years.

Vulnerability to Earthquake

Assets a Risk

Many Fire District facility were constructed before seismic upgrades were required. Only 4 fire stations have been built in the last 10 years. All other stations are in excess of 20 years old. Some stations are unreinforced masonry construction which is especially vulnerable during earthquakes. At least 30 fire stations do not meet current seismic guidelines.

Natural Resources at Risk

No natural resources are at risk for earthquake damages.

Historic and Cultural Resources at Risk

All historical buildings are at risk for damage during an earthquake.

Future Development

California Building Code requires all new construction to have features that will reduce damage due to an earthquake.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Flooding is the rising and overflowing of a body of water onto normally dry land. History clearly highlights floods as one of the most frequent natural hazards impacting Sacramento County. Floods are among the most costly natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. This is one reason floods kill more people trapped in vehicles than anywhere else. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to crops, roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

Metro Fire has two major rivers running though the district. The American River runs east to west from Folsom Dam until the confluence with the Sacramento River in the City of Sacramento. The Cosumnes River crosses the District in the southern part of the county. Both rivers have been subject to flooding in the past.

The American River bisects the Fire District. There are a limited number of bridges that cross the river. Large scale flooding could damage the bridge crossing, creating significant problems maintaining response levels during flooding.

There are several stream groups that can affected Metro Fire. These include Arcade Creek, Dry Creek and Cripple Creek in the north part of the District. Morrison Creek and Deer Creek are in the southern portions of the District. These creeks often flood during heavy rain. Deer Creek overtops and blocks Scott Rd between Boys Ranch Rd and Latrobe RD during many storms.

Past Occurrences

In 1986 severe weather over a ten day period caused flooding in the area. The American River was flowing beyond its predicted safe flow for several days.

The New Years flood of 1996-1997 caused widespread stream flooding and a levee failure on the Cosumnes river.

Vulnerability to Flood

Assets a Risk

Three Metro Fire Facilities are within the 200 year flood plain. According to the flood depth maps published by the Sacramento Area Flood Control Agency these stations would likely be exposed to water that is over 5 feet deep. The facilities are:

- Station 54
- Station 53
- Station 105

For additional facilities are within the 5000 year flood plain. These facilities are:

- Station 51
- Station 61
- Station 64
- Station 65

Natural Resources at Risk

Extensive flooding along the American River Parkway would damage sensitive habitat of many special-status plants and animals.

Historic and Cultural Resources at Risk

Most of the Points of Historical and Cultural Interest are with the flood plains. Flooding would cause severe damage to historic buildings as they were not built to resist flooding.

Future Development

Most of the future development in the Fire District is occurring in areas that are not susceptible to flooding.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding caused by levee failure can occur as the result of partial or complete collapse of an impoundment, and often results from prolonged rainfall and flooding. The primary danger associated with dam or levee failure is the high velocity flooding of properties downstream of the breach. Section 4.2.15 Levee Failure describes the levee inventory in the Sacramento County Planning Area.

Flooding caused by levee failure would vary in the District depending on which structure fails and the nature and extent of the failure and associated flooding. Flooding may present a threat to life and property depending on buildings or facilities flooded. Damage may include buildings, their contents and loss of

critical services to the community. Large flood events can affect lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, agricultural industry, and the local and regional economies.

Levee Flood Protection Zones estimate the maximum area that may be inundated if a project levee fails when water surface elevation is at the top of a project levee. Zones depicted on Figure 4.69 of the Base Plan do not necessarily depict areas likely to be protected from flow events for which project levees were designed. Figure 4.69 of the Base Plan illustrates the depths of flooding should a levee that protects that area fail.

Past Occurrences

In January 1997, a private levee on the Cosumnes River failed. This levee breach flooded mostly agricultural land in southeastern Sacramento County. There was not a significant impact on Metro Fire facilities or operations.

There have been no failures of the American River Levee System in recent history.

Vulnerability to Levee Failure

Assets a Risk

The facilities that are at risk for flooding are also at risk of levee failure.

Natural Resources at Risk

Extensive flooding from levee failure along the American River Parkway would damage sensitive habitat of many special-status plants and animals.

Historic and Cultural Resources at Risk

Most of the Points of Historical and Cultural Interest are with the flood plains. Flooding would cause severe damage to historic buildings as they were not built to resist flooding from levee failures.

Future Development

Most of the future development in the Fire District is occurring in areas that are not susceptible to flooding and levee failure.

Wildfire

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

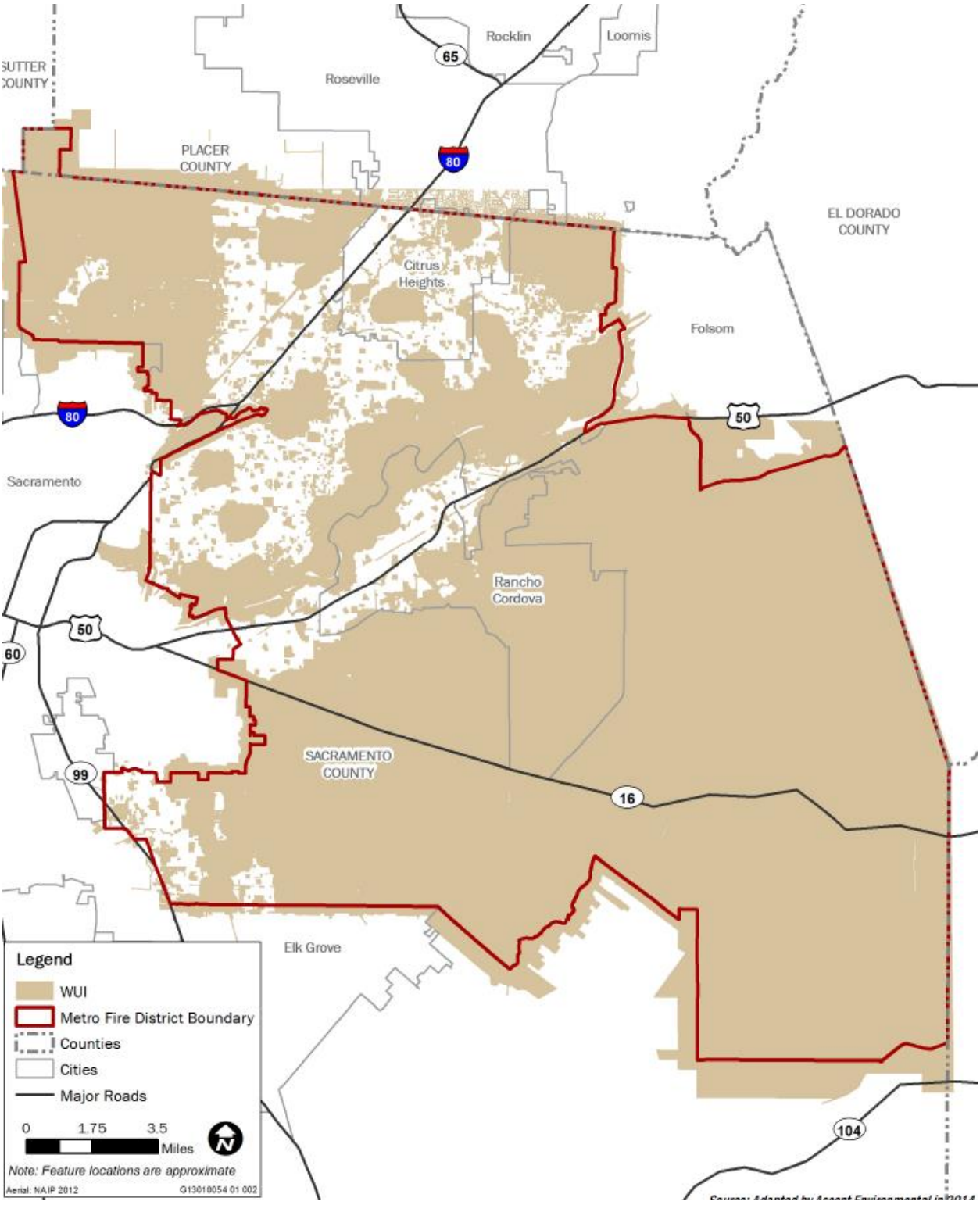
According to the American River CWPP, wildland fires are common in open space areas with vegetation that exhibits low fuel moisture. The threat for wildland fires is increased during the warmer months which are typically from late May until late October of every year. High winds can also contribute to the spread and severity of the fire. Specifically winds from the north which is drying winds they will support extreme wildland fire behavior, as opposed to winds from the west which have the ability to add moisture to fuels minimizing extreme fire behavior.

The WUI is the meeting point between wildland vegetation or fuels and structures (Figure J-3). At this interface, the structure and vegetation are sufficiently close that a wildfire could spread to a structure or a structure fire could ignite vegetation. The proximity of vegetation and structures needed to spread fire varies with the vegetation (fuel) type, the siting of the structure, and the exterior characteristics (building material and design) of the structure itself. WUI is defined on a scale larger than one lot or neighborhood.

In the past, the vast majority of wildfires occurred in remote locations and caused little damage to property or loss of human life. During the last 50 years, however, history is replete with examples of destructive fires in the WUI throughout California. Almost all of the wildfires within the District are caused by humans, and are closer to developed areas. Because of the increased values that accompany structures and other improvements, most losses from wildfire occur in the WUI.

Much of the development occurring in Metro Fire's jurisdiction is in the WUI. The current development projects in the Elverta area and the City of Rancho Cordova are in the WUI. There are also development occurring in the Rancho Murieta area.

Figure J-3 WUI in the Metro Fire District



Source: American River CWPP Appendix A

Past Occurrences

Metro Fire responds to an average of 869 wildfires per year (based on records from 2008-2013). This comprises 37 percent of all fires, even though wildlands cover only 15 percent of the District's 417 square mile jurisdictional area.

The number of wildfires in the District is rising, with a 5 percent increase in 2012 alone (Sacramento Metropolitan Fire District 2013). Simultaneously, major residential development has begun throughout the District, with a forecasted population increase of 200,000. Because most wildfires are human-caused, this higher population may well translate into more wildfires. The risk of wildfire is especially concerning because the wildland areas in these communities are not restricted to the outskirts of the District's jurisdictional area, but rather are interspersed amongst residential and commercial areas, creating a large wildland urban interface area. Additional risk factors for Metro Fire include topographical challenges in the ARP area that could impact fire suppression efforts, environmental considerations in the community, diversity of terrain, and increased residential development and population growth within WUI areas.

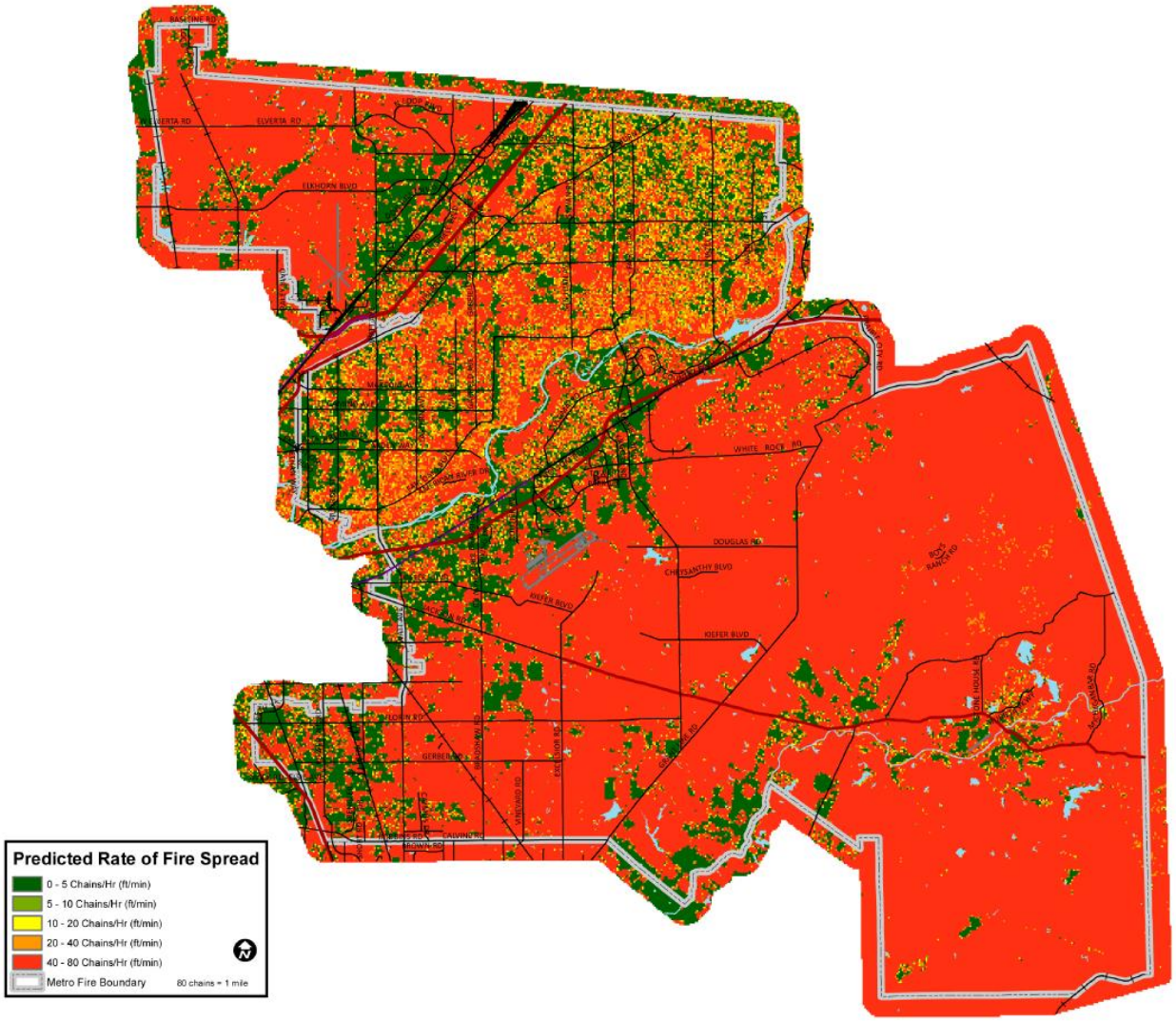
On June 10, 2008 a wildland fire started on Jackson Road east of Bradshaw Road. The Jackson Fire eventually burned 6400 acres, destroyed 5 homes and cause severe injuries to one firefighter. This fire required the extensive use of both automatic and mutual aid from both within Sacramento County and out-of-county resources.

Vulnerability to Wildfire

There are many ways to assess fire hazard; most utilize fuels, weather and topography, with possible inclusions of elevation, or fire history. Fire behavior modeling was used to assess the potential hazards within the District because it:

- integrates the effects of fuels, weather, and topography;
- denotes where containment may be easiest as well as where access may be precluded during a time of fire; and
- warns where natural resources may be unduly harmed by a wildfire as well as where fire may be inconsequential to natural resources.

Figure J-4 Predicted Rate of Fire Spread in the Metro Fire District



Source: American River CWPP Appendix A

Much of the land within the District is not predicted to have the capacity to burn under a wildfire, due to a lack of vegetation. Areas where surface fire can spread are located north of the American River, near Mather Air Field and the southeastern portion of the District. These generally coincide with lands mapped as WUI.

Assets a Risk

Only two Fire District facilities are at risk for wildfire: Station 58 and Station 33 (currently closed).

Natural Resources at Risk

The District Planning Team noted that all special status species and plant communities in the District are at risk to wildfire.

Historic and Cultural Resources at Risk

The following Points of Historic or Cultural Interest are at risk to wildfire:

- Indian Stone Corral
- Niscenan Village Site
- Sheldon Grist Mill'
- Sloughhouse

Future Development

The areas that are experiencing the greatest development are the southeastern portion of the City of Rancho Cordova, the Vineyard area and the northwestern portion of the county in the Elverta/Rio Linda area. All these areas are part of the WUI and are at greater risk for wildfire. Metro Fire has not formally designated a WUI area so the WUI components of the California Building Code do not apply except in the High Fire Severity Zone that is designated along the American River Parkway.

J.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

J.6.1. Regulatory Mitigation Capabilities

Table J-5 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the Metro Fire.

Table J-5 Metro Fire's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan		
Capital Improvements Plan		
Economic Development Plan		
Local Emergency Operations Plan	Y 2004	This plan is currently being updated. Hazards are identified. The plan does not identify mitigation strategy.
Continuity of Operations Plan		
Transportation Plan	N/A	
Stormwater Management Plan/Program	N/A	
Engineering Studies for Streams	N/A	

Community Wildfire Protection Plan	Y 2014	This plan addresses the wildfire hazards in the Fire District and recommends mitigation actions.
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N/A	Score:
Fire department ISO rating:	Y	Rating: 3/9
Site plan review requirements	Y	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance		
Subdivision ordinance		
Floodplain ordinance		
Natural hazard specific ordinance (stormwater, steep slope, wildfire)		
Flood insurance rate maps		
Elevation Certificates		
Acquisition of land for open space and public recreation uses		
Erosion or sediment control program		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: Metro Fire

J.6.2. Administrative/Technical Mitigation Capabilities

Table J-6 identifies the department(s) responsible for activities related to mitigation and loss prevention for Metro Fire.

Table J-6 Metro Fire's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission		
Mitigation Planning Committee		

Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)		
Mutual aid agreements		
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official		
Floodplain Administrator	N	
Emergency Manager		
Community Planner		
Civil Engineer		
GIS Coordinator		
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)		
Hazard data and information		
Grant writing		
Hazus analysis		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: Metro Fire

J.6.3. Fiscal Mitigation Capabilities

Table J-7 identifies financial tools or resources that the Metro Fire could potentially use to help fund mitigation activities.

Table J-7 Metro Fire's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding		
Authority to levy taxes for specific purposes	Y	This has not been attempted
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	Impact fees have been use open new fire stations
Storm water utility fee	N/A	

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities		
Community Development Block Grant		
Other federal funding programs	Y	SAFER, AFG, HSGP
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: Metro Fire

J.6.4. Mitigation Education, Outreach, and Partnerships

Table J-8 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table J-8 Metro Fire's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	
Natural disaster or safety related school programs	Y	
StormReady certification		
Firewise Communities certification		
Public-private partnership initiatives addressing disaster-related issues		
Other		
How can these capabilities be expanded and improved to reduce risk?		

J.6.5. Other Mitigation Efforts

As stated in the American River CWPP, there are mitigation efforts ongoing by the District. This includes:

- Fuel reductions projects
- Treatment of structural ignitability
- Vegetation treatments

Information on these items may be found in greater detail in the CWPP.

J.7 Mitigation Strategy

J.7.1. Mitigation Goals and Objectives

Metro Fire adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

J.7.2. Mitigation Actions

The planning team for Metro Fire identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Relocate the essential facilities in the 200 year flood plain.

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: 3 Fire stations (54, 53, 105) are located within the 200 year flood plain of the American River. These stations would become uninhabitable during a significant flood. Apparatus and equipment are vulnerable to damage.

Project Description: Locate suitable properties. Construct new fire stations to replace the 3 in the flood plain.

Other Alternatives: Raising station above flood level.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital Improvement Plan

Responsible Office/Partners: Sacramento Metropolitan Fire District Facilities Director

Project Priority: Medium

Cost Estimate: $15,000,000

Benefits (Losses Avoided): Prevents the loss of essential emergency facilities.

Potential Funding: Capital improvement funds, grant funding

Timeline: 3-5 years

Action 2. Perform seismic study of all district facilities and identify those facilities at greatest risk for earthquake damage.

Hazards Addressed: Earthquake

Goals Addressed: 1, 3, 4

Issue/Background: Except for 4 fire stations rebuilt of the last 7 years all other district fire stations are more than 20 years old. Many stations are unreinforced masonry construction and have a substantial risk of collapse during an earthquake.

Project Description: Perform a study of all district facilities to assess the risk of damage from earthquakes. Develop a list of seismic retrofit priorities for district facilities. Identify funding sources for seismic retrofitting of fire stations.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital Improvement Plan

Responsible Office/Partners: Metro Fire Facilities

Project Priority: Low

Cost Estimate: $250,000

Benefits (Losses Avoided): Will identify those district facilities that need to be retrofitted or replaced to avoid earthquake damage.

Potential Funding: Grant funding

Timeline: 1-3 years

Action 3. Implement a Wildland Urban Interface (WUI) Building/Fire Code

Hazards Addressed: Wildfire

Goals Addressed: 1, 3, 4

Issue/Background: Metro Fire does not have a designated WUI area and has implement a WUI Building/Fire Code. By designating a WUI area, WUI provisions of the California Building Code will become enforceable.

Project Description: Designate a WUI area within Metro Fire based on the information in the Community Wildfire Protection Plan. Develop WUI building code and defensible space ordinances

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Community Wildfire Protection Plan

Responsible Office/Partners: Metro Fire Community Risk Reduction Division

Project Priority: High

Cost Estimate: $10,000

Benefits (Losses Avoided): New construction in the WUI will meet guidelines to reduce the ignition potential of the structures in the WUI.

Potential Funding: Staff time, grant founding

Timeline: 1 year

Action 4. Develop and Implement a comprehensive WUI fuels management program.

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Reducing wildland fuels in the WUI will reduce the possibility of structure loss during a WUI fire. There are many stakeholders who will want to be involved in the fuels management program, citizens, property owners, county parks, state parks, and water districts. Fuel reduction can take on several different mechanism including grazing, hand clearing, mechanical clearing and prescribed burning.

Project Description: Hire a fuels management officer. Develop a fuels management policy. Convene a stakeholders group to prioritize projects. Implement fuels reductions as described in the CWPP. Develop an invasive species reduction program using prescribed burning and hand and mechanical clearing of non-native plants.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: CWPP

Responsible Office/Partners: Community Risk Reduction Division

Project Priority: High

Cost Estimate: $750,000 per year

Benefits (Losses Avoided): Reducing fuels in the WUI will decrease the likely hood of building ignition reducing structural losses during a wildfire.

Potential Funding: Grant founding

Timeline: 1-5 years

Action 5. Deploy 2 remote automated weather stations (RAWS) in Metro Fire jurisdiction

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: There are no weather stations in Metro Fires jurisdiction that provide readings that are compatible with the National Fire Danger Rating System (NFDRS). Having the correct reading will allow Metro Fire to issue weather advisories..

Project Description: Develop locations to place 1-2 RAWS in Sacramento County. Purchase and install the equipment. Develop a policy for issuing wildfire warnings. Develop policies relating to fire danger and the amount of equipment dispatched to a wildland fire incident.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: CWPP

Responsible Office/Partners: Community Risk Reduction Division

Project Priority: High

Cost Estimate: $20,000 per RAWS, yearly maintenance $3000

Benefits (Losses Avoided): Providing real time wildfire weather report would allow the district issue warnings about dangerous outdoor activities reducing the risk of wildfire.

Potential Funding: Grant found

Timeline: 2-3

Action 6. Defensible space ordinance

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Metro Fire does not have a defensible space ordinance or inspection program

Project Description: Develop and implement a defensible space ordinance for all WUI areas. Perform defensible space inspections.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: CWPP

Responsible Office/Partners: Community Risk Reduction

Project Priority: Medium

Cost Estimate: $10,000 to implement ordinance, $300,000 per year for inspections

Benefits (Losses Avoided): Defensible space will reduce the structure loss from wildland fires.

Potential Funding: Staff time, fines and fees, grant founding

Timeline: 2-4 years

Annex K Reclamation District 800

K.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Reclamation District 800 (RD 800), a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the RD 800. This Annex provides additional information specific to RD 800, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

K.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 800 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table K-1. Additional details on plan participation and RD 800 representatives are included in Appendix A.

Table K-1 RD 800 Planning Team

Name	Position/Title	How Participated
Robert C. Wagner, P.E.	District Engineer	Reviewed Draft Documents
Patrick W. Ervin, P.E.	Engineer	Attended Meetings, Drafted Text
Martin Berber	Staff Engineer	Reviewed Draft Documents, Collected Data

Source: RD 800

K.2.1. Coordination with Other District Planning Efforts

Coordination with other District planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the District integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, RD 800 incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table K-2.

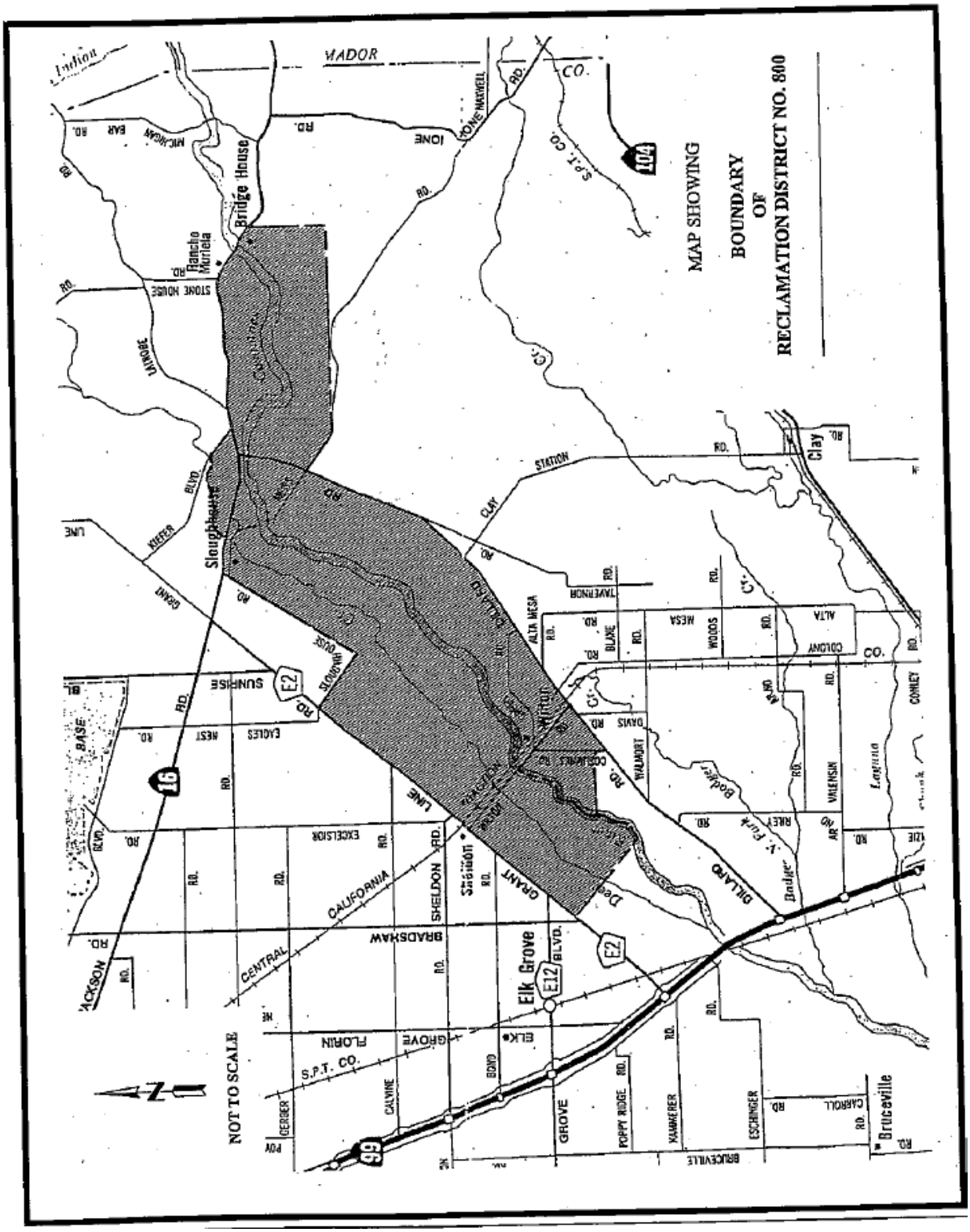
Table K-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
Erosion Repair Implemented	The District has repaired 4 places along the Consumnes River that had significant erosion issues between levee stations 100+00 and 404+50.

K.3 Community Profile

The community profile for RD 800 is detailed in the following sections. Figure K-1 displays a map and the location of RD 800 boundaries within Sacramento County.

Figure K-1 Reclamation District 800 Map



Source: RD 800

K.3.1. RD 800 Overview, Background, and History

Reclamation District No. 800 is an area within Sacramento County lying along the Cosumnes River and was originally created by action of the California State Legislature in 1907 (Statutes 1907,Ch 213). This original District, comprised of 2,136 acres, is located between Deer Creek and the Cosumnes River east of Elk Grove in Sacramento County. In January 1997, a flood of extraordinary size occurred on the Cosumnes River between Sloughhouse and Wilton requiring considerable construction work to levees along the river. However, no levee breaks occurred on those maintained by Reclamation District 800.

As a result of the 1997 flood on the Cosumnes River, it became apparent that a public agency was needed to maintain the levees and facilities along the river between Sloughhouse and Wilton areas, outside the boundaries of Reclamation District 800. At the request of landowners along the Cosumnes River whose lands were not included within Reclamation District 800, the Trustees of the District sought an amendment to the act under which the District was formed, in order to modify the boundaries and incorporate additional lands on the right bank of the Cosumnes River and to include, for the first time, lands on the left bank of the river down to the vicinity of Wilton.

To accommodate the above additions of land, SB 437 (Senator Patrick Johnston) was introduced and adopted by the Legislature and signed by the Governor as Chapter 191, Statutes of 1997. This action provided for the increase in District acreage from 2,136 to 25,435 acres. The total potential levee length is 34.05 miles with 17.65 miles along the right (or north) bank and 16.40 miles along the left (or south) bank.

Since the 1997 flood, with assistance from the County of Sacramento and funding by the U.S. Department of Agriculture, repairs were completed to levees along the Cosumnes River.

K.4 Hazard Identification

RD 800's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 800 (see Table K-3).

Table K-3 RD 800—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards				
Bird Strike				
Climate Change				
Dam Failure				
Drought and Water Shortage				
Earthquake				
Earthquake: Liquefaction				
Flood: 100/200/500-year	Extensive	Occasional	Catastrophic	High
Flood: Localized Stormwater Flooding				
Landslides				
Levee Failure	Extensive	Occasional	Catastrophic	High
River/Stream/Creek Bank Erosion	Significant	Highly Likely	Catastrophic	High
Severe Weather: Extreme Temperatures – Cold/Freeze				
Severe Weather: Extreme Temperatures – Heat				
Severe Weather: Fog				
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Significant	Likely	Critical	Medium
Severe Weather: Wind and Tornadoes				
Subsidence				
Volcano				
Wildfire:(Burn Area/Smoke)				

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area
Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid
Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

K.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 800's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 800 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

K.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section K.5.3, includes a description as to how the hazard affects the RD 800 and information on past occurrences. The intent of this section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

K.5.2. Vulnerability Assessment

This section identifies RD 800's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table K-4 lists particular critical facilities and other District assets identified by the RD 800's planning team as important to protect in the event of a disaster. RD 800's physical assets, valued at over $100 million, consist of the buildings and infrastructure to support the RD 800 operations.

Table K-4 RD 800's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
RD 800 levees	Levee		In excess of $100,000,000	Flood

Source: RD 800

Natural Resources

The Planning Team for the District noted no natural resources.

Historic and Cultural Resources

The Planning Team for the District noted no historic or cultural resources.

Growth and Development Trends

Growth and development within RD 800 has remained relatively unchanged since 2011. The District is composed of rural farmland with few economic drivers.

Development since the 2011 Plan

The RD has not seen an increase in their service area population since the 2011 plan. There is currently a project in the planning/permitting phase that will fix a large erosion area adjacent to Rooney Dam the Cosumnes River.

K.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table K-3 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 800 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable structures are those located within the floodplain or within levee and dam inundation areas, such as older facilities that may be constructed with unreinforced masonry and buildings built prior to the introduction of modern building codes. Buildings that contain electronic or electrically operated equipment are also vulnerable to flood inundation.

In general, the most vulnerable District assets include the levees and supporting structures that the District owns.

An estimate of the vulnerability of the RD 800 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.

- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Flooding would occur as a result of levee failure or overtopping.

Past Occurrences

The District Planning Team noted that multiple levee failures occurred on the Cosumnes in 1997 which led to flooding.

Vulnerability to Flood

Assets at Risk

Flooding would occur as a result of levee failure or overtopping. Levee failure from either breaching or overtopping would result in the total loss of levee embankment material, as was the case in the 1997 flood event. Levee embankment failure within the current District boundary from the 1997 event resulted in multiple levee failure sites along the Cosumnes River. The resulting damage to agricultural lands was extensive, with the most damage occurring immediately adjacent to the levee breach causing severe erosion to agricultural lands, deposition of sands and debris and the complete destruction of adjacent vineyards and irrigation systems.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards. The District Planning Team did note, that future development is unlikely.

Levee Failure

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the District from several sources including levee failure. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters

Past Occurrences

The Planning Team for the District noted multiple levee failures in 1997 which led to flooding.

Vulnerability to Levee Failure

Assets at Risk

Potential for severe damage to the Wilton Road crossing over the Cosumnes River would require detouring of extensive daily high volume traffic of Wilton Road. Closure of the road would severely delay public safety agency emergency response. Truck and vehicular traffic impacts would have severe economic impacts to the local economy.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards. The District Planning Team did note, that future development is unlikely.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

Past Occurrences

The District Planning Team noted that bank erosion is an ongoing problem, but noted no major past occurrences.

Vulnerability to Erosion

Assets at Risk

The waterside levee slope of the Cosumnes River is heavily vegetated and considered to be high value habitat with an abundance of endangered species. Consequently, the vulnerability to stream bank erosion is high, the cost to mitigate for habitat loss prevents the District from repairing existing eroded areas.

Future Development

While future development may occur in the areas protected by levees that may be affected by erosion, the District does not control this development. The District only can control whether the levees meet certification standards. The District Planning Team did note, that future development is unlikely.

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the District. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

The District Planning team noted that 1997 storms caused high flows in the Consumnes which cause levee failures and flooding.

Vulnerability to Heavy Rain and Storms

Assets at Risk

Heavy rain and thunderstorms are the most frequent type of severe weather occurrence in the area. Wind and lightning often accompany these storms and have caused damage in the past. Problems associated with the primary effects of severe weather include flooding, pavement deterioration, washouts, high water crossings, landslide/mudslides, debris flows, and downed trees. However, it is the secondary effects of heavy rain and storms that are of concern to RD 800. Heavy rains can cause flooding, levee failure, and stream bank erosion. Flooding, levee failure, and stream bank erosion can cost RD 800 millions in damages.

Future Development

While future development may occur in the areas protected by levee, the District does not control this development. The District only can control whether the levees meet certification standards and can withstand heavy rains and storms. The District Planning Team did note, that future development is unlikely.

K.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

K.6.1. Regulatory Mitigation Capabilities

Table K-5 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 800.

Table K-5 RD 800's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	N	
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y	5-Year Plan California DWR Emergency Safety Plan
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	N	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Encroachment permit regulations
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	Y	Erosion control measures on levee and canal slopes as necessary
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 800

K.6.2. Administrative/Technical Mitigation Capabilities

Table K-6 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 800.

Table K-6 RD 800's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	
Mutual aid agreements	N	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	
Civil Engineer	Y	
GIS Coordinator	N	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 800

K.6.3. Fiscal Mitigation Capabilities

Table K-7 identifies financial tools or resources that the RD 800 could potentially use to help fund mitigation activities.

Table K-7 RD 800's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	N	
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	N	
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds	N	
Incur debt through private activities	N	
Community Development Block Grant	Y	
Other federal funding programs		
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 800

K.6.4. Mitigation Education, Outreach, and Partnerships

Table K-8 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table K-8 RD 800's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Other		
How can these capabilities be expanded and improved to reduce risk?		

K.6.5. Other Mitigation Efforts

Levee maintenance practices designed to protect District levee system includes annual vegetation management and rodent control. Due to environmental protection limitations, District disaster reduction practices are limited.

K.7 Mitigation Strategy

K.7.1. Mitigation Goals and Objectives

RD 800 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

K.7.2. Mitigation Actions

The planning team for RD 800 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Erosion Repair

Hazards Addressed: Bank Erosion / Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Because RD 800 is outside of the legal Delta, it does not qualify for many State programs designed to fund the maintenance and repair District levees. Thus, there are many erosion sites on RD 800 that lack funds for repair.

Other Alternatives: None

Existing Planning Mechanisms through which Action will be Implemented: The District will rely on its Engineer to locate erosion sites and prioritize them by severity. Available funds will be used to repair the most severe erosion areas first. Depending on the size of the erosion site, regulatory permits may be

required by agencies such as the California Department of Fish and Wildlife and the U.S. Army Corps of Engineers.

Responsible Office: RD 800, RD Engineer

Priority (H, M, L): H

Cost Estimate: $1,000,000

Potential Funding: None

Benefits (avoided Losses): Homes, Agricultural Crops

Schedule: Ongoing

Action 2. Emergency Supplies

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Due to lack of funds, the District has minimal flood fight supplies on-hand. The California Department of Water Resources recommends the following items for flood fighting per 5 to 6 miles of levee:

- visquine plastic 10 rolls (@100'x20'x10mil)
- sandbags 5,000
- twine @ 200 lb. Test 8 boxes
- wooden stakes 200
- tie buttons 1,000

Tools needed:

- Lineman pliers 8 each
- sledge hammers 8 each
- shovels 10 each
- life jackets All personnel

In addition to flood fight supplies, the District also needs flood fight materials such as 18"-minus rock stockpiles to help prevent levee breaches and aggregate base rock to repair levee roads as they are damaged during a flood fight.

Other Alternatives: None

Existing Planning Mechanisms through which Action will be Implemented: Board of Trustees would purchase and stockpile supplies in strategic locations throughout the District.

Responsible Office: RD 800, RD Engineer

Priority (H, M, L): H

Cost Estimate: $500,000

Potential Funding: None

Benefits (avoided Losses): Homes, Agricultural Crops

Schedule: Ongoing

Annex L Reclamation District 1000

L.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Reclamation District 1000 (RD 1000), a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the RD 1000. This Annex provides additional information specific to RD 1000, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

L.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), RD 1000 formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table L-1. Additional details on plan participation and RD 1000 representatives are included in Appendix A.

Table L-1 RD 1000 Planning Team

Name	Position/Title	How Participated
Board of Trustees		Approved Emergency Action Plan and LHMP
Paul Devereux	General Manager/District Engineer	Participated in LHMP update process; drafted District's information included in LHMP; edited District Emergency Action Plan; participated in regional flood emergency exercise
AECOM	Consultant	Drafted District Emergency Action Plan (EAP)
Don Caldwell	Superintendent	Reviewed District EAP; participated in regional flood emergency exercise
Terrie Figueroa	Admin Services Manager	Reviewed District EAP; participated in regional flood emergency exercise

Source: RD 1000

L.2.1. Coordination with Other District Planning Efforts

Coordination with other District planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the District integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, RD 1000 incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table L-2.

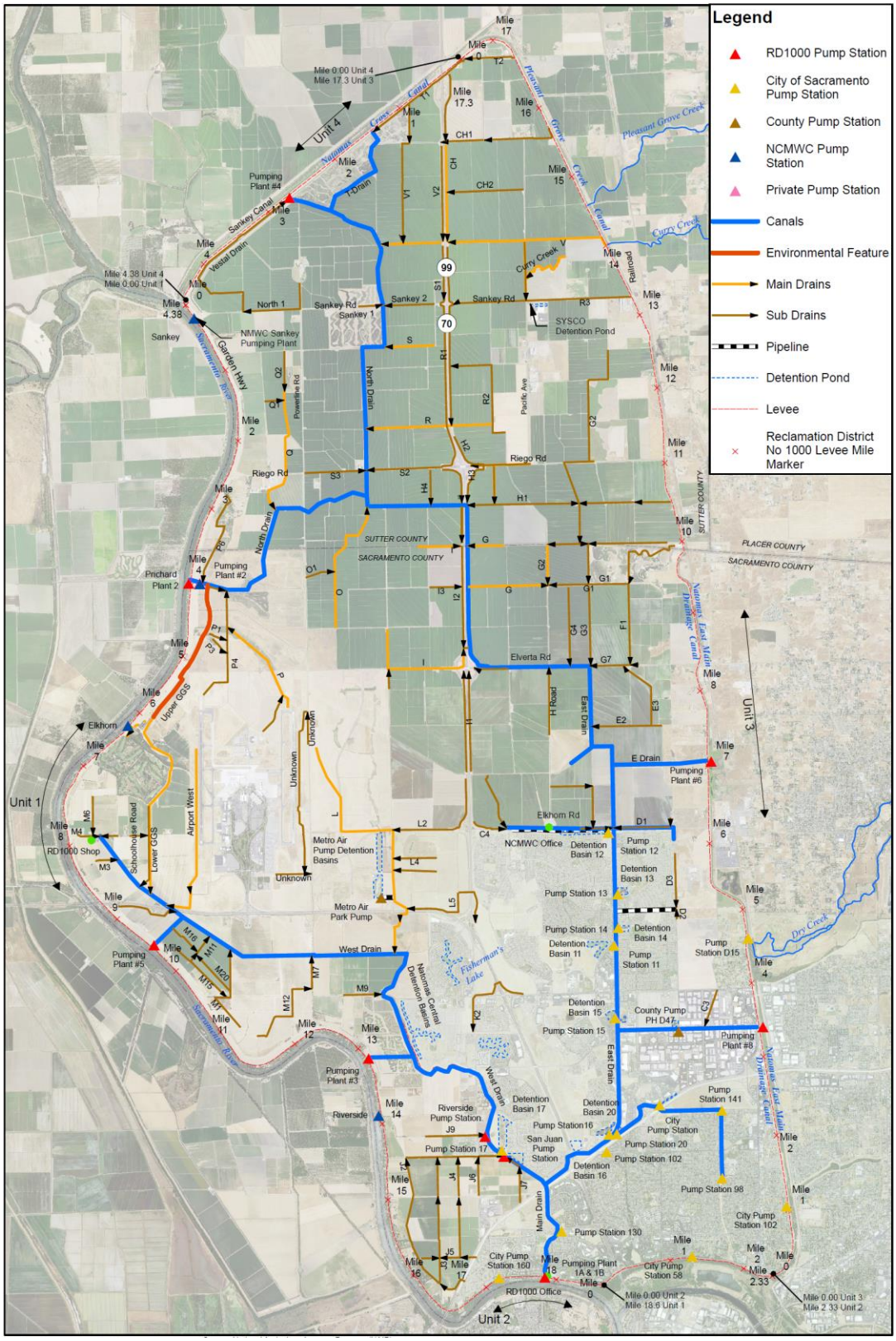
Table L-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
Emergency Action Plan	Identifies potential flood risks and District's plan to monitor and respond in an emergency including communications, pre-disaster deployment; flood fight materials storage; emergency response contracts all in compliance with NIMS and SEMS protocols
Capital Improvement Plan	Identifies improvements to District facilities to improve flood safety; assist with monitoring and responding in a flood emergency; and improve system reliability thereby reducing the overall flood risk
Security Risk Assessment	Identified critical District infrastructure and recommended measures to improve security and insure District can perform essential functions during an emergency
Strategic Plan	Identifies District mission to reduce flood risk; preparations for floods and emergency response; outreach to community including information during flood emergency; coordination with other regional agencies including City and County of Sacramento

L.3 Community Profile

The community profile for RD 1000 is detailed in the following sections. Figure L-1 displays a map and the location of RD 1000 boundaries within Sacramento County.

Figure L-1 Reclamation District 1000 Map



Source: RD 1000

L.3.1. RD 1000 Overview

Reclamation District No. 1000 has been providing flood protection and public safety to residents, businesses, schools, and agriculture since 1911. RD 1000 is a special district formed by the California State legislature. The District's job is to protect the lives and property in the Natomas basin from flooding. RD 1000 maintain 42 miles of levees surrounding Natomas, over 30 miles of large drainage canals and seven pump stations that collect and pump the storm water and agricultural runoff back into the adjacent river system. The District is governed by a seven-member Board of Trustees elected by the property owner's within the Natomas basin. The District operates under the direction of the District's General Manager who reports directly to the Board of Trustees. The District Superintendent supervises the daily activities of the field crew and reports to the General Manager.

L.3.2. District Overview, History and Background

Reclamation District No. 1000 was created by an act of the State Legislature on April 8, 1911 (Act). The purpose was to allow for the reclamation of what was then known as the American Basin for agricultural purposes. The American Basin historically flooded from the Sacramento and American Rivers overflowing their banks due to winter rains and runoff from the foothills giving it the rich fertile soil to support the agriculture which dominated the early years in Natomas. Much of the land was owned by the Natomas Company of California. The Act gave the District authority and responsibility for flood control and drainage in what has become the Natomas Basin.

Reclamation of Natomas began in 1913 with construction of the perimeter levee system which was completed in 1915. The original cost was approximately $2 million and was financed by the sale of bonds. Some of these original bonds are still in the possession of the District. Following completion of the levees, an interior drainage system consisting of canals, ditches and drains was constructed to collect both stormwater runoff from precipitation that falls within the leveed area as well as agricultural runoff from irrigated farm land. The original system conveyed all the runoff to a large pumping plant constructed in 1915 at the terminus of Second Bannon Slough (Plant 1A) at the south end of the District. This plant still exists and is used today. It is located directly across the Garden Highway from the District Office. A second pumping plant (Plant 2) was added at Pritchard Lake in 1920 along the Sacramento River north of Elverta Road, and a third plant (Plant 3) was added in 1939 also located on the Sacramento River just north of San Juan Road. Eventually four more pump plants were added at various locations in the District to accommodate more development and relieve pressure on the original plants.

The drainage system stayed in this configuration for a number of years. In the 1950's and 1960's urbanization of the Natomas Basin began, predominantly because of its close proximity to downtown Sacramento and the construction of the interstate highway system. The first area to develop was the Gardenland area in the southern extremity of the basin tucked up against the American River and Natomas East Main Drain Canal. In the 1960's Sacramento Metropolitan Airport was developed. A new pumping plant paid for by the County was constructed to handle the increased runoff from the newly constructed airport. Through the decades more development occurred starting with the South Natomas Community, Arco Arena, and the surrounding areas.

The levees around Natomas were designed to handle the historical "flood of record" which was the 1907 and 1909 floods on the Sacramento River. Another large flood event occurred in 1937 which the system safely passed with only minor problems. Again, in 1955 an even larger flood roared through the Central Valley around Christmas. The Natomas levees held with some minor sloughing along the Sacramento River near the Sacramento/Sutter County line. However, as a result of this flood, the Army Corps of Engineers raised the Natomas Cross Canal and Pleasant Grove Creek Canal levees as much as two to three feet in anticipation of future even larger flood events. In addition, by 1955 Folsom Dam was operational which provided additional flood storage capacity along the American River on the District's southern flank.

The system remained generally in the same condition as originally constructed until February 1986 when the flood of record occurred along the Sacramento and American Rivers fueled by a series of large Pacific storms carrying significant amounts of sub-tropical water. These storms coined as the "Pineapple Express" because of its origins near the Hawaiian Islands are now referred to as "atmospheric rivers". The flood on the Sacramento River caused significant seepage along the adjacent levee which nearly resulted in a catastrophic levee failure. Early flood emergency response by the District followed by a major flood fight by the Army Corps of Engineers prevented a levee failure. As a result of the near failure, the levees system surrounding Natomas was de-certified and any further development halted.

A system of repairs was initiated in the early 1990's on both the Sacramento River and Natomas East Main Drain Canal Work along the Sacrament was done by the Corps of Engineers (Sacramento Urban Project) while the work on the NEMDC was done by the Sacramento Area Flood Control Agency or SAFCA (North Area Local Project).

As a result of these projects, the levees were "certified" in 1997 and urban development began again with North Natomas in the City of Sacramento, bringing thousands of new residents, businesses and supporting infrastructure. Industrial and commercial development also expanded in the vicinity of the airport to support its growing needs. And the airport itself has undergone and continues to undergo significant expansion to support the growing passenger demands. In each case, the District worked with the appropriate land use agency to insure the impacts of the development and increased runoff are mitigated and do not overburden the existing drainage system. In most cases, large detention storage basins have been incorporated into new development to temporarily store the increased urban runoff and allow it to be bled back into our system at a rate similar to the pre-development condition. These detention basins are augmented by improvements to the existing pumping plants to assist in handling the increased urban runoff.

In January 1997, a flood similar in size and river levels struck the Sacramento area. The improved levee system passed the flood event with minimal issues supporting the levee infrastructure investment. However, a number of other levees in California failed during the flood event, and a deadly catastrophic flood in the New Orleans area raised questions about other potential levee safety issues—namely the potential for underseepage concerns. Following an analysis of the Natomas levees based on this new criteria, they were again de-certified in 2003 shutting down further urbanization

Efforts to address this newly defined levee risk and the potential for further urbanization of the Natomas basin are described later in this appendix.

L.4 Hazard Identification

RD 1000's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to RD 1000 (see Table L-3).

Table L-3 RD 1000—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards				
Bird Strike				
Climate Change				
Dam Failure	Extensive	Unlikely	Critical	Low
Drought and Water Shortage				
Earthquake				
Earthquake: Liquefaction	Limited	Unlikely	Limited	Low
Flood: 100/200/500-year	Extensive	Likely	Catastrophic	High
Flood: Localized Stormwater Flooding	Limited	Occasional	Limited	Medium
Landslides				
Levee Failure	Extensive	Occasional	Catastrophic	Medium
River/Stream/Creek Bank Erosion	Significant	Likely	Critical	High
Severe Weather: Extreme Temperatures – Cold/Freeze				
Severe Weather: Extreme Temperatures – Heat				
Severe Weather: Fog				
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Limited	Likely	Critical	Low
Severe Weather: Wind and Tornadoes				
Subsidence				
Volcano				
Wildfire:(Burn Area/Smoke)				

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

L.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile RD 1000's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to RD 1000 is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

L.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section L.5.3, includes a description as to how the hazard affects the RD 1000 and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

L.5.2. Vulnerability Assessment

This section identifies RD 1000's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table L-4 lists particular critical facilities and other District assets identified by the RD 1000's planning team as important to protect in the event of a disaster. RD 1000's physical assets, valued at over $2.1 billion, consist of the buildings and infrastructure to support the RD 1000 operations.

Table L-4 RD 1000's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
RD 1000 Plant 1A and 1B	Essential		$25 million	Flood
RD 1000 Plant 2	Essential		$5 million	Flood

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
RD 1000 Plant 3	Essential		$10 million	Flood
RD 1000 Plant 4	Essential		$7 million	Flood
RD 1000 Plant 5	Essential		$4 million	Flood
RD 1000 Plant 6	Essential		$7 million	Flood
RD 1000 Plant 8	Essential		$15 million	Flood
District Drains/Canals	Essential		$50 million*	Flood
RD 1000 Levee system	Essential		$2 billion**	Flood
Sacramento International Airport	Transportation		County	Flood
City of Sacramento River Pump Stations (3)	Essential		City	Flood
City of Sacramento Drainage Pump Stations	Essential		City	Flood
Schools (2 high schools, middle and elementary	High Potential		Natomas USD	Flood
Fire Stations	Essential		City	Flood
Senior Housing	High Potential		City	Flood
Interstate 5 and 80 Highway 99	Transportation		Caltrans	Flood
Day Care Centers	High Potential		City	Flood
Hazardous Material Sites	High Potential		City	Flood

Source: RD 1000

* the drains and canals would not have to be replaced but would need repairs after a flood event—estimate is for repairs if a flood occurred

** the levee system would not need to be replaced if a flood occurred but repaired. This is the cost to replace the system; the cost to repair the system following a flood about $200 million

Natural Resources

Within the District, the Natomas Basin Conservancy operates and maintains a number of wildlife preserve areas under the Natomas Basin Habitat Conservation Plan. The purpose of the preserves are to provide habitat for endangered and other species to mitigate for the impact of development within the Sutter County and City of Sacramento jurisdiction of the Natomas Basin.

Historic and Cultural Resources

There are a number of undisclosed Native American culturally sensitive sites which are generally buried below the ground and therefore would not be impacted by a flood event.

Growth and Development Trends

As described above, urban development was halted in the District when the levees were decertified in 2003. A comprehensive project for the District's perimeter levee system was studied and developed by SAFCA,

State of California and the Army Corps of Engineers. Work is required on the entire 42-miles of perimeter levees protection the District. As planned, the levee improvements would provide 200-year flood protection to the Natomas Basin, consistent with the newly adopted State flood control standards for urban areas (Urban Level of Protection or ULOP Criteria).

Work was initiated by SAFCA and the State of California in 2006 to mitigate the flood risk. With the construction that was completed (approximately 50% of the levee improvements) and the Federal authorization of the Natomas Levee Project in 2014, the area was remapped into an A99 FEMA flood plain designation recognizing the progress made towards eventually removing Natomas from a FEMA designated Special Flood Hazard Area. Under the A99 floodplain designation, development is again allowed within the District. However, given the continued flood risk, the local land use agencies are limiting the amount of urban development until the work is complete and the levees are re-certified.

With the lifting of the building moratorium, a number of projects are initiating the entitlement process and new development is expected in the District in the City of Sacramento, County of Sacramento and Sutter County over the next 30 years.

Development since the 2011 Plan

The RD has seen limited growth in their service area population since the 2011 plan due to the building moratorium as a result of the flood risk. The current population within the District is estimated at just over 100,000.

As noted above, a project to strengthen and improve the perimeter levee system to provide 200-year flood protection is underway. About 50% of the improvements were constructed by SAFCA between 2006 and 2013. The remaining improvements will be completed by the Corps of Engineers starting in 2017 and are scheduled to be completed by 2025.

Since 2011, the District completed the replacement of Pumping Plant No. 2. It was taken out during the 2006 flood event due to levee stability concerns at the site. A FEMA disaster assistance grant was used to fund the majority of the replacement project. The pump station is located in the basin and therefore subject to the flood risk identified.

L.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table L-3 as high or medium significance hazards. Impacts of past events and vulnerability of the RD 1000 to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable structures are those located within the floodplain or within levee and dam inundation areas, such as older facilities that may be constructed with unreinforced masonry and buildings built prior to the introduction of modern building codes. Buildings that contain electronic or electrically operated equipment are also vulnerable to flood inundation.

In general, the most vulnerable District assets include the levees and supporting structures that the District owns.

An estimate of the vulnerability of the RD 1000 to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Flood

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

As noted in this document, the current levee system does not meet the FEMA 100-year standard and therefore the District is vulnerable to a catastrophic flood from the potential failure of the perimeter levee system. The District Planning team noted that the likelihood of these floods is 1%, 0.5%, and 0.2% respectively in any given year; however, given current condition of levees, the risk of failure is what is high until they are recertified.

Past Occurrences

See descriptions of past flood events in Section L.3.2.

Vulnerability to Flood

Assets/Critical Facilities at Risk

The current population in Natomas is 100,000 based on the 2010 census and the Corps of Engineer's estimates total property damages (both public and private) would likely exceed $10 billion.

The District has seven pump stations in the interior basin used to pump the stormwater and agricultural runoff from the basin into the adjacent riverine system. A catastrophic levee failure could eventually damage all eight of the pump stations and require their reconstruction. Table L-4 shows the estimated

replacement cost for each of the pump stations. In addition, the District has a corporation yard and a main office in Natomas. The main office is located on top of the existing Sacramento River levee and would likely not be physically damaged by a catastrophic flood event though it would not be functional due to loss of utilities including power as a result of the flood. The corporation yard would be damaged due to a flood event and could result in a loss of the District's equipment fleet unless it can be relocated to high ground before flood waters affect the corporation yard. This would be dependent on the location of a levee breach in relation to the yard.

Natural Resources at Risk

RD 1000's drains, canals and ditches are considered natural resources in that they provide habitat for a number of species in the Natomas Basin. A large flood event would cause modest damage to these facilities requiring repairs and modifications such as sediment removal, access road and gate replacements.

Historic and Cultural Resources at Risk

The District Planning Team noted no cultural or historic resources that would be affected.

Future Development

As described above, urban development was halted in the District when the levees were decertified in 2003. A comprehensive project for the District's perimeter levee system was studied and developed by SAFCA, State of California and the Army Corps of Engineers. Work is required on the entire 42-miles of perimeter levees protection the District. As planned, the levee improvements would provide 200-year flood protection to the Natomas Basin, consistent with the newly adopted State flood control standards for urban areas (Urban Level of Protection or ULOP Criteria).

Work was initiated by SAFCA and the State of California in 2006 to mitigate the flood risk. With the construction that was completed (approximately 50% of the levee improvements) and the Federal authorization of the Natomas Levee Project in 2014, the area was remapped into an A99 FEMA floodplain designation recognizing the progress made towards eventually removing Natomas from a FEMA designated Special Flood Hazard Area. Under the A99 floodplain designation, development is again allowed within the District. However, given the continued flood risk, the local land use agencies are limiting the amount of urban development until the work is complete and the levees are re-certified.

With the lifting of the building moratorium, a number of projects are initiating the entitlement process and new development is expected in the District in the City of Sacramento, County of Sacramento and Sutter County over the next 30 years.

Flood: Localized Stormwater

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

The Natomas basin which is the jurisdiction of Reclamation District No. 1000, is a low-lying basin surrounded on all four sides by levees. The District operates and maintains miles of canals and drainage ditches which collect local rainfall from within the Natomas basin and transports the water to a system of seven pump stations for discharge into the adjacent river systems.

Past Occurrences

Over the history of the District, there have been a number of localized floods. However, prior to urban development, these floods impacted primarily agricultural properties during the non-growing season. Since urban development, there have been instances of localized flooding, the worst being in Feburary 1986, when spills through the "Sankey Gap" along the eastern perimeter levee system combined with interior runoff due to rainfall affected travel on Highway 99 as well as a number of interior roads. Had an evacuation been necessary, it would have been significantly impacted by the road closures.

The District does not have documents for other localized floods other than anecdotal information from landowners and Natomas residents.

Vulnerability to Localized Stormwater Flooding

Assets/Critical Facilities at Risk

The major interior canals in the urbanized area (City of Sacramento) in the southern quarter of the Natomas basin also have a levee system to contain the 100-year flood within the canals. If the pump stations are not operable due to power failure in the area, the canals are at risk of overflowing creating localized flooding. Flooding would be shallow (less than 3 feet), significantly less than from a failure of the perimeter levee; however, it would impact emergency response and evacuation routes should the perimeter levee system subsequently fail.

Natural Resources at Risk

RD 1000's drains, canals and ditches are considered natural resources in that they provide habitat for a number of species in the Natomas Basin. Stormwater flooding would cause modest damage to these facilities requiring repairs and modifications such as bank erosion and access road repairs.

Historic and Cultural Resources at Risk

The District Planning Team noted no cultural or historic resources that would be affected.

Future Development

Future development is not likely to be limited by localized flooding.

Levee Failure

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available.

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee, causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

A major overtopping of a levee, if flow persists, will result in severe erosion of the levee crowns on the landward side and cause levee failure over a period of minutes to several hours. A severe levee overtopping can, therefore, be considered as a levee break for the purpose of determining the extent of flooding that any area will suffer. Generally, overtopping can be predicted based on river stages and the warning given depending on the source of the flood waters

Past Occurrences

There have been no failures of District levees.

Vulnerability to Levee Failure

With the levee improvements that have been completed to date and the anticipated improvements described about to be completed by the Corps of Engineers over the next 10 year; the risk of a levee failure is significantly reduced and not likely to occur. However, if a larger storm event or an unforeseen levee stability issue results in a levee failure, there are a number of District facilities at risk as noted in the table above. These include the District pump stations, our Corporation Yard and potentially the District's main office depending on the location of a levee failure.

Natural Resources at Risk

RD 1000's drains, canals and ditches are considered natural resources in that they provide habitat for a number of species in the Natomas Basin. A large flood event would cause modest damage to these facilities requiring repairs and modifications such as sediment removal, access road and gate replacements.

Historic and Cultural Resources at Risk

The District Planning Team noted no cultural or historic resources that would be affected.

Future Development

As described above, urban development was halted in the District when the levees were decertified in 2003. A comprehensive project for the District's perimeter levee system was studied and developed by SAFCA, State of California and the Army Corps of Engineers. Work is required on the entire 42-miles of perimeter levees protection the District. As planned, the levee improvements would provide 200-year flood protection to the Natomas Basin, consistent with the newly adopted State flood control standards for urban areas (Urban Level of Protection or ULOP Criteria).

Work was initiated by SAFCA and the State of California in 2006 to mitigate the flood risk. With the construction that was completed (approximately 50% of the levee improvements) and the Federal authorization of the Natomas Levee Project in 2014, the area was remapped into an A99 FEMA floodplain designation recognizing the progress made towards eventually removing Natomas from a FEMA designated Special Flood Hazard Area. Under the A99 floodplain designation, development is again allowed within the District. However, given the continued flood risk, the local land use agencies are limiting the amount of urban development until the work is complete and the levees are re-certified.

With the lifting of the building moratorium, a number of projects are initiating the entitlement process and new development is expected in the District in the City of Sacramento, County of Sacramento and Sutter County over the next 30 years.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Stream bank erosion is a natural process, but acceleration of this natural process leads to a disproportionate sediment supply, stream channel instability, land loss, habitat loss and other adverse effects. As farmers settled the valleys in the 1800s, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment. However, the design of these narrow channels has been too successful. While

the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system and stream banks within the District.

The District Planning team noted that while erosion is likely to occur, it only is a threat if it impacts the stability of the adjacent levee causing a failure

Past Occurrences

RD 1000 conducted bank erosion studies in 1999 and 2004 to identify sites where erosion is of concern and could lead to levee erosion if not addressed. The District has continued to monitor these sites on a limited basis since 2004. In addition, the Army Corps of Engineers and California Department of Water Resources undertakes annual inspections of the Sacramento River to identify erosion sites that could impact the integrity of the adjacent levee system. Four sites both on the Corps list and the in the District's reports have now been repaired through contracts with the Corps of Engineers. These sites are along the Sacramento River adjacent to Natomas at River Miles 78.0, 77.2, 73.5 and 68.9.

During the winter of 2011, RD 1000 staff undertook emergency repairs at approximate RM 68.4 as high water during this past season eroded a significant portion of the bank and was threatening the adjacent levee. This site is just downstream of the work done by the Corps of Engineers at RM 68.9 and is part of an approximately 5800 foot reach of eroding bank site identified in the District's report that is being monitored.

In addition to this site, the District's studies in 1999 and 2004 have identified 6 additional small erosion sites which are being monitored and are being requested to be repaired through the Sacramento River Bank Protection Project though it currently has not been identified by the Corps for remedial work.

Vulnerability to Erosion

Assets/Critical Facilities at Risk

The entirety of the levee system in RD 1000 is at risk to erosion.

Natural Resources at Risk

The natural resources at risk would be the same as those identified above for a levee failure or flood. In addition, the eroding banks themselves are natural resources as they provide critical habitat for fisheries by providing Shaded Riverine Habitat and in-stream woody vegetation.

Historic and Cultural Resources at Risk

The District Planning Team noted no cultural or historic resources that would be affected.

Future Development

This hazard is not applicable to future development issues.

L.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

L.6.1. Regulatory Mitigation Capabilities

Table L-5 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the RD 1000.

Table L-5 RD 1000's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y	District adopted a 2015-2020 Strategic Plan
Capital Improvements Plan	Y	Yes
Economic Development Plan	N	
Local Emergency Operations Plan	Y	Yes
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	Y	Proposed projects which impact levees or drainage facilities require permits from District and include plan review and sign of

Land Use Planning and Ordinances	Y/N	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Title 23 California Water Code
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	Y	Erosion control measures on levee and canal slopes as necessary
Other	Y	District has adopted a Development Impact Fee
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 1000

L.6.2. Administrative/Technical Mitigation Capabilities

Table L-6 identifies the department(s) responsible for activities related to mitigation and loss prevention for RD 1000.

Table L-6 RD 1000's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	District's O&M activities directly reduce flood risks as described above including vegetation management; levee maintenance and monitoring during flood events
Mutual aid agreements	Y	District has mutual aid agreements with City and County of Sacramento
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y	RD 1000 District Manager
Community Planner	N	
Civil Engineer	Y	RD 1000 District Manager/Consultant

GIS Coordinator	Y	RD 1000 District Manager/Consultant
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	N	
Grant writing	N	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 1000

L.6.3. Fiscal Mitigation Capabilities

Table L-7 identifies financial tools or resources that the RD 1000 could potentially use to help fund mitigation activities.

Table L-7 RD 1000's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	District using Capital Reserves to fund projects
Authority to levy taxes for specific purposes	Y	For increase in assessments must comply with Proposition 218 which requires vote
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	District requires impact fee and mitigation for new development
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds	Y	District has authority but currently has no GO Bonds outstanding
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	Y	Emergency funding through Corps of Engineer's PL 84-99 authority; FEMA disaster assistance funding and grants for declared emergency events
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: RD 1000

L.6.4. Mitigation Education, Outreach, and Partnerships

Table L-8 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table L-8 RD 1000's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.		
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	District has community outreach program started five years ago. Reach out to a variety of community and neighborhood groups annually. Also, District has a Facebook page and Twitter account that we use to provide information to the public both generally and during an emergency.
Natural disaster or safety related school programs		
StormReady certification		
Firewise Communities certification		
Public-private partnership initiatives addressing disaster-related issues		
Other		
How can these capabilities be expanded and improved to reduce risk?		

L.6.5. Other Mitigation Efforts

Efforts are currently underway to address both these potential risks with the goal of providing Natomas at least 200 year level of flood protection (a 0.5% risk of flooding in any given year) and looking for opportunities to improve the system even beyond this level; particularly as urbanization of the basin continues.

As described previously, perimeter levee improvements (Natomas Levee Improvement Project) have been completed by the Sacramento Area Flood Control Agency (SAFCA) with local assessment funds and State Bond funds for approximately half of the system. The remaining levee improvements are to be completed by the Corps of Engineers as federal funds are appropriated

RD 1000 has worked with other partners in the Natomas Basin including the Sacramento Area Flood Control Agency, Natomas Central Mutual Water Company, Natomas Basin Conservancy, Sacramento

County Airports and the City of Sacramento on projects of mutual benefit that address public safety and the District's flood control mission.

L.7 Mitigation Strategy

L.7.1. Mitigation Goals and Objectives

RD 1000 adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

L.7.2. Mitigation Actions

The planning team for RD 1000 identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. River Berm and Levee Erosion

Hazards Addressed: Levee failure and Levee overtopping and loss of riverine habitat

Goals Addressed: 1, 2, 3, 4

Issue/Background: The District's perimeter levee system is susceptible to active erosion due to high velocity flows and fluctuating water levels in the river system. The erosion on the river banks, if not mitigated, will eventually reach the levee section undermining the foundation leading to levee slope failure and levee overtopping. The Corps of Engineers and State DWR conduct annual inspection to identify critical erosion locations.

Project Description: When erosion reaches a critical stage jeopardizing the adjacent levee, a bank erosion project is constructed. Work includes place a rock toe and bottom of the eroding slope with an earthen planting berm placed on top which includes environmental mitigation features.

Other Alternatives: Armor levee slopes. More expensive and results in loss of critical habitat.

Existing Planning Mechanism(s) through which Action Will Be Implemented: RD 1000 Capital Improvement Plan and Sacramento River Bank Protection federally authorized project and California state funds as appropriated

Responsible Office/Partners: RD 1000, California Dept of Water Resources and Corps of Engineers for river bank erosion

Project Priority: Medium

Cost Estimate: $10 to $50 Million for river erosion over time

Benefits (Losses Avoided): Loss of property and life due to catastrophic levee failure due to river bank erosion

Potential Funding: RD 1000, California DWR and Corps of Engineers for river bank erosion

Timeline: Projects are implemented when erosion reaches critical stage

Action 2. Erosion Protection Canal Banks

Hazards Addressed: Erosion, Levee failure, Localized flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Both the District's perimeter levee system and interior drainage canals are susceptible to active erosion due to water flows in the rivers and fluctuating water levels in the interior canals. The erosion on the river banks, if not mitigated, will eventually reach the levee section undermining the foundation leading to slope failure and levee overtopping. Along the drain canals, fluctuating water levels cause the side slopes to slough which eventually reaches the tops of the canal banks and causes loss of the access roads and adjacent ground.

Project Description: The canal slopes are stabilized by placing a layer of rock slope protection at the waterline and re-grading the canal slope. above

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: District's Capital Improvement Plan and on-going maintenance

Responsible Office/Partners: RD 1000 for canals;

Project Priority: High

Cost Estimate: $10 Million for interior canals;

Benefits (Losses Avoided): Loss of property and canal repair/replacement costs for canal bank erosion

Potential Funding: RD 1000 for canal bank erosion;

Timeline: Canal bank erosion protection is done annually

Action 3. Implement Security Measures at Key Facilities

Hazards Addressed: Localized flooding, levee failure, levee overtopping

Goals Addressed: 1, 2, 3, 4

Issue/Background: The District had a security risk assessment conducted by an outside contractor who recommended specific measures be implemented to reduce the risk at key District facilities

Project Description: Security measures include improved perimeter fencing to reduce vandalism and theft; security monitoring using cameras, physical patrols and other security measures. The key facilities identified include the District office and Corporation Yard as well as the pump stations

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: District's Capital Improvement Program

Responsible Office/Partners: RD 1000

Project Priority: High

Cost Estimate: $1.5 Million

Benefits (Losses Avoided): Reduce risk of power loss due to vandalism and theft which would avoid localized flooding; insure District materials and equipment are available for flood emergency response to reduce risk of levee failure/overtopping

Potential Funding: RD 1000 and state-wide grants

Timeline: Current. Projects on-going on an annual basis

Action 4. 2014 Capital Improvement Plan

Hazards Addressed: Localized flooding, levee failure, levee overtopping, erosion

Goals Addressed: 1, 2, 3, 4

Issue/Background: District identified a number of capital project needs—some of which are included in this plan under separate Mitigation Action Worksheets

Project Description: See attached

Other Alternatives:

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: RD 1000

Project Priority: Varies by project

Cost Estimate: Estimate $1.0 to $3.0 million annually to implement over next 20 years

Benefits (Losses Avoided): Avoid potential loss of life, property damage

Potential Funding: RD 1000, SAFCA, USACE, State of California

Timeline: Portions of CIP currently being implemented

Action 5. Implement Supervisory Control and Acquisition Data system (SCADA) on District canals and pump stations

Hazards Addressed: Localized flooding

Goals Addressed: 1, 2, 3

Issue/Background: District cannot remotely monitor levels in canals and pump stations—only physical monitoring available

Project Description: SCADA system allows for remote monitoring of canals and pump stations and operations.

Other Alternatives: Physical monitoring and operations

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: Natomas Central Mutual Water Company

Project Priority: High

Cost Estimate: $1.5 million

Benefits (Losses Avoided): Flood losses due to localized flooding

Potential Funding: District funds and Bureau of Reclamation District grant

Timeline: Initiate in 2016

Action 6. Public Outreach and Education

Hazards Addressed: Flood risk including localized flooding, levee failure and levee overtopping

Goals Addressed: 1, 2, 3, 4

Issue/Background: Providing education and information to the public allows for them to prepare for and respond during a flood emergency including evacuation procedures, personal and family preparation.

Project Description: District will outreach to community based organizations providing information about the District and our critical role in provide flood protection. Also improve our website and social media presence to provide information to the public during flood on status of canal, river levels and levee conditions.

Other Alternatives: Respond to phone calls during emergency

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: RD 1000; City of Sacramento; County of Sacramento; Sutter County

Project Priority: High

Cost Estimate: $50,000 to $100,000 annually

Benefits (Losses Avoided): Assist with potential emergency evacuation and personnel property protection during flood emergency—prevent potential loss of life and loss of property

Potential Funding: RD 1000

Timeline: Currently implemented

Action 7. Stockpile and pre-stage flood emergency response materials

Hazards Addressed: Levee failure, levee overtopping

Goals Addressed: 1, 2, 3

Issue/Background: District needs to have readily available flood fight materials such as sand bags, rock, AB and fill material in close proximity to potential levee failure areas to stabilize levee and avoid failure.

Project Description: Purchase properties at strategic locations in District to stockpile flood fight materials. Purchase and store materials at the sites for deployment during flood emergency

Other Alternatives: Stockpile at remote locations or purchase as necessary—delay in response which could result in levee failure

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: RD 1000

Project Priority: High

Cost Estimate: $2.5 million

Benefits (Losses Avoided): Catastrophic levee failure, loss of life and significant property loss

Potential Funding: RD 1000

Timeline: Immediate

Action 8. Emergency response improvements including radios for communications

Hazards Addressed: Levee failure, levee overtopping, localized flooding

Goals Addressed: 1, 2, 3

Issue/Background: Current operations rely on cell phone communications. During flood emergency, cell phone communication not reliable. Also District needs additional flood fight equipment such as portable lights, trailers, flatbed trucks, ect.

Project Description: Purchase radios to allow communication between District personnel during emergency and with outside emergency operational area coordinators including law enforcement, fire and Sacrament County OES. Also purchase additional flood fight equipment such as portable lights, trailers and flatbed trucks for emergency response

Other Alternatives: Cell phone

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: RD 1000; Sacramento County OES

Project Priority: Very High

Cost Estimate: $100,000 for radios; $300,000 for equipment

Benefits (Losses Avoided): Coordinated emergency response can prevent levee failure or overtopping avoiding catastrophic flooding, loss of life and significant property damage

Potential Funding: RD 1000, Sac County OES

Timeline: Prior to 2016 flood season

Action 9. Emergency Back-up Generator for pump stations

Hazards Addressed: Localized flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Only one District pump station has an emergency backup generator for power failure situations. Need to have additional generators at existing pump stations or portable generators that could be deployed to stations if power is lost. Without pumping capacity, canals will overtop and flood adjacent property and flood potential evacuation routes in case of imminent levee overtopping or failure

Project Description: Construct permanent back up diesel or gas powered generators at current pump plants or provide for two or more portable generators for deployment during power outage

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented:

Responsible Office/Partners: RD 1000

Project Priority: High

Cost Estimate: $3.0 million

Benefits (Losses Avoided): Localized flood damages to properties due to water overtoping canals. Disruption to evacuation and/or emergency response due to flooded access routes

Potential Funding: RD 1000

Timeline: Purchase as funds available--2018

Annex M Sacramento Regional County Sanitation District

M.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Sacramento Regional County Sanitation District (Regional San/District), a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the base plan document. As such, all sections of the base plan, including the planning process and other procedural requirements apply to and were met by the Regional San. This Annex provides additional information specific to Regional San, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

M.2 Planning Process

As described above, the Regional San followed the planning process detailed in Section 3 of the base plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), Regional San formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table M-1. Additional details on plan participation and Regional San representatives are included in Appendix A.

Table M-1 Regional San Planning Team

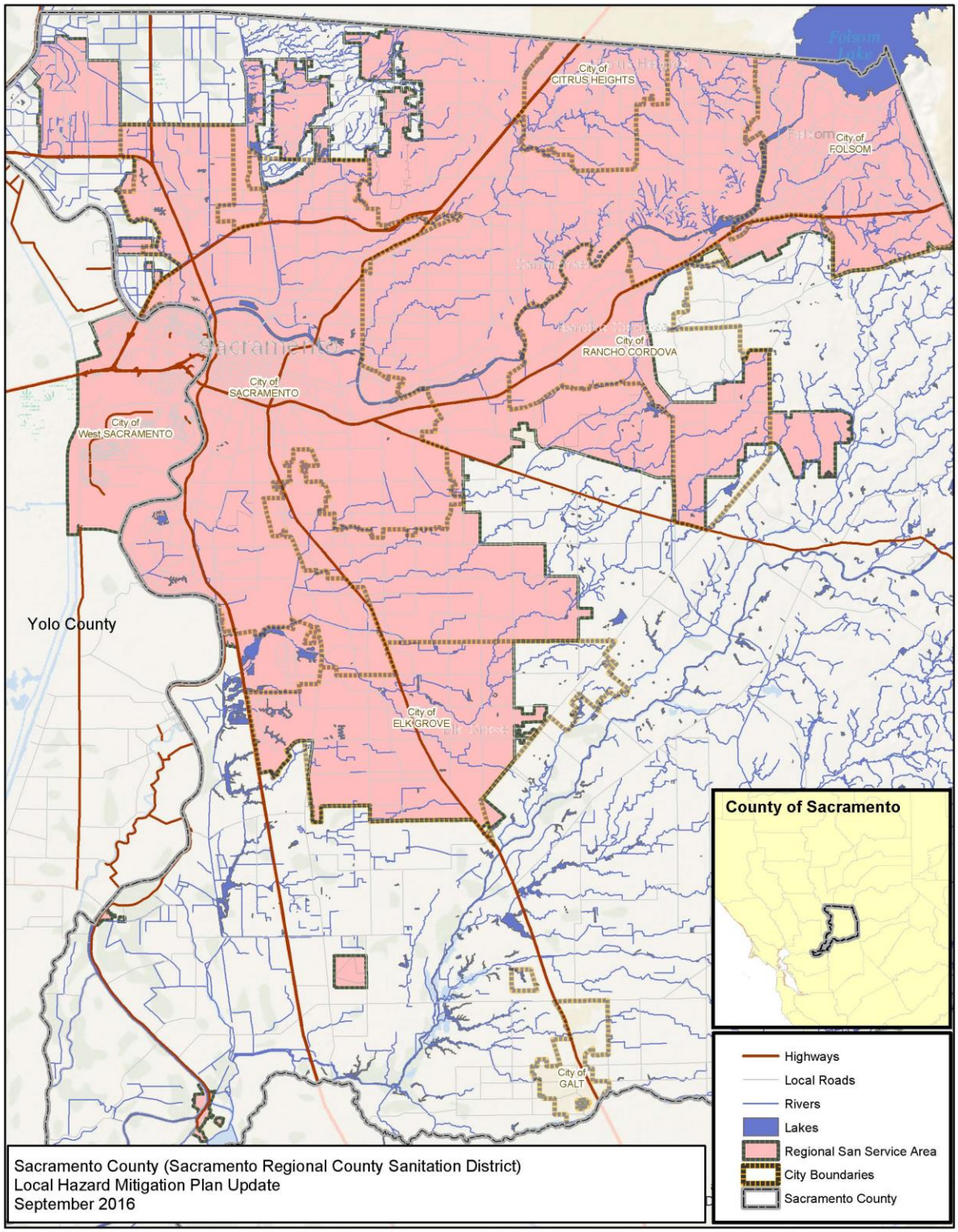
Name	Position/Title	How Participated
Steve Nebozuk	Civil Engineer	HMPC: collect data, draft text, review documents, attended meetings
Mike Donahue	Civil Engineer	Regional San Perimeter Levee: collect data, draft text, review document
Claudia Goss	Public Affairs Manager	Reviewer: review documents
Dave Ocenosak	Policy and Planning Section Manager	Reviewer: review documents
Raul Rodriguez	GIS Analyst	Identify Assets/Figures: collect data, prepare GIS figures
Bryan Young	Natural Resource Supervisor	Natural Resource Updates: draft text, review documents
William Yu	Civil Engineer	EchoWater Project: draft text, review documents

Source; Regional San

M.3 Community Profile

The community profile for the Regional San is detailed in the following sections. Figure M-1 displays a map and the location of Regional San boundaries within Sacramento County.

Figure M-1 Regional San Service Area



M.3.1. Regional San Overview, History and Background

The following is a brief history about the Sacramento Regional County Sanitation District.

Following World War II, the Sacramento region grew and wastewater treatment plants were built along the Sacramento and American Rivers to accommodate the population increase. In the early 1970s, 22 separate wastewater collection and treatment systems collected and treated the wastewater for the 600,000 residents of the Sacramento region. All of the plants discharged into local waterways, and many discharged into the American River.

In 1973, the County of Sacramento and the City of Sacramento joined forces and, together with the City of Folsom, formed the Sacramento Regional County Sanitation District. The Regional San assumed responsibility for wastewater treatment facilities, which were operated by the County's Water Quality Division. As a result, $460 million was invested in development of a regional wastewater collection and treatment program. A regional system of interceptor pipelines gathered sewage flow from various areas and conveyed the flow to the County Central Plant in Elk Grove.

In 1976, with one of the largest single grants in the nation under the Federal Water Pollution Control Act Amendments of 1972, commonly known as the Clean Water Act, the District upgraded the County Central Plant and entered into construction contracts to build the Sacramento Regional Wastewater Treatment Plant (SRWTP), the City Interceptor and the Emergency Storage Basins. Construction of the SRWTP was completed in 1982 and the facility began treating 136 million gallons per day. The SRWTP was designed to be a pure oxygen activated sludge treatment plant that provided secondary treatment and disinfection.

Regional San provides wastewater service to the cities of Sacramento, Citrus Heights, Folsom, Ranch Cordova and Elk Grove, and the unincorporated area of Sacramento County. In 2007, the City of West Sacramento, in Yolo County, connected to the Regional San system. In 2010 the Delta communities of Courtland and Walnut Grove were connected to the Regional San system.

December 9, 2010, the Central Valley Regional Water Quality Control Board adopted a new NPDES permit for the SRWTP. This permit mandates strict new standards for the SRWTP requiring nutrient removal and filtration. Regional San has initiated the EchoWater Project. Per the terms of the permit, the EchoWater Project has to be constructed and operational beginning in 2021 for nutrient removal and by 2023 for filtration. The estimated cost for the EchoWater Project is $1.7 billion. The cost of the new critical capital infrastructure will be updated in the 2021 LHMP Annex.

Today, as the only regional provider of sewer collection and treatment services for the greater Sacramento area, Regional San continues to maintain its status as a leader in environmental stewardship through quality service and efficient projects and programs.

M.3.2. Geography and Climate

The geography and climate for the Sacramento Regional County Sanitation District is identical to that of Sacramento County and Yolo County. Please refer to Section 1.3.2 Geography and Climate in the base plan document.

M.3.3. Economy

Regional San grows at the same rate as the communities that it serves.

M.3.4. Population

In 2016, the total population served by the Sacramento Regional County Sanitation District was estimated at 1.4 million. Regional San provides sewer service to the cities of Citrus Heights, Elk Grove, Folsom, Rancho Cordova, Sacramento, West Sacramento, the unincorporated areas of Sacramento County and portions of Yolo County.

M.4 Hazard Identification

Regional San's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to Regional San (see Table M-2).

Table M-2 Regional San—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Likely	Critical	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Significant	Likely	Limited	Low
Dam Failure	Significant	Unlikely	Catastrophic	Medium
Drought and Water Shortage	Extensive	Likely	Limited	Low
Earthquake	Limited	Occasional	Critical	Low
Earthquake: Liquefaction	Limited	Unlikely	Critical	Low
Flood: 100/200/500-year	Significant	Occasional	Critical	High
Flood: Localized Stormwater Flooding	Limited	Highly Likely	Limited	Low
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Significant	Likely	Critical	High
River/Stream/Creek Bank Erosion	Limited	Highly Likely	Limited	Low
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Negligible	Low
Severe Weather: Fog	Extensive	Highly Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Critical	Low
Severe Weather: Wind and Tornadoes	Limited	Likely	Limited	Low
Subsidence	Significant	Highly Likely	Limited	Low
Volcano	Limited	Unlikely	Limited	Low
Wildfire:(Burn Area/Smoke)	Limited	Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

M.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Regional San's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to the District is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

M.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section M.5.3, includes a description as to how the hazard affects the Regional San and information on past occurrences. The intent of these sections is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

M.5.2. Vulnerability Assessment

This section identifies Regional San's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the Department's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table M-3 lists particular critical facilities and other District assets identified by the Regional San's planning team as important to protect in the event of a disaster. Regional San's physical assets, valued at over $3.4 billion, consist of the buildings and infrastructure to support the Regional San operations.

Table M-3 Regional San's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Underground Pipeline, Structures, Equipment and Appurtenances(2)	Essential	215 miles of pipelines, force mains (1), pipe structures & appurtenances (2)	$1,826,040,275	Dam failure, Levee failure, Flood
S94 – Regional Wastewater Treatment Plant	Essential		$925,517,080	Dam failure, Levee failure, Flood
SRWTP Perimeter Levee	Essential		$9,407,241	Dam failure, Levee failure, Flood
SRWTP Outfall Facility	Essential		$13,756,812	Dam failure, Levee failure, Flood
N50 – South River Pump Stn	Essential		$103,501,785	Dam failure, Levee failure, Flood
N51 – New Natomas Pump Stn	Essential		$89,631,950	Dam failure, Levee failure, Flood
N40 – Iron Point Pump Stn	Essential		$13,011,990	Dam failure, Levee failure, Flood
N52 – Power Inn Pump Stn	Essential		$7,886,866	Dam failure, Levee failure, Flood
N19 – Arden Pump Stn	Essential		$35,877,916	Dam failure, Levee failure, Flood
N53 – Van Maren Pump Stn	Essential		$21,828,647	Dam failure, Levee failure, Flood
N27 – Sump 55 Facility	Essential		$15,206,272	Dam failure, Levee failure, Flood
N28 – Sump 119 Facility	Essential		$14,612,029	Dam failure, Levee failure, Flood
N29 – Sump 2/2A Facility	Essential		$8,304,103	Dam failure, Levee failure, Flood
N35 – Sump 76 Facility	Essential		$3,308,012	Dam failure, Levee failure, Flood
N43 – Roseville/Watt Liquid Waste Disposal Facility	High Potential Loss		$3,575,531	Dam failure, Levee failure, Flood
S30 – Old Natomas Pump Stn	High Potential Loss		$4,006,130	Dam failure, Levee failure, Flood
S33 – Cordova Pump Stn	Essential		$15,340,337	Dam failure, Levee failure, Flood
S55 – Northeast Pump Stn	Essential		$1,80929551	Dam failure, Levee failure, Flood
N15, N16 – Northeast Siphon	Essential		$8,516,570	Dam failure, Levee failure, Flood
Bufferlands and Environmental Mitigation Lands	Natural Resource		$10,028,251	Fire, Dam failure, Levee failure, Flood

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Sims Ranch	Historic Resource		(3)	Fire, Dam failure, Levee failure, Flood
Nicolaus Dairy	Historic Resource		(3)	Fire, Dam failure, Levee failure, Flood
Regional San Archeological Site CA-SAC-83	Cultural Resource		(3)	Fire, Dam failure, Levee failure, Flood
Real Property, Land and Easements	Essential		$58,399,339	
Buildings	Essential		$184,101,805	
TOTAL			**$3,372,951,493**	

Source: Regional San Finance, Engineering, and Policy and Planning Offices

(1) Asset value includes facility, site structures, site equipment, mobile equipment, miscellaneous items that may have soft cost components, some associated adjacent pipeline components. Values taken from Regional San 2010 Comprehensive Annual Financial Report, and engineering project reports. Values from the 2011 LHMP have been escalated 4% per year for inflation.

(2) Pipelines include gravity and force mains ranging in size from 36-inch to 120-inch. Structures and appurtenances include valves, vaults, junction structures, flow meters, and roller gates, etc.

(3) Costs for these sites have not been estimated.

An inventory of critical facilities in the Regional San is provided in Table M-4 and shown in Figure M-2.

Table M-4 Regional San Critical Facilities: Summary Table

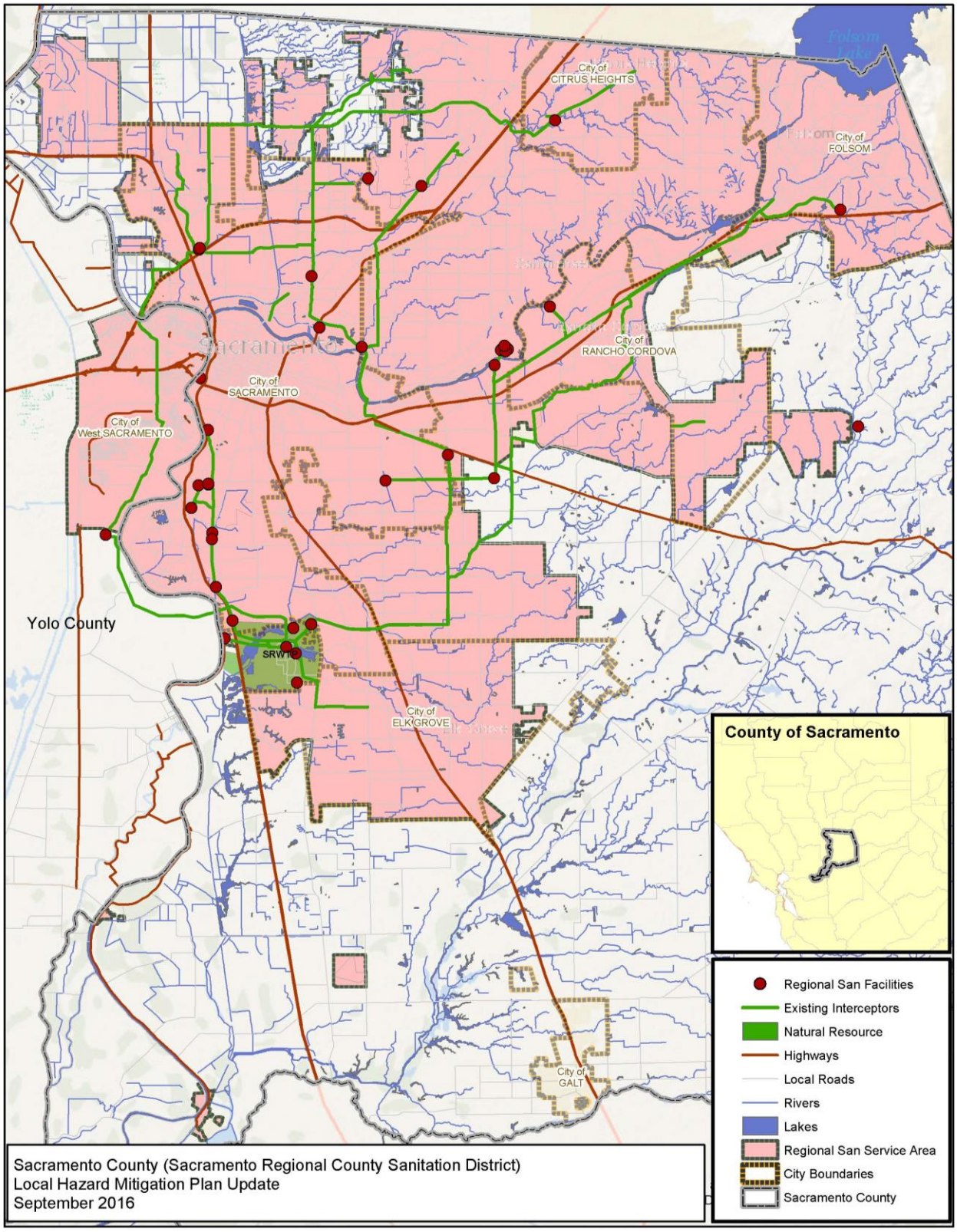
CF Definition Category	Type	Total by Location
Essential Services Facilities	Sewer Pipelines(1)	215 miles
Essential Services Facilities	Pipe Structures & Appurtenances(2)	27
Essential Services Facilities	Sewer Pump Stations	13
Essential Services Facilities	Siphon	1
Essential Services Facilities	Regional Wastewater Treatment Plant	1
Essential Services Facilities	SRWTP Perimeter Levee	1
Essential Services Facilities	SRWTP Outfall Facility	1

Source: Regional San

(1) Pipelines include gravity-flow pipes and force main pipes and range in size from 36-inch to 120-inch.

(2) Appurtenances include underground valves, vaults, junction structures, flow meters, and roller gates.

Figure M-2 Regional San Key Assets



Source: Regional San

Natural Resources

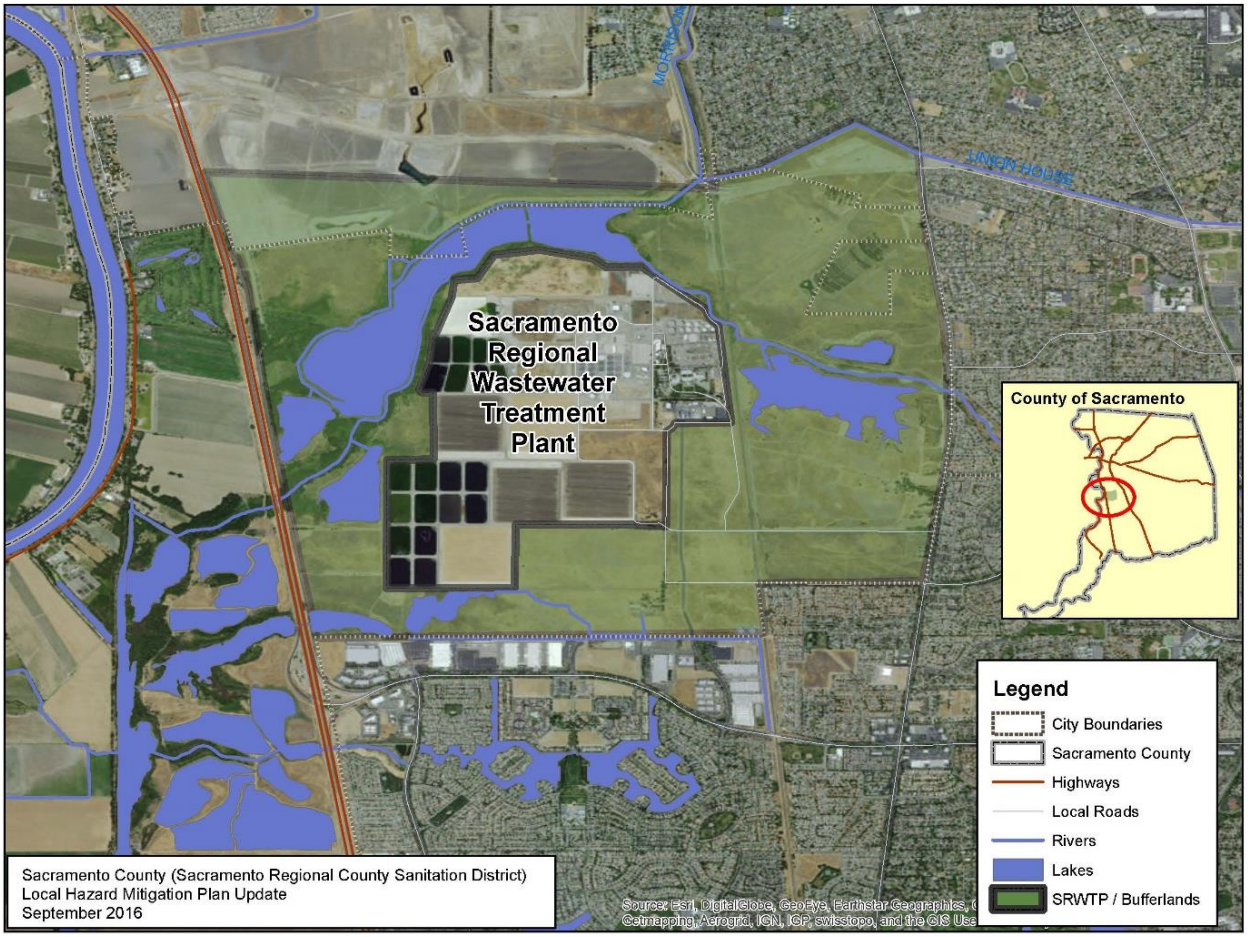
It is important for Regional San to operate its regional wastewater treatment facility in a manner so as to provide efficient and reliable service while minimizing impacts of the facility to the adjacent communities. In the 1970s, the District planned a large undeveloped buffer area between the Sacramento Regional Wastewater Treatment Plant and the surrounding residential neighborhoods in southern Sacramento County. That farsighted decision led to conservation of increasingly scarce wetlands, grasslands and riparian forest habitats on Regional San's 2,150 acres of Bufferlands.

The District has the following natural resources of value to the local communities;

Regional San Bufferlands: Surrounding the Sacramento Regional Wastewater Treatment Plant in Elk Grove is the Bufferlands. This 2,150-acre expanse, shown in Figure M-3, of open space minimizes the potential for odor and other nuisances that could impact the surrounding neighborhoods. The Bufferlands has been developed into an important natural area that provides a large contribution of high quality wildlife habitat, farmland and open space. It provides a varied mix of upland and wetland habitats and important wildlife area, supporting over 235 species of birds, 25 species of mammals and several dozen native fish, amphibians and reptiles. The Bufferlands is also home to more than 20 species of rare plants (Table M-5) and animals (Table M-6) including several threatened and endangered species such as Swainson's hawks, vernal pool fairy shrimp and giant garter snakes.

Through grant funding and mitigation efforts, Regional San has restored or created approximately 250 acres of managed seasonal wetlands, 100 acres of open water and emergent marsh, 350 acres of native grasslands, and the establishment of over 30,000 trees in restored riparian forests and oak woodlands covering nearly 200 acres. These restoration efforts augment the upland, wetland, and forest habitat that previously existed on the Bufferlands, including Laguna, Unionhouse, and Morrison Creeks, four small lakes, nearly 25 acres of vernal pools, approximately 50 acres of mature riparian forest, and hundreds of acres of annual grassland. Approximately 700 acres of the Bufferlands is leased for agricultural production. Row crop, hay crop, and rangeland leases are all managed to be compatible with conservation efforts occurring throughout the Bufferlands.

Figure M-3 Regional San Bufferlands



Source: Regional San

Table M-5 Special Status Plant Species that Occur or that May Occur on the Bufferlands

Species	Status*Federal/ State/CNPS	Habitats	Flowering Period
Dwarf downingia *Downingia pusilla*	X/X/2	Vernal pools and vernally wet areas in annual grasslands	March–May
Stinkbells *Fritillaria agrestis*	X/X/4	Clay depressions or other areas with heavy soils in chaparral, cismontane woodland, and annual grassland	March–April
Bogg's Lake hedge-hyssop *Gratiola heterosepala*	X/E/1B	Shallow water and margins of vernal pools	April–June
Ahart's dwarf rush *Juncus leiospermus var. ahartii*	X/X/1B	Margins of vernal pools	March–May
Legenere *Legenere limosa*	X/X/1B	Vernal pools and other vernally wet areas	May–June
Pincushion navarretia *Navarretia myersii*	X/X/1B	Vernal pools	May

Species	Status*Federal/ State/CNPS	Habitats	Flowering Period
Slender orcutt grass *Orcuttia tenuis*	T/E/1B	Vernal pools	May–June
Sacramento orcutt grass *Orcuttia viscida*	E/E/1B	Vernal pools	May–June
Sanford's arrowhead *Sagittaria sanfordii*	X/X/1B	Ponds, ditches, marshes, and other shallow freshwater habitats	May–August

* Status explanations
Federal
E = listed as endangered under the federal Endangered Species Act.
T = listed as threatened under the federal Endangered Species Act.
SC =species of concern (species for which existing information may warrant listing but for which substantial biological information to support a proposed rule is lacking).
X = no status definition
State
E = listed as endangered under the California Endangered Species Act
X = no status definition
California Native Plant Society
1B = List 1B species (rare, threatened, or endangered in California and elsewhere).
2 = List 2 species (rare, threatened, or endangered in California but more common elsewhere).
4 = List 4 species (plants of limited distribution).

Table M-6 Special Status Wildlife Species that Occur or that May Occur on the Bufferlands

Species	Status* Federal/State	Habitats	Potential for Occurrence
Vernal pool fairy shrimp *Branchinecta lynchi*	T/X	Common in vernal pools; also found in sandstone rock outcrop pools.	Present
Vernal pool tadpole shrimp *Lepidurus packardi*	E/X	Vernal pools and ephemeral.	Present
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T/X	Riparian and oak savanna habitats with elderberry shrubs; elderberries are host plant.	Present
Northwestern pond turtle *Clemmys marmorata marmorata*	SC/SSC	Woodlands, grasslands, and open forests; occupies ponds, marshes, rivers, streams, and irrigation canals that have muddy or rocky bottoms and contain watercress, cattails, water lilies, or other aquatic vegetation	Present
Giant garter snake *Thamnophis gigas*	T/T	Sloughs, canals, and other small water-ways where there is a prey base of small fish and amphibians; requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter	Present
White-tailed kite *Elanus leucurus*	X/FP	Low foothills and valley areas with valley or live oaks, riparian areas, and marshes; requires access to open grasslands for foraging	Present

Species	Status* Federal/State	Habitats	Potential for Occurrence
Northern harrier *Circus cyaneus*	X/SSC	Grasslands, meadows, marshes, and seasonal and agricultural wetlands providing tall cover	Present
Swainson's hawk *Buteo swainsoni*	X/T	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields.	Present
Ferruginous hawk *Buteo regalis*	SC/SSC	Open terrain in plains and foothills where ground squirrels and other prey are available.	Present
Golden Eagle *Aquila chrysaetos*	X/FP	Forages in grasslands, deserts and other open terrain.	Present
Bald Eagle *Haliaeetus leucocephalus*	X/E	Forages near lakes, rivers, and coastlines where prey is abundant.	Present
American peregrine falcon *Falco peregrinus anatum*	E/E	Nests and roosts on protected ledges of high cliffs, usually adjacent to lakes, rivers, or marshes that support large populations of other bird species	Present
Greater sandhill crane *Grus canadensis tabida*	X/T	Summers in open terrain near shallow lakes or freshwater marshes; winters on plains and in valleys near bodies of fresh water.	Present
Lesser sandhill crane *Grus canadensis tabida*	X/SSC	Summers in open terrain near shallow lakes or freshwater marshes; winters on plains and in valleys near bodies of fresh water.	Present
Least Tern *Childonias niger*	E/E	Nests on gravel roads around wastewater treatment ponds.	Present
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	X/E	Wide, dense riparian forests with a thick understory of willows for nesting; prefers sites with a dominant cottonwood overstory for foraging; may avoid valley-oak riparian habitats where scrub jays are abundant	Low
Western burrowing owl *Athene cunicularia hypugea*	SC/SSC	Rodent burrows in sparse grassland, desert, and agricultural habitats	Present
Long-eared owl *Asio otus*	X/SSC	Dense riparian stands of willows, cottonwoods, live oaks, or conifers; uses adjacent open lands for foraging. Nests in abandoned crow, hawk, or magpie nests	Present
Short-eared owl *Asio flammeus*	X/SSC	Freshwater and salt marshes, lowland meadows, and irrigated alfalfa fields; needs dense tules or tall grass for nesting and for daytime roosting	Present

Species	Status* Federal/State	Habitats	Potential for Occurrence
Little willow flycatcher *Empidonax traillii brewsteri*	SC/E	Riparian areas and large, wet meadows with abundant willows for breeding; usually found in riparian habitats during migration	Present
Purple martin *Progne subis*	X/SSC	Nests in abandoned woodpecker holes in valley oak and cottonwood forests; also nests in vertical drainage holes under elevated freeways and highway bridges. Requires open areas for feeding	Low
Bank swallow *Riparia riparia*	X/T	Nests in bluffs or banks, usually adjacent to water, where the soil consists of sand or sandy loam that allows digging	Present
Loggerhead shrike *Lanius ludovicianus*	X/SSC	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches	Present
Least Bell's vireo *Vireo bellii pusillus*	E/E	Riparian thickets either near water or in dry portions of river bottoms; may also be found using mesquite and arrow weed in desert canyons. Nests along margins of bushes and forages near the ground	Present
California yellow warbler *Dendroica petechia brewsteri*	X/SSC	Nests in riparian areas dominated by willows, cottonwoods, sycamores, or alders or in mature chaparral; may also use oaks, conifers, and urban areas near streamcourses.	Present
Yellow-breasted chat *Icteria virens*	X/SSC	Nests in dense riparian habitats dominated by willows, alders, Oregon ash, tall weeds, blackberry vines, and grapevines	Present
Tricolored blackbird *Agelaius tricolor*	SC/C	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or at upland sites with blackberries, nettles, thistles, and grainfields; nesting habitat must be large enough to support 50 pairs. Probably requires water at or near the nesting colony. Requires large foraging areas where insect prey is abundant, such as marshes, pastures, agricultural wetlands, dairies, and feedlots	Present
Pallid bat *Antrozous pallidus*	X/SSC	Rocky outcrops, cliffs, and crevices for Low roosting; requires access to open habitats for foraging	Low

* Status explanations

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

C = species for which U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.
SC = species of concern (species for which existing information may warrant listing but for which substantial biological information to support a proposed rule is lacking).
X = no status definition.
State
E = listed as endangered under the California Endangered Species Act.
T = listed as threatened under the California Endangered Species Act.
C = Candiadte species for listing under California Endangered Species Act.
FP = fully protected under the California Fish and Game Code.
SSC = species of special concern in California.
X = no status definition.

South River Pump Station Habitat Area: To the north and west of the South River Pump Station in Yolo County, Regional San owns approximately 26-acres of open space. This property was previously used as a private hunting and fishing reserve. The property contains approximately 10 acres of wetlands including the northern tip of Glide Lake, consisting primarily of open water with emergent marsh on the margins. Additionally, there are several acres of mature valley oak woodland and several mature elderberry shrubs on the site.

Regional San Parkway Site: A 29 acre site within the American River Parkway in the vicinity of William B Pond is owned by Regional San. This site is predominately landscaped with irrigated turf grass. Mature native and non-native trees within the landscape provide habitat for the wide variety of wildlife that utilize the parkway.

Historic and Cultural Resources

The Sacramento Regional County Sanitation District has several significant historic and cultural resources on the Bufferlands surrounding the Sacramento Regional Wastewater Treatment Plant.

- Regional San Archeological Site CA-SAC-83: An archeologically significant prehistoric and archeological site designated CA-SAC-83 exists in the Bufferlands west of the SRWTP. Artifacts including beads, shell, obsidian, slate, backed clay, charcoal, and human bone provide evidence that a Plains Miwok village once existed in this area.
- Nicolaus Dairy and Sims Ranch: Two post-European settlement resources are located on the Bufferlands. The historic Sims Ranch is located on the eastern side of the Bufferlands. This large ranch was established in 1850. While none of the original structures remain on this property, two houses built by the grandsons of the original property settler, Joseph Sims, remain at the site. These houses are regarded as excellent examples of Minimal Tradition style construction that speak to the frugal, no-frills era of the Great Depression. Both houses meet the criteria for listing in the National and California Register of Historic Places. The Nicolaus Dairy occurs in the southern portion of the Bufferlands. The Craftsman-style residence on this property dates back to 1914. While no longer in operation, the Nicolaus Dairy retains elements of a small scale 1949 dairy which contributes to its importance to local history. The historic core of this ranch also meets the criteria for listing within the National and California Register of Historic Places.

Figure M-4 Bufferlands in the Vicinity of Historic Sims Ranch

Source: Regional San

Growth and Development Trends

Growth and development trends within the contributing agencies including the Cities of Citrus Heights, Elk Grove, Folsom, Rancho Cordova, Sacramento, West Sacramento (in Yolo County), and the unincorporated portions of Sacramento County may result in increased flows to the Sacramento Regional Wastewater Treatment Plant, owned and operated by the Regional San. The District's growth and development trends typically mirror those of Sacramento County, portions of Yolo County, and the surrounding communities served by Regional San as described in the base plan. However in recent years, with all the water conservation efforts that have been implemented in the District's service area, influent flows have not increased at the typical rate of development.

Development since the 2011 Plan

Regional San has seen minor increase in their service area population since the 2011 plan, but the population served remains at approximately 1.4 million.

In order to comply with new permit regulations (as discussed in Section L.3.1) Regional San has initiated the EchoWater Project at the Sacramento Regional Wastewater Treatment Plant and will share the same hazard categories as described previously in the document and as shown in Table M-7, below. The project should not cause a significant change in vulnerability of the District to identified priority hazards.

Table M-7 Regional San Development by Year and Hazard Areas since 2011

Asset Type	Year Built	Outside of Known Hazard Area	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
EchoWater Project	2014-2023	0	1	1	1	

Source: Regional San

M.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table M-2 as high or medium significance hazards. Impacts of past events and vulnerability of the Regional San to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the base plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the base plan and are based on data provided by the District as described further below. In general, the most vulnerable structures are those located within the floodplain or within levee and dam inundation areas, such as older facilities that may be constructed with unreinforced masonry and structures built prior to the introduction of modern building codes. Buildings that contain electronic or electrically operated equipment are also vulnerable to flood inundation.

An estimate of the vulnerability of the Regional San to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Methodology

Sacramento Regional County Sanitation District's GIS has mapped the four specific hazard areas identified within its service area. The four specific hazards are: 100- and 500-year flood, levee failure, dam failure, and wildfire. GIS was used to determine the possible impacts of these specific hazards to Regional San facilities, and how the risk varies across its service area. The following methodology was followed in

determining the Regional San assets at risk to the 1% (100-year flood) and 0.2% (500-year flood) annual chance flood event, levee failure, dam failure, and wildfire event.

Regional San asset records, engineering and construction reports, and financial data and reports were used as the basis for determining asset value by individual asset or by asset class. County GIS data/hazard layers were used and included Sacramento County and Yolo County DFIRMs, dam failure inundation zones, and wildfire threat areas. The FEMA Preliminary DFIRM, made available on June 16, 2015 was used as the hazard layers for the 100- and 500-year flood zones, and levee failure analysis.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

Dam failures can result from a number of natural or manmade causes such as earthquakes, erosion of the face or foundation, improper siding, rapidly rising flood waters, structural/design flaws, and deliberate human actions. Folsom Dam is the major dam which affects the Regional San and the populations in the inundation areas. Folsom Dam is owned by the US Bureau of Reclamation. The flood waters from a dam failure would likely affect the Sacramento Regional Sanitation District's service area. Flood waters could inundate sewer pump stations, regional collector pipes, underground structures, and equipment, resulting in the inability to access or operate Regional San's facilities within the flooded areas. A severe flood could jeopardize the operation of the regional sewer treatment plant. Access to the regional sewer treatment plant, affected pipe systems and pump station facilities to assess and restore operation could be limited until such time that the flood waters receded.

The ability to warn downstream communities in the event of a flood event caused by a dam failure is generally dependent on conditions such as the frequency of inspections for the dam's structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate or take preventative actions to minimize damage to utilities or infrastructure. The existence and frequency of updating and exercising an evacuation plan that is site-specific assists in warning and evacuation functions.

A dam failure will cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to sewer collection, conveyance and treatment facilities would likely impact communities outside the immediate hazard areas by disrupting sewer collection and treatment services.

Past Occurrences

The Planning Team noted no past occurrences that have affected Regional San.

Vulnerability to Dam Failure

According to the Sacramento County General Plan Background report, there are four major and two minor dams which, if they fail, may impact the people and resources of this District. The major dams are comprised of Shasta on the Sacramento, Oroville on the Feather, Comanche on the Mokelumne and Folsom on the American. The minor dams include Nimbus and Rancho Seco. Regional San has no records indicating that previous dam failures have impacted its assets.

Scenario for Evaluating Values at Risk

Sacramento County provided inundation as a GIS layer for the Folsom Dam system, as part of the following breaks:

- Folsom Right Wing
- Folsom Mormon
- Folsom Dike 4
- Folsom Dike 5
- Folsom Dike 6
- Folsom Dike 7
- Folsom Dike 8
- Folsom Dam

Description of Folsom Dam Facilities

The Folsom Dam and Reservoir Project is located on the American River, about 20 miles upstream of the City of Sacramento, California. I t was designed and built by the Corps of Engineers during the period 1948 to 1956, and is now owned and operated by the U.S. Bureau of Reclamation. The reservoir has a storage capacity of 1 million acre-ft at gross pool. The project includes about 4.5 miles of man-made water retaining structure that have a crest elevation of 480.5ft above sea level.

Purpose of Study

As described in Section 4.3.6 of the based plan, the Bureau of Reclamation performed a study in an attempt to determine the magnitude of flooding that would result from various breach scenarios of structures located around the reservoir. The structures are Folsom Dam itself, its right wing dam, dikes 4, 5, 6, 7, 8, and Mormon Island. The results of hydrodynamic simulations are used to generate potential inundation maps that can aid in the development of emergency actions plans.

Assets at Risk

The values for each of the assets were taken from the 2010 Comprehensive Annual Financial Report for the Fiscal Years Ended June 30. 2010 and 2009, asset lists, and engineering and construction reports to populate the 2011 LHMP tables. For this update, asset values have been escalated 4% per year for inflation. The tables included in this plan itemize assets into asset categories such as land and easements, structures, pipes, and other works of improvement that include equipment, and structures. The recent asset value, if available, was used directly with a pre-determined inflation value. If not available, the value was estimated based on similar asset types and values. The asset values were not depreciated.

Regional San has identified the following assets in Table M-8 as being potentially affected if the Folsom Dam were to have a catastrophic failure.

Table M-8 Regional San Assets and Values at Risk in the Folsom Dam Inundation Zone

Facility #	Facility Name	Asset Value(1)
FM003	SRWTP South Trunk Inflow Flow Meter	$1,094,988
FM050	SRWTP Water Reclamation Flow Meter	$243,311
FM066	SRWTP Bradshaw/Central Interceptor Inflow Flow Meter	$729,992
FM067	SRWTP City Interceptor Inflow Flow Meter	$486,661
FM075	SRWTP Laguna/Elk Grove Trunk Inflow Flow Meter	$729,992
FM166	Freeport Flow Meter	$486,661
FM339	SRWTP Central Trunk Inflow Flow Meter	$729,992
N11	City Interceptor Valve Structure	$2,433,306
N12	City Interceptor Oxygen Structure	$2,433,306
N13	City Interceptor Air Intake Structure	$1,824,979
N20	Arden Force Main Oxygen Structure	$2,798,302
N41	City Water Line to the SRWTP	$425,829
RG01	Roller Gate Structure 1 (N24-RG0027A)	$2,433,306
RG02	Roller Gate Structure 2 (N24-RG0008A)	$2,433,306
RG03	Roller Gate Structure 3 (N21-RG0061A)	$3,041,632
RG04	Roller Gate Structure 4 (N21-RG0044A)	$3,041,632
RG05	Roller Gate Structure 5 (N21-RG0028A)	$3,041,632
RG07	Roller Gate Structure 7 (N21-RG0007A)	$3,041,632
RG08	Roller Gate Structure 8 (N17-RG0024A)	$1,824,979
RG09	Roller Gate Structure 9 (N33-RG0017A)	$1,094,988
RG10	Roller Gate Structure 10 for Sump 82 (N17-SG0015B)	$1,459,983
S29	Mission Trunk Control	$948,989
N15&N16	Northeast Siphon Inlet & Outlet Structures	$8,516,570
N19	Arden Sewage Pumping Station	$35,877,916
N27	Sump 55 Sewage Pumping Station	$15,206,272
N28	Sump 119 Sewage Pumping Station	$14,612,029
N29	Sump 2/2A Sewage Pumping Station	$8,304,103
N35	Sump 76 Sewage Pumping Station	$3,308,012
N40	Iron Point Sewage Pumping Station	$13,011,990
N51	New Natomas Sewage Pumping Station	$89,631,950
N52	Power Inn Sewage Pumping Station	$7,886,866
S30	Old Natomas Sewage Pumping Station	$4,006,130
S33	Cordova Sewage Pumping Station	$15,340,337

Facility #	Facility Name	Asset Value(1)
S55	Northeast Sewage Pumping Station	$1,092,551
S94	Sacramento Regional Wastewater Treatment Plant	$925,517,080
Total		$1,179,091,224

Source: Regional San Finance, Engineering, and Policy and Planning Offices

(1) Asset value includes facility, site structures, site equipment, mobile equipment, miscellaneous items that may have soft cost components, some associated adjacent pipeline components. Values taken from Regional San 2010 Comprehensive Annual Financial for the 2011 LHMP and escalated 4% per year for inflation for the LHMP 2016 update.

Critical Facilities at Risk

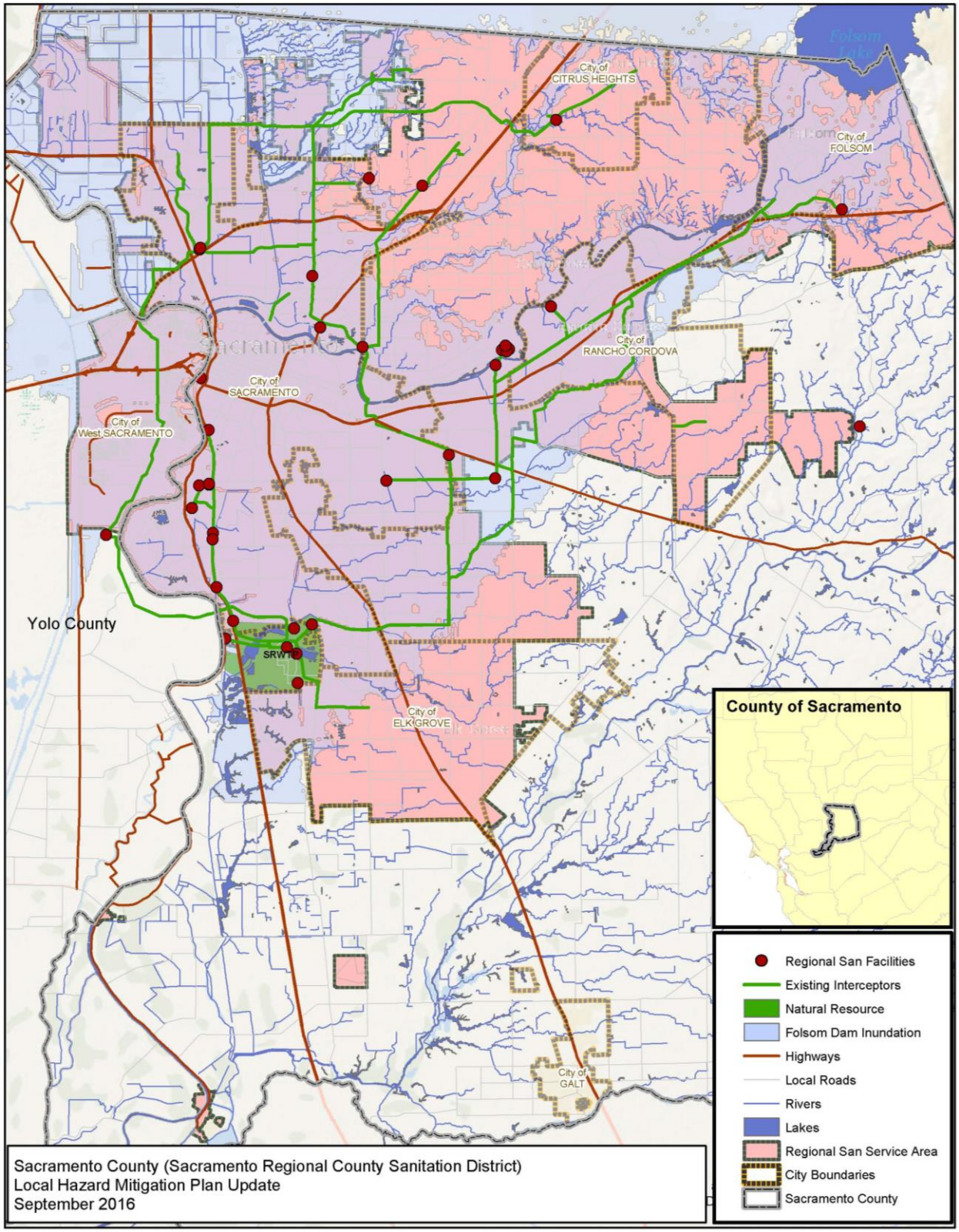
The Regional San critical facility inventory was compared with the Folsom Dam failure inundation layer using GIS. Facility locations that were within the hazard area were selected and sorted by critical facility definition category; the summary results of this analysis are show in Table M-9. A detailed critical facility table is included in the base plan as Appendix E. The dam failure hazard column on the right-hand side of Appendix E denotes whether a particular facility is considered to be vulnerable to dam failures.

Table M-9 Regional San Critical Facilities at Risk in the Folsom Dam Inundation Zone

Critical Facility Definition	Count
Essential Services Facilities	35
High Potential Loss Facility	1
Transportation & Lifeline	0
Total	**36**

Source: Regional San GIS

Figure M-5 Regional San Critical Facilities in the Folsom Dam Inundation Area



Source: Regional San

Regional San Owned Dams and Levees

SRWTP Perimeter Levee. The Sacramento Regional Wastewater Treatment Plant is protected by an earthen perimeter levee system that is owned by Regional San. The Perimeter Levee was originally designed to mitigate the risk of immediate failure of a local levee along the Sacramento River while the river is at flood stages (elevation 25 ft – 33 feet above mean sea level). Recent levee improvement efforts along the Sacramento River and the American River reduced the risk of levee failure throughout all of the urban areas of Sacramento County. However, Sacramento River levee systems located along the east side at all points south of the Freeport area are still considered to present a risk of failure potential. Should one or more levees fail from Freeport south into the Delta area, it could contribute some water at elevations that could approach the SRWTP levee. In 1998, the perimeter levee was raised to an elevation that provides flood protection for 100, 200 and 400-year flood events based on recent studies within the Sacramento River floodplain which increased the predicted 100-year floodplain elevation approximately 2 feet above previous studies. The current SRWTP Perimeter Levee provides 100- and 200-year flood protection with approximately 3 feet of freeboard. The levee provides 400-year flood protection with no freeboard, which complies with US Army Corps of Engineers standards to ensure protection from a 400-year flood event with no overtopping.

During the 1986 storm, a 100-year storm event, there was no overtopping of the perimeter levee with peak water surface elevation predicted at 15.3 to 15.8-feet NVGD. During the 1995 series of storm events which lead to flooding in both the Sacramento and American River floodplains, Interstate 5 was temporarily closed in close proximity to the SRWTP due to flooding. During this event, none of the storm water in the combined floodplain reached the levee at the SRWTP.

Emergency Storage Basins A, B, C and D. The Emergency Storage Basins (ESBs) are structures at the Sacramento Regional Wastewater Treatment Plant that are used for "emergency" or occasional use. These basins, normally do not have liquids stored in them, and on the occasion when they are used the fluid levels are typically only one to two feet deep. Operational use allows a minimum of 5.5 feet of freeboard. A constructed spillway is designed to direct any excess fluid volume back into the wastewater treatment plant. During review of these basins, DSOD engineers concurred with Regional San engineers that there were no risk factors for downstream property or human life in the event of structure failure, and that a study was not required to determine the extent of property damage and/or risk to life resulting from a hypothetical facility failure. Thus, this facility meets the "Low Hazard" classification in that a failure would result in minimal property damage and loss of life is unlikely. This facility is currently listed on Table 4.18 Sacramento County Dam Inventory as a Hazard Class level of "High". Regional San disagrees with this classification and may, in the future, pursue a reclassification of this facility to a Hazard Class level of "Low". The next update to this LHMP annex will include information on modifications to the basin configuration and operation as part of the EchoWater Project.

Solids Storage Basin (SSB) Battery III Ponds CA01421. The SSB ponds operate with a minimum 3 feet of freeboard. The SSBs are also provided with an emergency overflow that directs any excess fluid volume back into the SRWTP. Any fluid volume that escaped the SSB structure would be contained within the SRWTP perimeter levee system. Thus a dam failure for this asset meets the "Low Hazard" classification in that a failure would result in minimal property damage and loss of life is unlikely. This facility is currently listed on Table 4.18 Sacramento County Dam Inventory as a Hazard Class level of "High". Regional San

disagrees with this classification and may, in the future, pursue a reclassification of this facility to a Hazard Class level of "Low".

Natural Resources at Risk

The Sacramento Regional County Sanitation District has significant historical, cultural, and natural resources located throughout and adjacent to the Bufferlands including the 2,650-acre wildlife habitat, farmland and open space at the SRWTP, the prehistoric and archeological site designated CA-SAC-83, the Nicolaus Dairy, the Sims Ranch. These sites may be vulnerable to flood water inundation caused by a dam failure. Potential losses include partial or complete loss of structures, natural habitat and species.

Historic and Cultural Resources at Risk

The Planning Team for Regional San noted that the Nicolaus Dairy and Sims Ranch are both at risk to dam failure.

Future Development

Future development at this time is focused on the SRWTP EchoWater Project. This project will add $1.6 to $2 billion dollars of critical facilities at the SRWTP by 2023. Therefore, dam failure could result in significant loss at the treatment plant. No other future development is anticipated at this time.

Flood

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Major surface waters in the vicinity of the Regional San service area include the American River, Nimbus Reservoir, Folsom Reservoir, Lake Natoma, the Sacramento River, and the Consumnes River. In the Regional San service area, the potential for flood damage would occur in the floodplains of the American River, Sacramento River, Cosumnes River, Mokeolumne River, Laguna Creek, Morrison Creek, Dry Creek and Strawberry Creek.

Past Occurrences

Regional San facilities are impacted by wet weather and flood events that affect the Sacramento Region including localized and regional flooding. Historical large rainfall events have been noted in 1986, 1995, and 2005/06. More information regarding these events can be found in Table M-10.

Table M-10 Regional San Historical Flood Events

Date	Facility	Performance Comments
1986 storm, a 100-year storm event	SRWTP Perimeter Levee	No overtopping of the perimeter levee with peak water surface elevation predicted at 15.3 to 15.8-feet NVGD

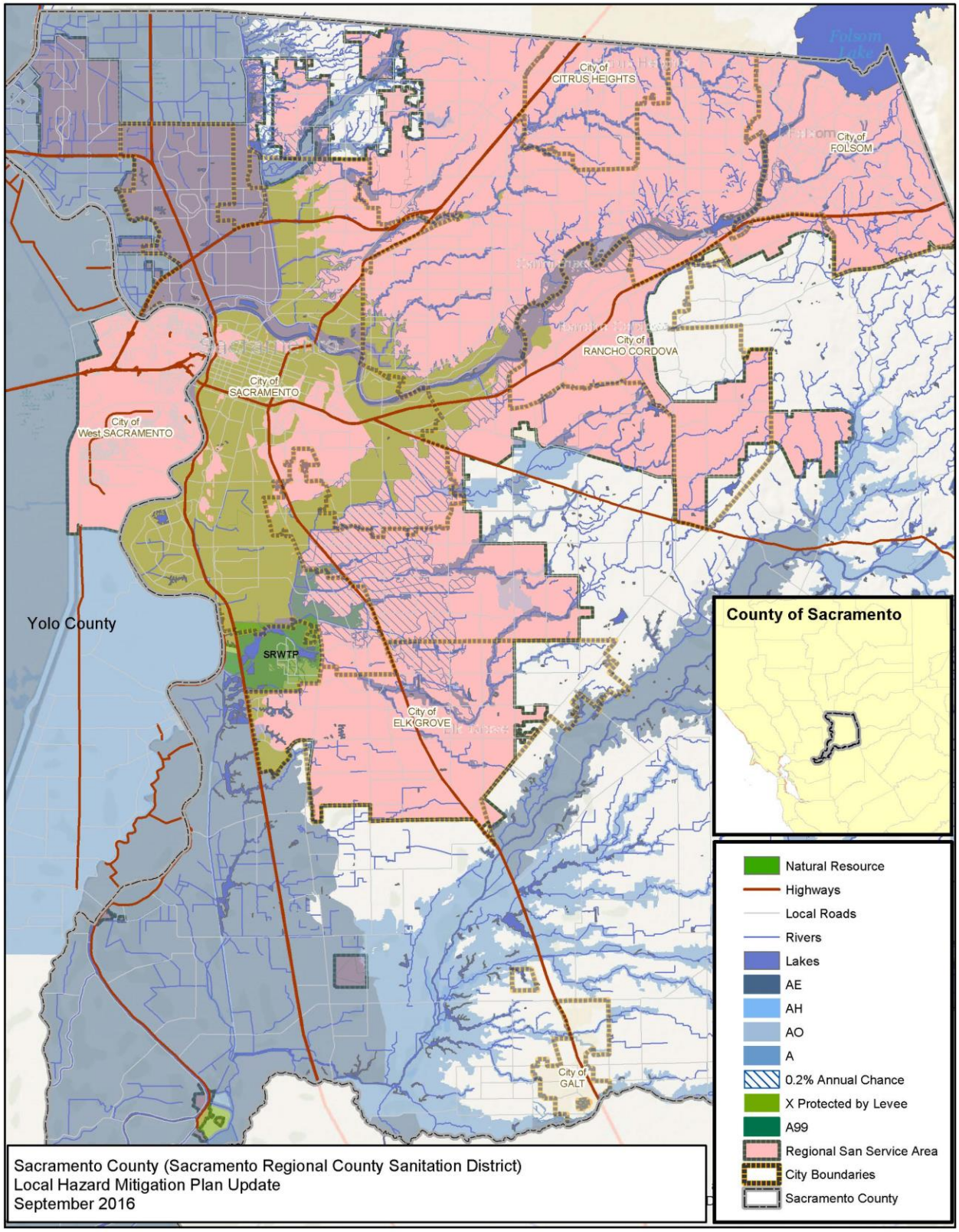
Date	Facility	Performance Comments
December 2005 / January 2006 storm events	SRWTP and local construction projects.	SRWTP operations were impacted by high inlet flows. These flows plus localized flooding at on-site construction project(s) resulted in the discharge of a mixture of fully treated and partially treated wastewater for two days. Effluent sampling demonstrated that the discharge was in compliance with NPDES permit limits.
December 2005 / January 2006 storm events		Heavy rains impacted construction sites and caused four sanitary sewer overflows in the regional sewer collection system. Some reimbursements received from FEMA for flood-related damages.
1986, Spring 1995, and December 2005 / January 2006 storm events	SRWTP Perimeter Levee	No impacts

Source: Regional San

Vulnerability to Flood

Figure M-6 shows the Regional San service area overlaid on the DFIRM.

Figure M-6 Sacramento Regional County Sanitation District Service Area and DFIRM



Source: Regional San

Assets a Risk

Regional San has identified the following assets as being potentially affected from a 100- (Table M-11) or 500-year (Table M-12) flood event.

Table M-11 Regional San Assets at Risk in the 100-year Floodplain

Facility #	Facility Name	Asset Value(1)
FM066	SRWTP Bradshaw/Central Interceptor Inflow Flow Meter	$729,992
FM067	SRWTP City Interceptor Inflow Flow Meter	$486,661
FM166	Freeport Flow Meter	$486,661
FM339	SRWTP Central Trunk Inflow Flow Meter	$729,992
N13	City Interceptor Air Intake Structure	$1,824,979
N41	City Water Line to the SRWTP	$425,829
RG03	Roller Gate Structure 3 (N21-RG0061A)	$3,041,632
RG07	Roller Gate Structure 7 (N21-RG0007A)	$3,041,632
N15	Northeast Siphon Inlet Structure	$8,516,570
N19	Arden Sewage Pumping Station	$35,877,916
N27	Sump 55 Sewage Pumping Station	$15,195,322
N28	Sump 119 Sewage Pumping Station	$14,612,029
N50	South River Pump Station	$103,501,785
N51	New Natomas Sewage Pumping Station	$89,631,950
S30	Old Natomas Sewage Pumping Station	$4,006,130
S55	Northeast Sewage Pumping Station	$1,092,551
S94	Sacramento Regional Wastewater Treatment Plant	$925,517,080
RG06	Roller Gate Structure 6 (N21-RG0014A)	$2,433,306
N53	Van Maren Sewage Pumping Station	$21,828,647
	Total	**$1,232,980,665**

Source: Regional San Finance, Engineering, and Policy and Planning Office

(1) Asset value includes facility, site structures, site equipment, mobile equipment, miscellaneous items that may have soft cost components, some associated adjacent pipeline components. Values taken from Regional San 2010 Comprehensive Annual Financial Report engineering project reports for the 2011 LHMP. Asset values for the 2016 LHMP update have been escalated 4% per year for inflation.

Table M-12 Regional San Assets at Risk in the 500-year Floodplain

Facility #	Facility Name	Asset Value(1)
FM003	SRWTP South Trunk Inflow Flow Meter	$1,094,988
N11	City Interceptor Valve Structure	$2,433,306
N12	City Interceptor Oxygen Structure	$2,433,306
N20	Arden Fall Structure Bypass	$2,798,302
RG01	Roller Gate Structure 1 (N24-RG0027A)	$2,433,306

Facility #	Facility Name	Asset Value(1)
RG05	Roller Gate Structure 5 (N21-RG0028A)	$3,041,632
RG08	Roller Gate Structure 8 (N17-RG0024A)	$1,824,979
RG10	Roller Gate Structure 10 for Sump 82 (N17-SG0015B)	$1,459,183
N16	Northeast Siphon Outlet Structure	$8,516,570
N29	Sump 2/2A Sewage Pumping Station	$8,304,103
N35	Sump 76 Sewage Pumping Station	$3,308,102
N52	Power Inn Sewage Pumping Station	$7,886,866
S33	Cordova Sewage Pumping Station	$15,340,337
RG11	Roller Gate Structure 11 (Bradshaw-Central Junction Structure)	$2,433,306
X009	SRWTP Outfall	$13,756,812
Total		**$77,065,808**

Source: Regional San Finance, Engineering, and Policy and Planning Office

(1) Asset value includes facility, site structures, site equipment, mobile equipment, miscellaneous items that may have soft cost components, some associated adjacent pipeline components. Values taken from Regional San 2010 Comprehensive Annual Financial Report, and engineering project reports for the 2011 LHMP. Asset values for the 2016 LHMP update have been escalated 4% per year for inflation..

Critical Facilities at Risk

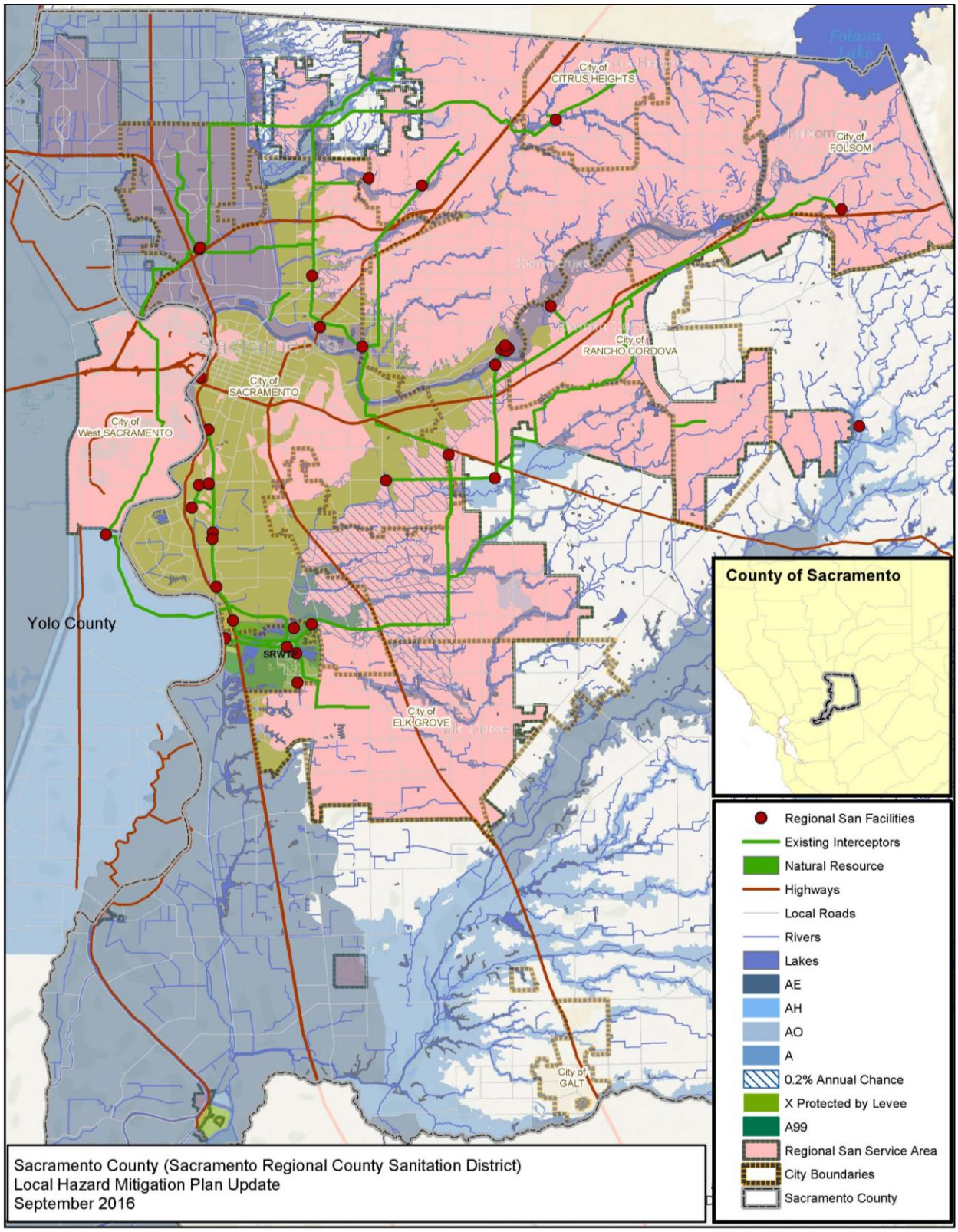
The Regional San critical facility inventory was overlayed on the Sacramento and Yolo Counties DFIRM flood hazard layer using GIS. Facility locations that were within the hazard area were selected and sorted by critical facility definition category; the summary results of this analysis are show in Table M-13. A detailed critical facility table is included in the base plan as Appendix E; the flood hazard column on the right-hand side of that table denotes whether a particular facility is considered to be vulnerable to that hazard.

Table M-13 Regional San Critical Facilities at Risk in the Floodplain

Flood	Critical Facility Category	Count
1%	Essential Services Facilities	18
1%	High Potential Loss Facility	1
1%	Transportation & Lifeline	0
	Total 1%	**18**
0.2%	Essential Services Facilities	15
0.2%	High Potential Loss Facility	0
0.2%	Transportation & Lifeline	0
	Total 0.2%	**33**

Source: Regional San GIS

Figure M-7 Regional San Critical Facilities in the Floodplain



Source: Regional San

Natural Resources at Risk

The Sacramento Regional County Sanitation District has significant historical, cultural, and natural resources located throughout the Bufferlands. Vulnerability analysis of these individual resources specific to flood loss was not performed.

Historic and Cultural Resources at Risk

The Planning Team noted that the Nicolaus Dairy and Sims Ranch would both be at risk to flooding.

Future Development

None anticipated by the Regional San Planning Team.

Levee Failure

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Note: This section includes a discussion of levees that are not owned or maintained by Regional San.

Flooding caused by levee failure can occur as the result of partial or complete collapse of an impoundment, and often results from prolonged rainfall and flooding. The primary danger associated with dam or levee failure is the high velocity flooding of properties downstream of the breach. Section 4.2.17 Levee Failure in the base plan describes the levee inventory in the Sacramento County Planning Area.

Flooding caused by levee failure would vary in the District depending on which structure fails and the nature and extent of the failure and associated flooding. Flooding may present a threat to life and property depending on buildings or facilities flooded. Damage may include buildings, their contents and loss of critical services to the community. Large flood events can affect lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, agricultural industry, and the local and regional economies.

Levee Flood Protection Zones estimate the maximum area that may be inundated if a project levee fails when water surface elevation is at the top of a project levee. Zones depicted on Figure 4.69 of the base plan do not necessarily depict areas likely to be protected from flow events for which project levees were designed. Figure 4.81 of the base plan illustrates the depths of flooding should a levee that protects that area fail.

Past Occurrences

Regional San does not have a documented history of impacts, damages or costs associated with previous levee failure in the Sacramento region.

Vulnerability to Levee Failure

Unincorporated Sacramento County and its incorporated jurisdictions have mapped flood hazard areas. This includes areas protected by levees. GIS was used to determine the possible impacts of flooding in areas protected by levee within the County, and how the risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and values at risk to levee failure. However, this analysis was performed based on the most current 2015 DFIRMs which still reflect some levees as providing 100-year level of protection. According to the County, all levees have since been decertified as not providing a 100-year level of protection, so this analysis is based solely on the information presented in the DFIRMs. Further it is important to note that many levee improvement projects are ongoing throughout the Planning Area, some of which will be providing certification of area levees to both a 100-year and 200-year levels depending on applicable requirements. Thus, this analysis reflects a moment in time and while it does provide information on areas developed behind levees, the X Protected by Levee flood zone will continue to change as these projects are completed and new certifications obtained.

Assets a Risk

Regional San has identified the following assets in Table M-14 as those potentially affected from a levee failure event.

Table M-14 Regional San Assets at Risk in the X Protected by Levee Zone

Facility #	Facility Name	Asset Value (1)
N11	City Interceptor Valve Structure	$2,433,306
N12	City Interceptor Oxygen Structure	$2,433,306
RG08	Roller Gate Structure 8 (N17-RG0024A)	$1,824,979
RG10	Roller Gate Structure 10 for Sump 82 (N17-SG0015B)	$1,459,983
N16	Northeast Siphon Outlet Structure	$8,516,570
N29	Sump 2/2A Sewage Pumping Station	$8,304,103
N35	Sump 76 Sewage Pumping Station	$3,308,012
N52	Power Inn Sewage Pumping Station	$7,886,866
X009	SRWTP Outfall	$13,756,812
FM067	SRWTP City Interceptor Inflow Flow Meter	$486,661
FM166	Freeport Flow Meter	$486,661
N13	City Interceptor Air Intake Structure	$1,824,979
N41	City Water Line to the SRWTP	$425,829
N27	Sump 55 Sewage Pumping Station	$15,195,322
N28	Sump 119 Sewage Pumping Station	$14,612,029
FM050	SRWTP Water Reclamation Flow Meter	$243,331
FM075	SRWTP Laguna/Elk Grove Trunk Inflow Flow Meter	$729,992
RG02	Roller Gate Structure 2 (N24-RG0008A)	$2,433,306
RG04	Roller Gate Structure 4 (N21-RG0044A)	$3,041,632

Facility #	Facility Name	Asset Value (1)
RG09	Roller Gate Structure 9 (N33-RG0017A)	$1,094,988
S29	Mission Trunk Control	$948,989
FM398	Santa Anna McClellan Flow Meter	$60,832
N43	Roseville/Watt Liquid Waste Disposal Facility	$3,575,531
	Total	**$95,094,970**

Source: Regional San Finance, Engineering, and Policy and Planning Offices

(1) Asset value includes facility, site structures, site equipment, mobile equipment, miscellaneous items that may have soft cost components, some associated adjacent pipeline components. Values taken from Regional San 2010 Comprehensive Annual Financial Report, and engineering project reports for the 2011 LHMP. Asset values for the 2016 LHMP update have been escalated 4% per year for inflation.

Critical Facilities at Risk

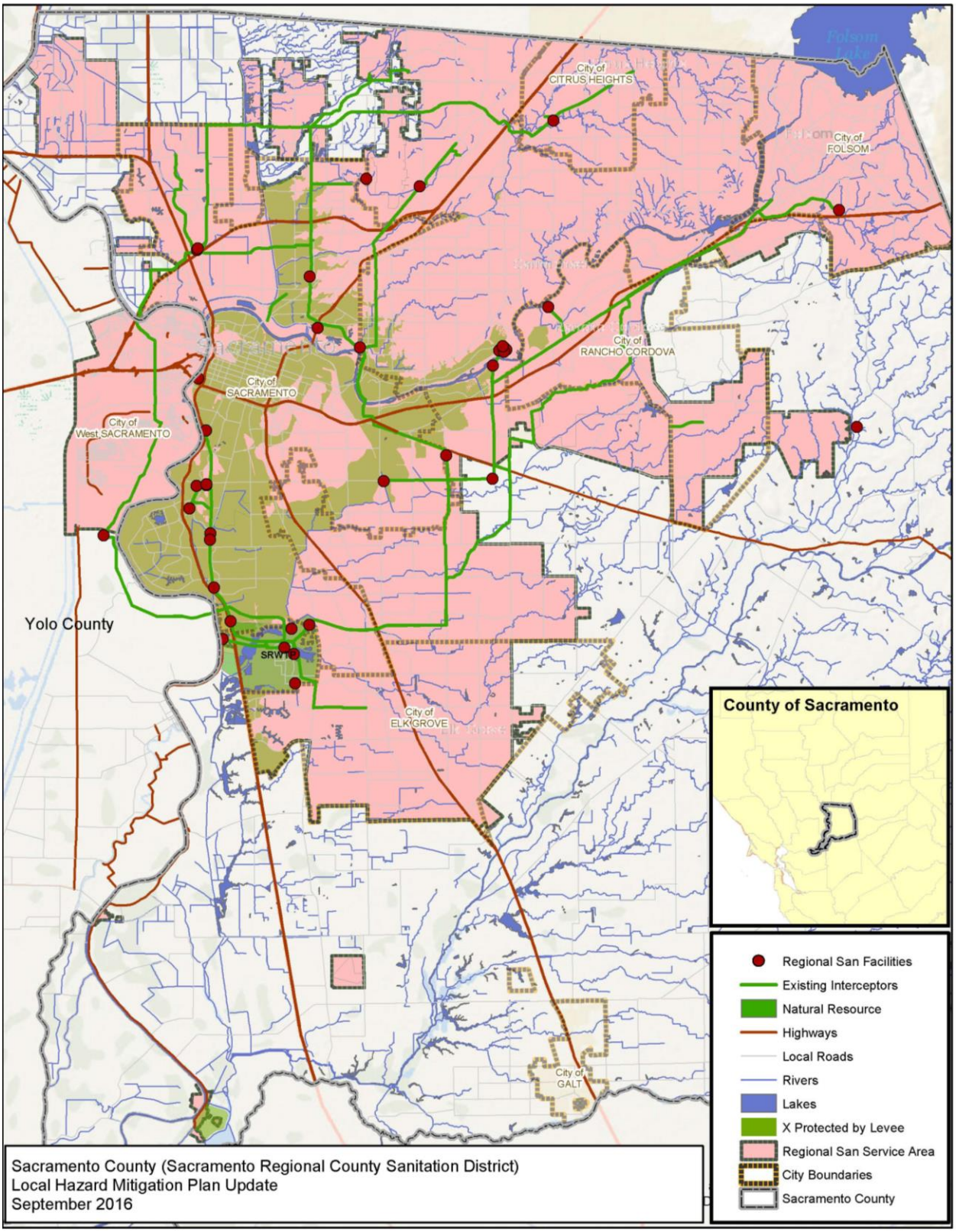
The Regional San critical facility inventory was overlayed on the Sacramento and Yolo Counties DFIRM - X Protected by Levee hazard layer using GIS. Facility locations that were within the hazard area were selected and sorted by critical facility definition category; the summary results of this analysis are show in Table M-15. A detailed critical facility table is included in the base plan as Appendix E; the levee failure hazard column on the right-hand side of that table denotes whether a particular facility is considered to be vulnerable to that hazard.

Table M-15 Regional San Critical Facilities at Risk in the X Protected by Levee Zone

Critical Facility Definition	Count
Essential Services Facilities	22
High Potential Loss Facility	1
Transportation & Lifeline	0
Total	**23**

Source: Regional San GIS

Figure M-8 Regional San Critical Facilities in the X Protected by Levee Zone



Source: Regional San

Natural Resources at Risk

The Sacramento Regional County Sanitation District has significant historical, cultural, and natural resources located throughout the Bufferlands as described in other sections of this document. Those assets include the Bufferlands, Sims Ranch, Nicolaus Dairy,South River Pump Station Habitat Area, and Regional San Architectural Site CA-SAC-83. Each of these sites is subject to damage during a flood event including floodwater inundation, erosion, structure and site damage, loss of vegetation and habitat, loss of species. A vulnerability assessment analysis for each individual site was not performed.

Historic and Cultural Resources at Risk

The Planning Team noted that the Nicolaus Dairy and Sims Ranch would both be at risk to levee failure flooding.

Future Development

No development is anticipated by the Regional San Planning Team.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Regional San has identified areas and District assets at risk to wildfire. The Bufferlands and the Sims Ranch structures are susceptible to wildfire and Regional San has a plan to mitigate those risks.

Past Occurrences

Regional San Bufferlands: The Bufferlands are subject to periodic grassfires which are extinguished by local firefighters. Damage estimates typically range from $1,000 to $5,000. Although the Bufferlands is not classified as a critical facility, it provides sensitive environmental habitat for many species and contains several historical buildings.

Nicolaus Dairy and Sims Ranch: There have not been any recorded fires affecting these historic structures, but since they are surrounded by native grasses they are subject to fires during the seasonally dry months.

Vulnerability to Wildfire

Assets a Risk

Regional San has identified the following assets in Table M-16 as being potentially affected from a wildfire event.

Table M-16 Regional San Assets at Risk in the Wildfire Threat Zone

Facility #	Facility Name	Asset Value (1)
Little or Moderate Fire Threat		
–	Regional San Bufferlands (2,650 acres)	$10,028,251
–	Historic Sims Ranch	(2)
–	Historic Nicolaus Dairy	(2)
–	Regional San Biological Site CA-SAC-83	(2)
Moderate Fire Threat		
N11	City Interceptor Valve Structure	$2,433,306
N12	City Interceptor Oxygen Structure	$2,433,306
N15&N16	Northeast Siphon	$8,516,570
N36	Sump 82 Sewage Pumping Station	$2,975,264
FM166	Freeport Flow Meter	$486,661
N41	City Water Line to the SRWTP	$425,829
FM050	SRWTP Water Reclamation Flow Meter	$243,331
RG02	Roller Gate Structure 2 (N24-RG0008A)	$2,433,306
RG04	Roller Gate Structure 4 (N21-RG0044A)	$3,041,632
S29	Mission Trunk Control	$948,989
N40	Iron Point Sewage Pumping Station	$13,011,990
FM398	Santa Anna McClellan Flow Meter	$60,833
N43	Roseville/Watt Liquid Waste Disposal Facility	$3,575,531
FM003	SRWTP South Trunk Inflow Flow Meter	$1,094,988
N20	Arden Fall Structure Bypass	$2,798,302
RG05	Roller Gate Structure 5 (N21-RG0028A)	$3,041,632
RG11	Roller Gate Structure 11 (Bradshaw-Central Junction Structure)	$2,433,306
FM066	SRWTP Bradshaw/Central Interceptor Inflow Flow Meter	$2,433,306
FM339	SRWTP Central Trunk Inflow Flow Meter	$729,992
RG07	Roller Gate Structure 7 (N21-RG0007A)	$3,041,632
N51	New Natomas Sewage Pumping Station	$89,631,950
S30	Old Natomas Sewage Pumping Station	$4,006,130
S55	Northeast Sewage Pumping Station	$1,092,551
RG06	Roller Gate Structure 6 (N21-RG0014A)	$2,433,306
N50	South River Sewage Pumping Station	$103,501,785
Total		**$266,853,676**

Source: Regional San Finance, Engineering, and Policy and Planning Offices

(1) Asset value includes facility, site structures, site equipment, mobile equipment, miscellaneous items that may have soft cost components, some associated adjacent pipeline components. Values taken from Regional San 2010 Comprehensive Annual Financial

Report, and engineering project reports for the 2011 LHMP. Asset values for the 2016 LHMP update have been escalated 4% per year for inflation.

(2) Costs for these sites have not been estimated.

Critical Facilities at Risk

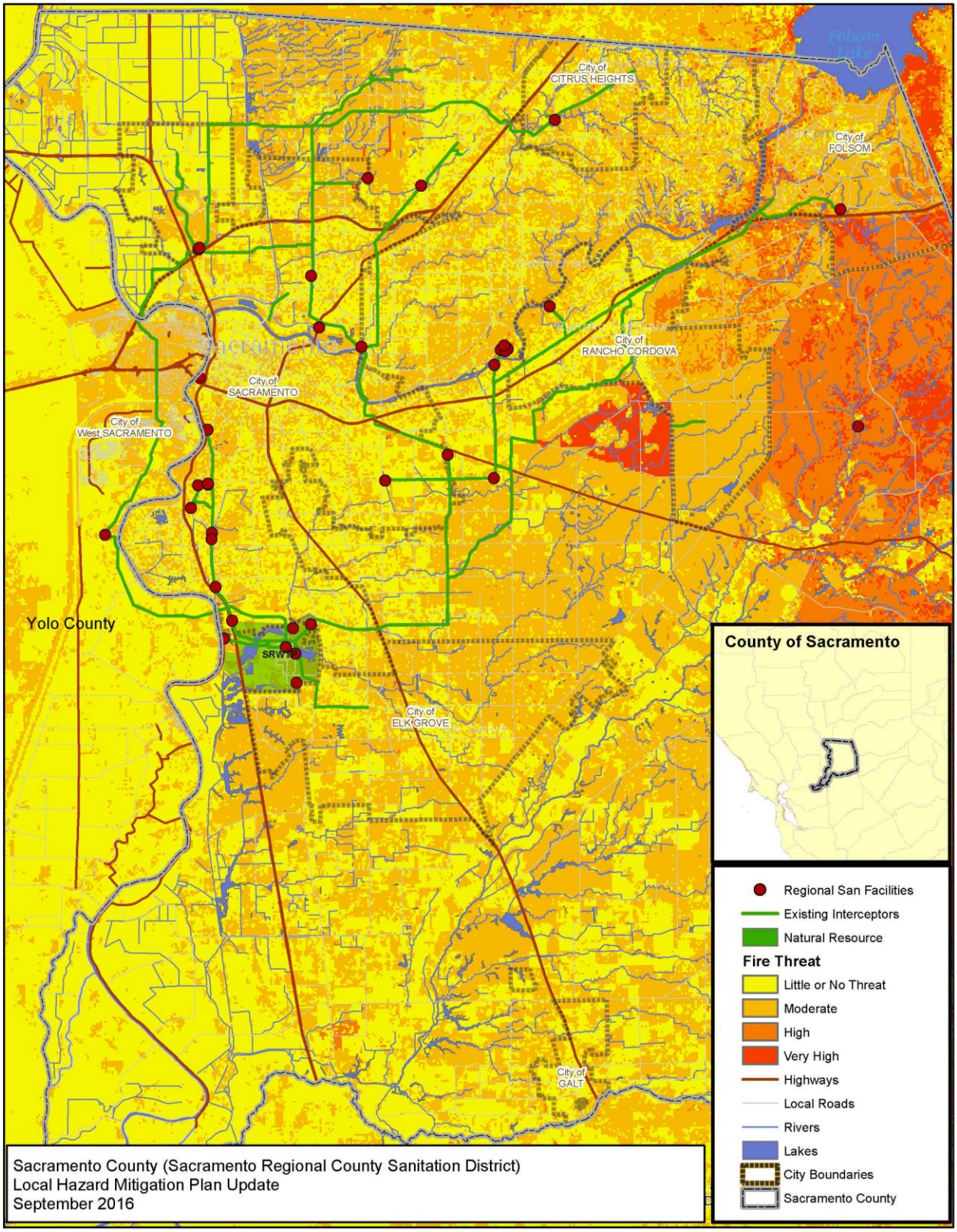
The Regional San critical facility inventory was overlayed on the Sacramento and Yolo Counties wildfire hazard layer using GIS. Facility locations that were within the hazard area were selected and sorted by critical facility definition category and key asset type; the summary results of this analysis are show in Table M-17. A detailed critical facility table is included in the base plan as Appendix E; the wildfire hazard column on the right-hand side of that table denotes whether a particular facility is considered to be vulnerable to that hazard.

Table M-17 Regional San Critical Facilities in the Wildfire Threat Zone

Critical Facility Category	Fire Threat	Count
Historical Sites with multiple structures	Little or Moderate	1
Cultural Sites	Little or Moderate	2
Natural Resources (Bufferlands)	Little or Moderate	2,650-acre
Essential Services Facilities	Little or No Threat	18
Essential Services Facilities	Moderate	25
Essential Services Facilities	High	0
Essential Services Facilities	Very High	0
High Potential Loss Facility	Little or No Threat	0
High Potential Loss Facility	Moderate	0
High Potential Loss Facility	High	0
High Potential Loss Facility	Very High	0

Source: Regional San

Figure M-9 Regional San Fire Threat and Critical Facilities



Source: Regional San

Natural Resources at Risk

The Sacramento Regional County Sanitation District has significant historical, cultural, and natural resources located throughout the Bufferlands. Vulnerability analysis of these individual resources specific to wildfire loss was not performed.

Historic and Cultural Resources

The Planning Team noted that the Nicolaus Dairy and Sims Ranch would both be at risk to wildfire.

Future Development

None anticipated by the Regional San Planning Team.

M.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

M.6.1. Regulatory Mitigation Capabilities

Table M-18 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the Regional San.

Table M-18 Regional San's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y	Regional San Emergency Response Plan (October 2009) SRWTP Flood Response Manual (October 2007) Sanitary Sewer Overflow Response Plan for Interceptor System (September 2007)
Capital Improvements Plan	Y	Rate and Fee Study (2009 and 2011) Capital Funding Needs Projections (Annual) SRWTP 2020 Master Plan 2000 Interceptor Master Plan 2009 Interceptor Sequencing Stud
Economic Development Plan	N	
Local Emergency Operations Plan	Y	SRWTP Administrative Operating Procedures (2011)
Continuity of Operations Plan	N	
Transportation Plan	N	

Stormwater Management Plan/Program	Y	Regional San requires compliance with Sacramento County Standard Construction Specifications Stormwater Compliance sections and State Water Resources Control Board Construction General Permit, Order 2009-0009-DWQ and Industrial General Permit, State Water Board Order No. 97-03-DWQ
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y	Regional San Flood Risk Evaluation for the South River Pump Station South River Pump Station Emergency Response Plan Pump Station Protection Plan for the South River Pump Station Flood Protection Project Draft Report
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	Y	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	Y	Rating: 3/9 (urban/rural)
Site plan review requirements	Y	Work in conjunction with the Sacramento Area Sewer District and other local jurisdictional authorities to review site plans to ensure code compliance for building, mechanical, plumbing, etc and to ensure compliance with local ordinances. County of Sacramento Construction Management and Inspection Division services are utilized during construction to ensure continued compliance.
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	Y	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	Y	Require compliance with Sacramento County Standard Construction Specifications Erosion and Sediment Control Compliance sections State Water Resources Control Board Construction General Permit, Order 2009-0009-DWQ
Other	Y	Use design standards for facilities. These standards include items such as fire protection systems, building alarms, etc. These standards are shown in Sewage Pump Station Design Manual (Feb ;2005); Interceptor Design Manual (October 2003); and SRWTP Guide Specifications (2006/07).

How can these capabilities be expanded and improved to reduce risk?

Source: Regional San

SCRSD Emergency Response Plan

The purpose of this Emergency Response Plan (ERP) is to provide the District with a response and recovery protocol to prepare for, minimize, and mitigate injury and damage resulting from emergencies or disasters of man-made or natural origin, while ensuring continuity of treatment plant and interceptor sewer collector system operations. This plan assigns roles and responsibilities to individuals for managing emergency response and support services. The ERP documents the steps needed to ensure reliable conveyance and treatment of wastewater during an emergency event. The ERP assists in meeting the following objectives:

- Provide for a safe and coordinated response to emergencies
- Ensure effective communication between local or regional responders to an emergency
- Ensure continuity of the wastewater collection system and treatment process
- Minimize wastewater system damage
- Minimize adverse effects on the environment
- Minimize negative impacts on public health and employee safety

SRWTP Flood Response Manual

The SRWTP Flood Response Manual was created in 1997 and is updated periodically to maintain up to date flood response procedures. The document provides recommended actions for possible flood scenarios at SRWTP. The document is meant to provide preventative measures to help prevent flooding of SRWTP as well as response procedures for responding to unavoidable flood situations. The plan contains recommended actions to help prevent the SRWTP from flooding and to minimize damages when preventing flooding is not possible. Each flood alert state has corresponding flood response actions.

Sanitary Sewer Overflow Response Plan

The Sanitary Sewer Overflow (SSO) Response Plan for the Interceptor System identifies measures to protect public health and the environment. It contains important information and resources that will be used during and after an SSO occurrence. The purpose of this plan is to identify the necessary procedures for notification, response, reporting, and clean-up of SSOs that may occur within the Interceptor System. Additionally, the document attempts to improve communication between satellite agencies and Regional San through the development and implementation of the practices described in this report.

Sewage Pump Station Design Manual

This manual was prepared as for use as an overall criteria or standard to ensure consistency for pump station design projects. The manual provides guidance for the most effective design practices for new pumping stations and is intended to:

- Establish design guidelines for new pump stations in interceptor conveyance and local trunk collection systems,
- Identify design functions required by a pump station design consultant,

- Provide an acceptable level of quality and uniformity in pump station design,
- Provide design consistency.

Interceptor Design Manual

The Regional San Interceptor Design Manual is used for design and construction of the interceptor system including ancillary components. This manual provides guidelines that are used for interceptor projects such as pipe design criteria, hydraulic analysis, geotechnical reports, right of way recommendations, surveying, construction techniques and materials, inspection, safety, project management and administration, and other topics that are standard to the Districts interceptor pipe projects. The manual provides clear guidance and direction for interceptor projects to set forth working relationships among the parties involved in the projects, establish criteria that will result in acceptable levels of quality and uniformity in procedure and finished project, and obtain cost savings in production of design and construction.

SRWTP Guide Specifications

The guide specifications provide standards for construction projects at the Sacramento Regional Wastewater Treatment Plant (SRWTP). These specifications provide guidance on bidding, contractor experience requirements, equipment and materials, general conditions, coordination with existing operations, etc. The guide specifications ensure that construction projects are completed so as to conform with SRWTP standards.

2000 Interceptor Master Plan

Long range planning is essential to managing expansion of the regional wastewater system in a cost-effective manner. Construction typically occurs only in response to actual growth and facilities constructed will have a projected 50-100 year service life. The Interceptor Master Plan is based on the master plans of surrounding cities, counties and communities within the service area. The Master Plan is intended to be a planning level tool to provide long term guidance for timely commitment of resources.

Flood Risk Evaluation for the South River Pump Station

This study included an evaluation and analysis of the pump station including a comprehensive evaluation of the current level of flood protection at the South River Pump Station and analysis of alternatives for improvements to provide additional flood protection. The study evaluated the impacts of the 100 and 200-year storm events caused by local flooding and levee failure on the Sacramento River in the vicinity of the South River Pump Station. The study also provided an assessment of potential damage to the facility caused by flooding.

South River Pump Station Emergency Response Plan

This plan provides the District with preparation and response procedures to ensure continued operation of the South River Pump Station in the event of major or minor flooding events.

West Sacramento Emergency Flow Plan

This plan provides procedures for operation of the South River Pump Station during flood events to maintain sewer service to the City of West Sacramento.

M.6.2. Administrative/Technical Mitigation Capabilities

Table M-19 identifies the department(s) responsible for activities related to mitigation and loss prevention for Regional San

Table M-19 Regional San's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission		
Mitigation Planning Committee		
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)		
Mutual aid agreements		
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y	
Community Planner	Y	
Civil Engineer	Y	
GIS Coordinator	Y	
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	Y	
Grant writing	Y	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: Regional San

M.6.3. Fiscal Mitigation Capabilities

Table M-20 identifies financial tools or resources that the Regional San could potentially use to help fund mitigation activities.

Table M-20 Regional San's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	Y	
Impact fees for new development	Y	
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	N	
Community Development Block Grant	Y	
Other federal funding programs		
State funding programs		
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: Regional San

M.6.4. Mitigation Education, Outreach, and Partnerships

Table M-21 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table M-21 Regional San's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

M.6.5. Other Mitigation Efforts

Regional San will participate as required during activation of the Sacramento County Office of Emergency Services for local and emergency events to assist in emergency coordination and intends to look for funding required to continue and complete projects identified that are necessary to protect Regional San assets to allow continued service to local communities.

Some of Regional San's past or current hazard mitigation projects include:

- South River Pump Station Low Level Flood Protection Project: In 2009, Regional San completed a temporary flood mitigation project for the South River Pump Station (SRPS) located in Yolo County. When the SRPS was designed and constructed, the SRPS was shown on the Yolo County FIRM to be in the 500-year floodplain. Shortly afterwards, the surrounding levees were re-evaluated and the SRPS is now shown in the 100-year flood plain. The temporary flood mitigation project for the SRPS consisted of constructing a sealed, custom (no holes) 2-foot 8-inch K-Rail wall around the pump station perimeter at an estimated cost of $76,000. This temporary mitigation is effective against low-level flooding (i.e., 8 to 12 inches of water depth).
- Bufferlands Fire Break Maintenance (ongoing): Annually by the end May, Regional San uses a combination of mowing and disking to establish firebreaks on the Bufferlands as a fire control measure. The firebreak widths vary from 30-60 feet depending on the habitat types and fire risks.

M.7 Mitigation Strategy

M.7.1. Mitigation Goals and Objectives

Regional San adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

M.7.2. Mitigation Actions

The planning team for Regional San identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and

administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. South River Pump Station Flood Protection Project

Hazards Addressed: Flooding, Levee Failure

Goals Addressed: 1, 2, 3, 4

Issue/Background: The South River Pump Station (SRPS) is located at 30030 South River Road in Clarksburg, CA, in an undeveloped agricultural basin immediately south of the southern boundary of the City of West Sacramento in Yolo County. It was placed in service in 2007 and is a critical facility that provides service to West Sacramento and the northern portions of Sacramento County.

Changes in federal levee design and assessment criteria have impacted the overall protection ratings for levees in the Sacramento region. Although the exact level of flood protection is not known, based on previous studies in the region it is estimated that the SRPS basin has less than a 100-year level of flood protection.

Project Description: The SRPS Flood Protection Project will construct a new 200-year level of flood protection ring levee and a raised all weather access road for the facility. The ring levee and raised access road will consist of 22-foot-high, 160 feet wide bottom width, earthen embankment that will surround the SRPS and provide access from South River Road in the event that flooding occurs. The project requires 400,000 cubic yards of borrow material.

Other Alternatives:

- Do Nothing; unacceptable
- Wait for improvements to Sacramento River Levee in the area; unacceptable

Existing Planning Mechanisms through which Action will be Implemented: This project is listed on Regional San's capital improvements for implementation in 2017.

Responsible Office: Regional San Engineering

Priority (H, M, L): High

Cost Estimate: $10,000,000 for design, permitting, and construction

Potential Funding: FEMA grants

Benefits (avoided Losses): This pump station serves West Sacramento and the northern portions of Sacramento County. Loss of the SRPS due to flood would be catastrophic.

Schedule:

- Advertise for bid December 2016

- Award Contract February 2017
- Start Construction May 2017
- Complete Construction October 2017

Action 2. Reduction of Fire Hazard SRCSD Bufferlands

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Hot, dry summers increase the likelihood of wildfire on the Bufferlands area surrounding the Sacramento Regional Wastewater Treatment Plant. While much of the habitat of the Bufferlands is fire adapted, high fuel loads associated with the prevalent annual herbaceous vegetation on the property puts some habitats, crops, and infrastructure at risk. To minimize the risk of wildfire on the Bufferlands, SRCSD annually establishes firebreaks between public roads and sensitive resources. Firebreaks are either disked to bare ground at a width of 30 feet or mowed to height of 4-inches or less at a width of 100 feet. Grazing leases are utilized to reduce summer fuel loads on a large portion of SRCSD upland habitat. Through lease agreements, SRCSD requires that agricultural tenants be responsible for establishing fire breaks around their sensitive crop areas.

Other Alternatives: None

Existing Planning Mechanisms through which Action will be Implemented: Annual O&M Planning.

Responsible Office: SRWTP Bufferlands Office

Priority (H, M, L): Medium

Cost Estimate: $50,000 annually

Benefits (Losses Avoided): Avoids fire damage to grasslands, tree mitigation lands, sensitive habitat area, crops, infrastructure.

Potential Funding: SRCSD funded annually. Tenants required to fund mitigation on tenant-occupied land.

Schedule: Annually.

Annex N Sacramento Area Sewer District

N.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Sacramento Area Sewer District (SASD), a new participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the Sacramento Area Sewer District. This Annex provides additional information specific to SASD, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

N.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), SASD formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table N-1. Additional details on plan participation and SASD representatives are included in Appendix A.

Table N-1 SASD Planning Team

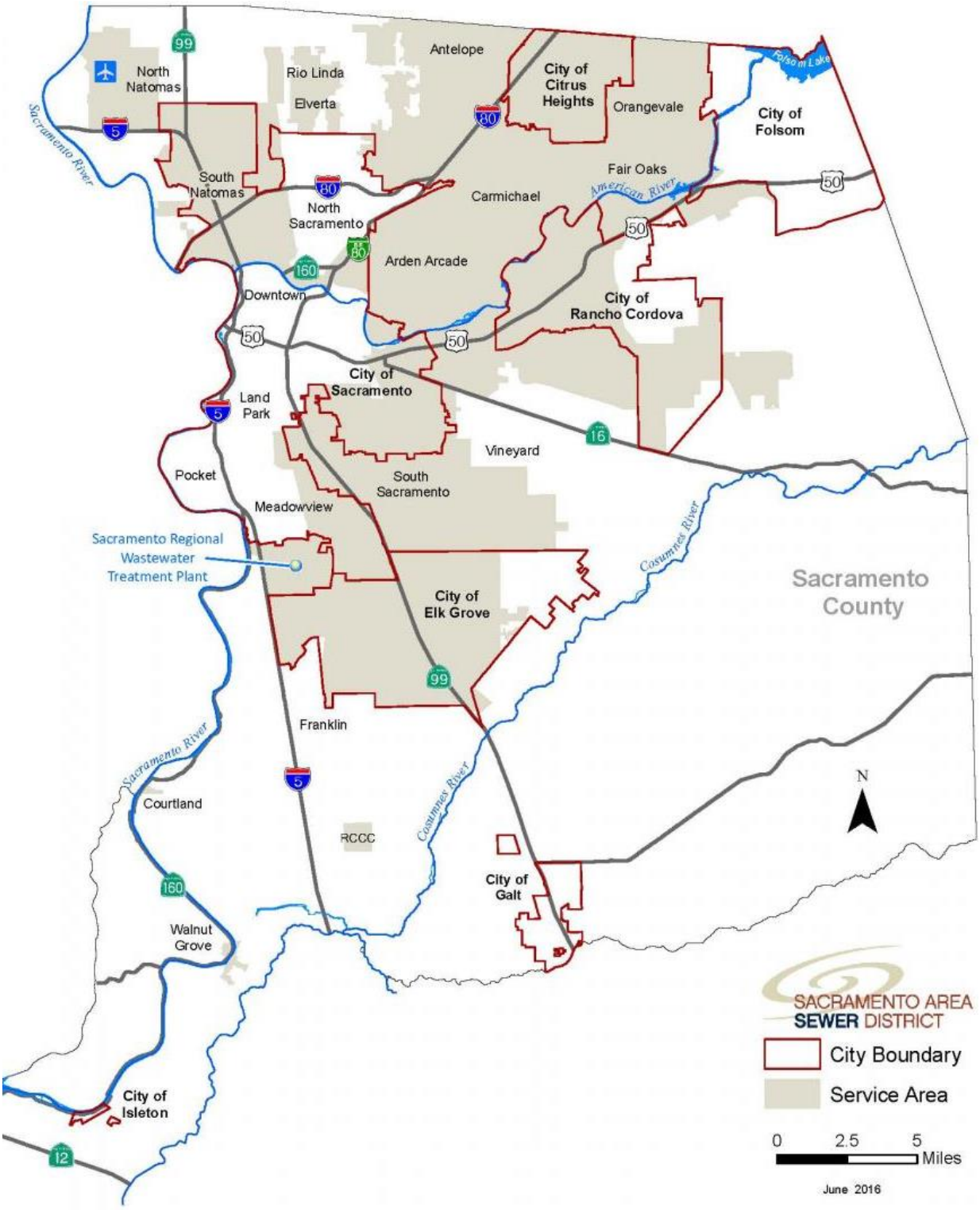
Name	Position/Title	How Participated
Matthew Doyle	Safety & Regulatory Compliance Manager	Gathered Information, Main point of contact, met with Engineering and M&O for data collection
John Hough	M&O Assistant Superintendent	Gathered Service Map, reviewed documents
Patrick Schroeder	Principle Engineer	Attended meeting, Reviewed documents
Raul Rodriguez	GIS Analyst III	GIS Mapping data
Steve Nebozuk	Civil Engineer	Attended HMPC meetings

Source: SASD

N.3 Community Profile

The community profile for SASD is detailed in the following sections. Figure N-1 displays a map and the location of SASD boundaries within Sacramento County.

Figure N-1 Sacramento Area Sewer District Map



Source: SASD

N.3.1. District Overview, History, and Background

The SASD is a sewer utility providing service to more than one million people in the Sacramento region, including the unincorporated areas of Sacramento County; the cities of Citrus Heights, Rancho Cordova, and Elk Grove; as well as portions of the cities of Folsom and Sacramento. The District serves residential, commercial and industrial customers.

SASD owns and operates thousands of miles of lower lateral and main line pipes and is responsible for the day-to-day operations and maintenance of these sewer pipes. Once collected in the system, sewage flows into the Regional San interceptor system, where it is conveyed to the Sacramento Regional Wastewater Treatment Plant near Elk Grove.

SASD was formed in 1978 and is governed by a 10-member Board of Directors representing the various city and county jurisdictions in the District's service area.

N.4 Hazard Identification

SASD's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to SASD (see Table N-2).

Table N-2 SASD—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Likely	Critical	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change				
Dam Failure	Significant	Unlikely	Catastrophic	High
Drought and Water Shortage	Extensive	Likely	Limited	Low
Earthquake	Limited	Occasional	Critical	Medium
Earthquake: Liquefaction				
Flood: 100/200/500-year	Significant	Occasional	Critical	High
Flood: Localized Stormwater Flooding	Limited	Highly Likely	Limited	Medium
Landslides	Limited	Unlikely	Negligible	Low
Levee Failure	Significant	Likely	Critical	High
River/Stream/Creek Bank Erosion	Limited	Highly Likely	Limited	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Negligible	Low
Severe Weather: Fog	Extensive	Highly Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Limited	Low
Severe Weather: Wind and Tornadoes	Limited	Likely	Limited	Medium
Subsidence	Significant	Highly Likely	Limited	Low
Volcano	Limited	Unlikely	Limited	Low
Wildfire:(Burn Area/Smoke)	Limited	Likely	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

N.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile SASD's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Hazard Profiles and Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to SASD is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

N.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section N.5.3, includes a description as to how the hazard affects the SASD and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

N.5.2. Vulnerability Assessment

This section identifies SASD's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table N-3 lists particular critical facilities and other District assets identified by the SASD's planning team as important to protect in the event of a disaster. SASD's physical assets, valued at over $990 million, consist of the buildings and infrastructure to support the SASD operations.

Table N-3 SASD's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
SACY	Essential	10060 Goethe Rd Sacramento	$60,600,000	Minimal flood, airplane crash, fire

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
NACY	Essential	5026 Don Julio Sacramento	$26,800,000	Minimal flood, fire
Main Lines	Essential	3,000 miles of pipelines	$2,930,400,000	Minimal earthquake
Lower Laterals	Essential	1,400 miles of pipelines	$1,704,300,000	Minimal earthquake
Manholes	Essential	60,880 manholes	$1,704,300,000	Minimal earthquake
Pump Stations	Essential	105 pump stations	$97,200,000	Minimal fire, flood, earthquake

Source: SASD

Natural Resources

The District Planning Team noted Sacramento River, American River, creek habitats, and vernal pools are natural resources located in District boundaries.

Historic and Cultural Resources

The District Planning Team noted the City of Locke as a historic resource.

Growth and Development Trends

Population growth will accelerate over the next 5 years. Annual growth in the 2011 to 2016 period averages 1.5 percent per year.

N.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table N-2 as high or medium significance hazards. Impacts of past events and vulnerability of the SASD to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable structures are those located within the floodplain or within levee and dam inundation areas. Buildings that contain electronic or electrically operated equipment are also vulnerable to flood inundation.

An estimate of the vulnerability of the SASD to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–High

Hazard Profile and Problem Description

Dam failures can result from a number of natural or manmade causes such as earthquakes, erosion of the face or foundation, improper siding, rapidly rising flood waters, structural/design flaws, and deliberate human actions. Folsom Dam is the major dam which affects the SASD and the populations in the inundation areas. Folsom Dam is owned by the US Bureau of Reclamation. The flood waters from a dam failure would likely affect the SASD's service area. Flood waters could inundate sewer pump stations, regional collector pipes, underground structures, and equipment, resulting in the inability to access or operate SASD's facilities within the flooded areas. A severe flood could jeopardize the operation of the regional sewer treatment plant. Access to the regional sewer treatment plant, affected pipe systems and pump station facilities to assess and restore operation could be limited until such time that the flood waters receded.

The ability to warn downstream communities in the event of a flood event caused by a dam failure is generally dependent on conditions such as the frequency of inspections for the dam's structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate or take preventative actions to minimize damage to utilities or infrastructure. The existence and frequency of updating and exercising an evacuation plan that is site-specific assists in warning and evacuation functions.

A dam failure will cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to sewer collection, conveyance and treatment facilities would likely impact communities outside the immediate hazard areas by disrupting sewer collection and treatment services.

Past Occurrences

The District Planning Team noted no past occurrences of dam failure to affect SASD.

Vulnerability to Dam Failure

Assets/Critical Facilities at Risk

According to the Sacramento County General Plan Background report, there are four major and two minor dams which, if they fail, may impact the people and resources of this District. The major dams are comprised of Shasta on the Sacramento River, Oroville on the Feather River, Comanche on the Mokelumne River, and Folsom on the American River. The minor dams include Nimbus and Rancho Seco. SASD has no records indicating that previous dam failures have impacted its assets.

Scenario for Evaluating Values at Risk

Sacramento County provided inundation as a GIS layer for the Folsom Dam system, as part of the following breaks:

- Folsom Right Wing
- Folsom Mormon
- Folsom Dike 4
- Folsom Dike 5
- Folsom Dike 6
- Folsom Dike 7
- Folsom Dike 8
- Folsom Dam

Description of Folsom Dam Facilities

The Folsom Dam and Reservoir Project is located on the American River, about 20 miles upstream of the City of Sacramento, California. I t was designed and built by the Corps of Engineers during the period 1948 to 1956, and is now owned and operated by the U.S. Bureau of Reclamation. The reservoir has a storage capacity of 1 million acre-ft at gross pool. The project includes about 4.5 miles of man-made water retaining structure that has a crest elevation of 480.5 ft above sea level.

Purpose of Study

As described in Section 4.3.6 of the based plan, the Bureau of Reclamation performed a study in an attempt to determine the magnitude of flooding that would result from various breach scenarios of structures located around the reservoir. The structures are Folsom Dam itself, its right wing dam, dikes 4, 5, 6, 7, 8, and Mormon Island. The results of hydrodynamic simulations are used to generate potential inundation maps that can aid in the development of emergency actions plans.

Assets at Risk

SASD has identified the following assets in Table N-4 as being potentially affected if the Folsom Dam were to have a catastrophic failure.

Table N-4 SASD Assets and Values at Risk in the Folsom Dam Inundation Zone

Facility #	Facility Name	Asset Value(1)
S43	Rio Linda	$560,000
S53	Rio Linda Woods	$560,000
S125	Northborough	$1,200,000
S018	Westgate	$560,000
S139	Gateway	Just used as a flow through
S067	Landis	$560,000
S084	Rivergate	$560,000
S051	Larchmont Butterfield	$560,000
S006	American River Dr.	$560,000
S050	Goethe Rd	$560,000
S079	College Town	$680,000
S036	Alder Creek	$560,000
S129	Fruitridge Center	$4,700,000
S022	Antelope Village Unit #1	$560,000
S112	Parkway Greens	$560,000
S009	Rivergreen Ranch	$560,000
S002	Antelope North Area	$2,100,000
S054	Antelope Vista	$560,000
S080	Sunview	$560,000
S091	Mountain Ave	$560,000
S046	Woodgate #1	$560,000
S026	Northgate #5	$560,000
S110	Westborough Village #2	$560,000
S034	Mills Park	$560,000
S101	Bazely	$560,000
S100	Lemay	$560,000
S039	Routier Rd	$810,000
S107	Mather	$560,000
S099	Elder Creek	$801,000
S032	Rosemont	$2,000,000
S059	Arden Gold	$1,900,000
S111	Laguna-Stonelake	$1,200,000
S048	Whyte Ave	$7,500,000
S004	Country Club Cove	$560,000
S011	Bridge	$850,000
S001	Northbrook	$560,000

Facility #	Facility Name	Asset Value(1)
S082	Butterfield	Retired
S041	Willow Creek	$560,000
S090	West La Loma Pump Station	$810,000
S077	Capitola Pump Station	$560,000
S005	Arden and Fulton Pump Station	$560,000
S028	River Gardens Pump Station	$560,000
S124	College Oak Drive Pump Station	$810,000
S007	Tributary Point Unit #1 Pump Station	$560,000
S128	Bear Hollow Pump Station	$560,000
S070	Sunrise White Rock Pump Station	$810,000
S003	Cottage and Kincaid Pump Station	$560,000
S098	Fruitridge Industrial Pump Station	$560,000
S035	Cordova Towne	$560,000
S049	Del Rio	$810,000
S021	Lakeside/Laguna West	$1,700,000
S127	Arcadian Village Unit #2	$560,000
S013	Hoffman Park	$980,000
S040	Silver Oak Estates	$560,000
S014	Park Road	$4,700,000
S008	Hagginbottom	$2,000,000
S010	Parkway Chlorine	Retired
S143	Florin Mall	$750,000
S117	54th And Dudley	$560,000
S148	Hadleigh Dr	$560,000
S055	Northeast	$560,000
S113	Metro Air Park	$560,000
S149	Garfield	$560,000
S071	Zinfandel Dr	$1,700,000
S150	Center Parkway	$810,000
S073	Sailor Bar	$2,400,000
S066	Bannister	$1,200,000

Source: SASD Finance Office, SASD Engineering, SASD Policy and Planning

(1) Asset value includes facility, site structures, site equipment, mobile equipment, miscellaneous items that may have soft cost components, some associated adjacent pipeline components. Values taken from SASD 2010 Comprehensive Annual Financial

Critical Facilities at Risk

The SASD critical facility inventory was compared with the Folsom Dam failure inundation layer using GIS. Facility locations that were within the hazard area were selected and sorted by critical facility

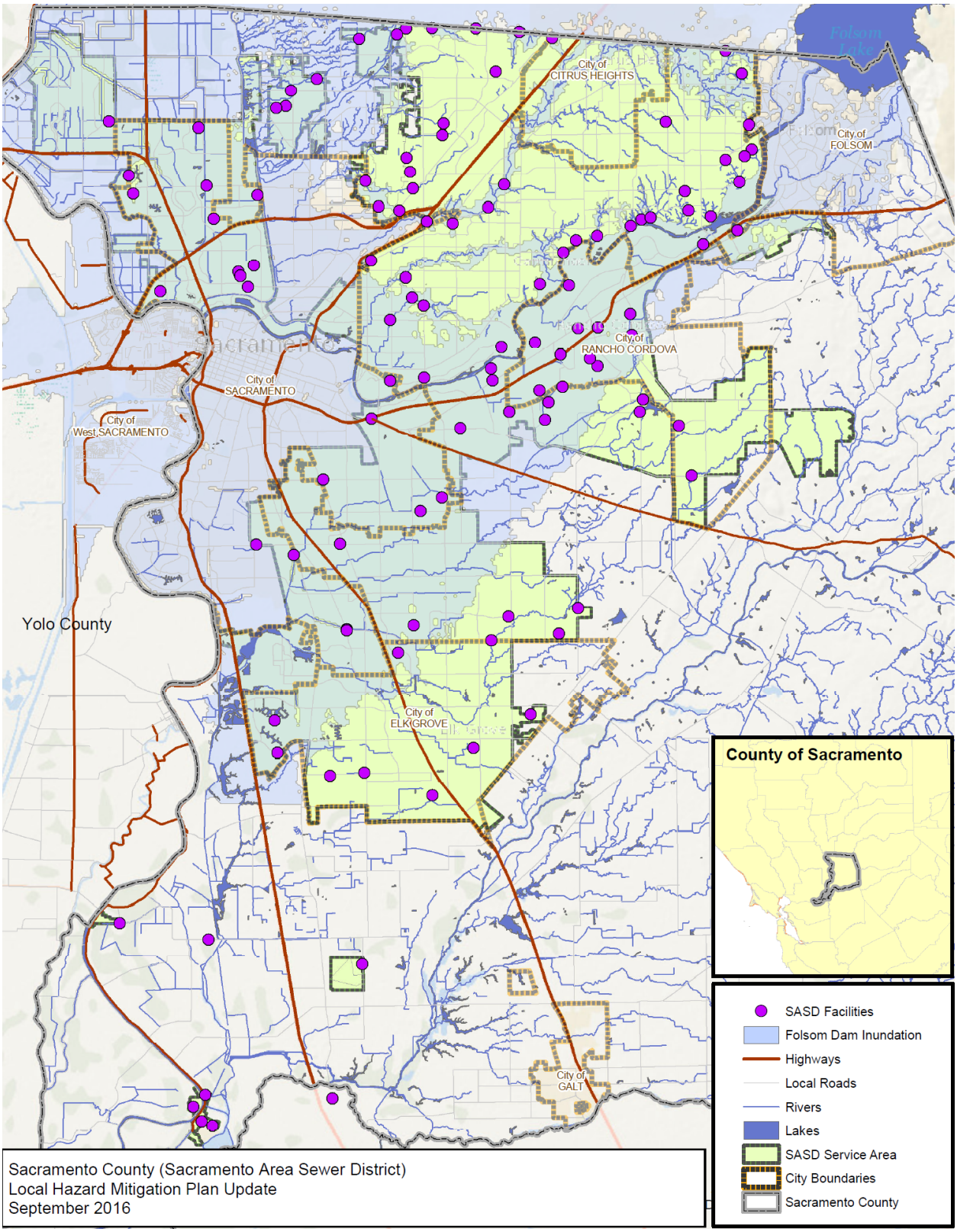
definition category; the summary results of this analysis are show in Table N-5. A detailed critical facility table is included in the Base Plan as Appendix E. The dam failure hazard column on the right-hand side of Appendix E denotes whether a particular facility is considered to be vulnerable to dam failures.

Table N-5 SASD Critical Facilities at Risk in the Folsom Dam Inundation Zone

Critical Facility Definition	Count
Essential Services Facilities	67
High Potential Loss Facility	0
Transportation & Lifeline	0
Total	**67**

Source: SASD GIS

Figure N-2 SASD Critical Facilities in the Folsom Dam Inundation Area



Source: SASD

Natural Resources at Risk

The District Planning Team noted that the American River, Folsom Reservoir, Consumnes River, Sacramento River, and numerous creeks are natural resources in the District at risk from dam failure.

Historic and Cultural Resources at Risk

The District Planning Team noted no historic or cultural resources at risk in the District from dam failure.

Future Development

Any future development that falls in the Folsom Dam Inundation Area identified in Figure N-2.

Earthquake

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

SASD facilities are in a low risk area with no history of damage due to earthquakes.

Past Occurrences

There are no past occurrences affecting District SASD facilities.

Vulnerability to Earthquake

Assets/Critical Facilities at Risk

SASD assets at risk are pump stations, force mains, main lines, manholes, lower laterals, North Area Corp Yard, and the South Area Corp Yard.

Future Development

There is no additional risk to future development than what currently exists.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Major surface waters in the vicinity of the SASD service area include the American River, Nimbus Reservoir, Folsom Reservoir, Lake Natoma, the Sacramento River, and the Consumnes River. In the SASD service area, the potential for flood damage would occur in the floodplains of the American River,

Sacramento River, Cosumnes River, Mokelumne River, Laguna Creek, Morrison Creek, Dry Creek and Strawberry Creek.

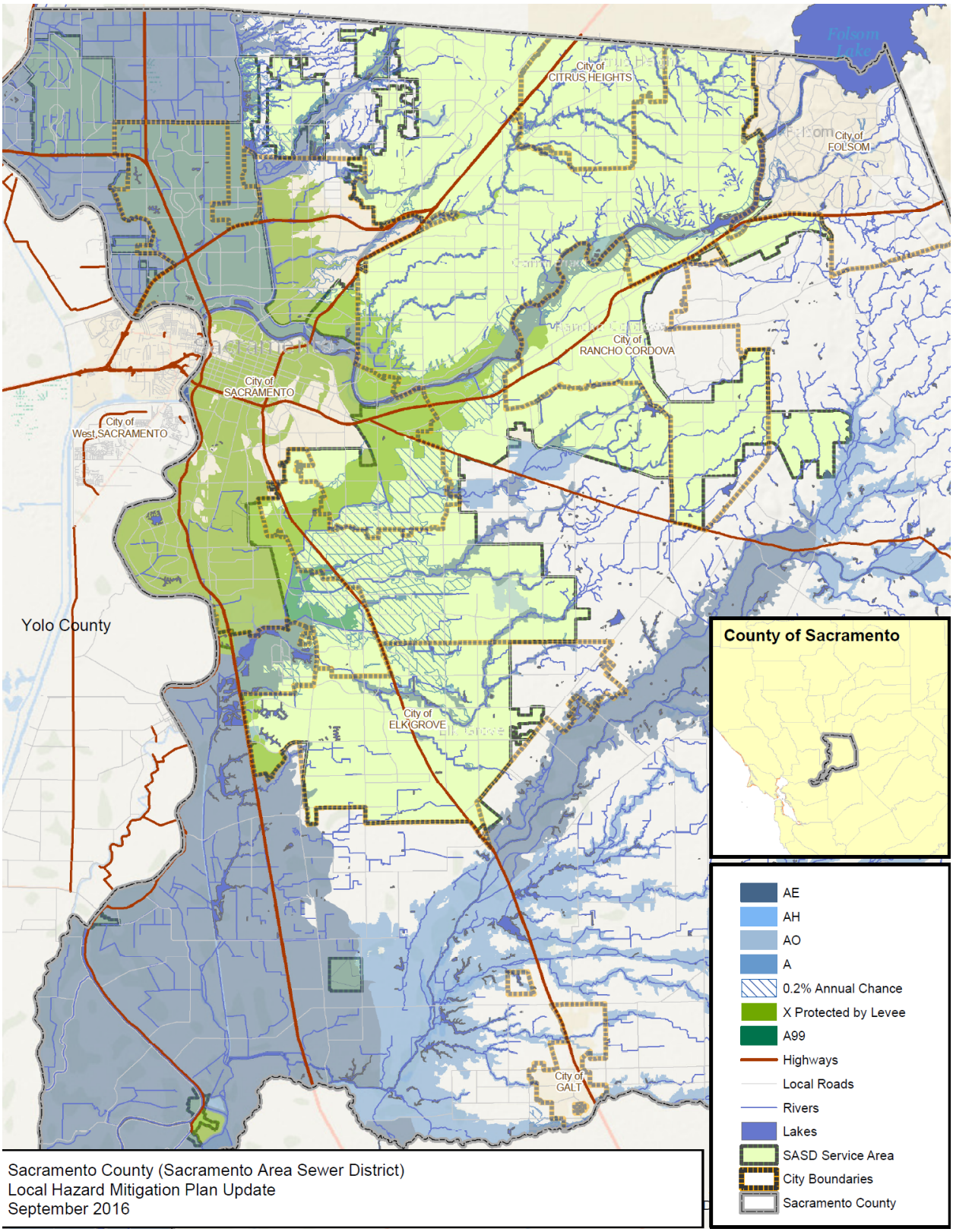
Past Occurrences

The District Planning Team noted no past occurrences of flooding in SASD.

Vulnerability to Flood

Figure N-3 shows the SASD service area overlaid on the DFIRM.

Figure N-3 Sacramento Area Sewer District Service Area and DFIRM



Source: SASD

Assets a Risk

SASD has identified the following assets as being potentially affected from a 100-year flood event, as shown in Table N-6.

Table N-6 SASD Assets at Risk in the 100-year Floodplain

Facility type	Facility Name	Asset Value(1)
Sub	S001 Northbrook Pump Station	$3000 @ 1' of water $560,000 total replacement
Sub	S006 American River Drive Pump Station	$100,000 at 1' water $560,000 Total replacement cost
WW/DW	S008 Hagginbottom Pump Station	$200,000 at 1' water $2 Million Total Replacement Cost
Sub	S012 RCCC Pump Station	$10,000 at 1' of water $1.5 Million Total Replacement Cost
Sub	S018 Westgate Pump Station	$1,000 @ 1' water $560,000 Total Replacement Cost
Sub	S025 Center Parkway Pump Station	$10,000 at 1' water $810,000 Total Replacement cost
Sub	S026 Northgate #5 Pump Station	$3,000 at 1' water $560,000 total replacement cost
WW/DW	S028 River Gardens Pump Station	$10,000 @ 1' water $560,000 Total Replacement Cos
WW/DW	S032 Rosemont Pump Station	$500,000 flood total $2 Million total Replacement Cost
Sub	S041 Willow Creek Pump Station	$4,000 at 1' of water $560,000 Total Replacement Cost
Sub	S046 Woodgate #1 Pump Station	$5,000 at 1' of water $560,000 Total Replacement Cost
Canned WW/DW	S049 Del Rio Pump Station	$1,000 at 1' of water $810,000 Total Replacement Cost
Canned WW/DW	S051 Larchmont Butterfield No.3 Pump Station	$3,000 at 1' water $560,000 total Replacement Cost
Sub	S053 Rio Linda Woods Pump Station	$4,000 at 1' of water $560,000 total replacement cost
Sub	S055 Northeast Pump Station	$100,000 total Flood replacement $750,000 Total replacement cost
Sub	S064 Walnut Grove Pump Station	$20,000 @ 1' Water $1.5 Million total Replacement Cost
Sub	S065 Clampett Tract Pump Station	$20,000 at 1' water $1.5 Million total Replacement Cost
Sub	S080 Sunview Pump Station	$6,000 at 1' of water $560,000 Total Replacement Cost
Sub	S084 Rivergate Pump Station	$5,000 at 1' of water $560,000 Total Replacement Cost

Facility type	Facility Name	Asset Value(1)
Sub	S090 West La Loma Pump Station	$100,000 at total flood damage $ 810,000 Total Replacement Cost
Sub	S110 Westborough Village No.2 Pump Station	$5,000 at 1' of water $560,000 Total Replacement Cost
Sub	S113 Metro Air Park Pump Station	$10,000 at 1' of water $560,000 Total Replacement Cost
Sub	S125 Northborough Pump Station	$10,000 at 1' of water $1.2 Million Total Replacement Cost
Multiple Grinder	S133 Locke Pump Station	No damage at 1' of water $200,000 total flood damage $980,000 Total Replacement Cos
Sub	S140 Hovnanian Drive Pump Station	$10,000 at 1' of water $560,000 Total Replacement Cost
Sub	S144 Wilson Road Pump Station	$500,000 flood total $1.5 Million total Replacement Cost
Sub	S145 Lambert Road Pump Station	$500,000 flood total $1.5 Million total Replacement Cost
Sub	S146 Walnut Grove Pump Station	$500,000 flood total $1.5 Million total Replacement Cost
Sub	S147 Cameron Road Pump Station	$500,000 flood total $1.5 Million total Replacement Cost
Sub	S150 Center Parkway Pump Station	$10,000 at 1' water $810,000 Total Replacement cost

Source: SASD Finance Office, SASD Engineering, SASD Policy and Planning

(1) Asset value includes facility, site structures, site equipment, mobile equipment, miscellaneous items that may have soft cost components, some associated adjacent pipeline components. Values taken from SASD 2010 Comprehensive Annual Financial Report, and SASD engineering project reports. Some values have been escalated based on 3% to 5% inflation.

Critical Facilities at Risk

The SASD critical facility inventory was overlayed on the Sacramento County DFIRM flood hazard layer using GIS. Facility locations that were within the hazard area were selected and sorted by critical facility definition category; the summary results of this analysis are show in Table N-7. A detailed critical facility table is included in the Base Plan as Appendix E; the flood hazard column on the right-hand side of that table denotes whether a particular facility is considered to be vulnerable to that hazard.

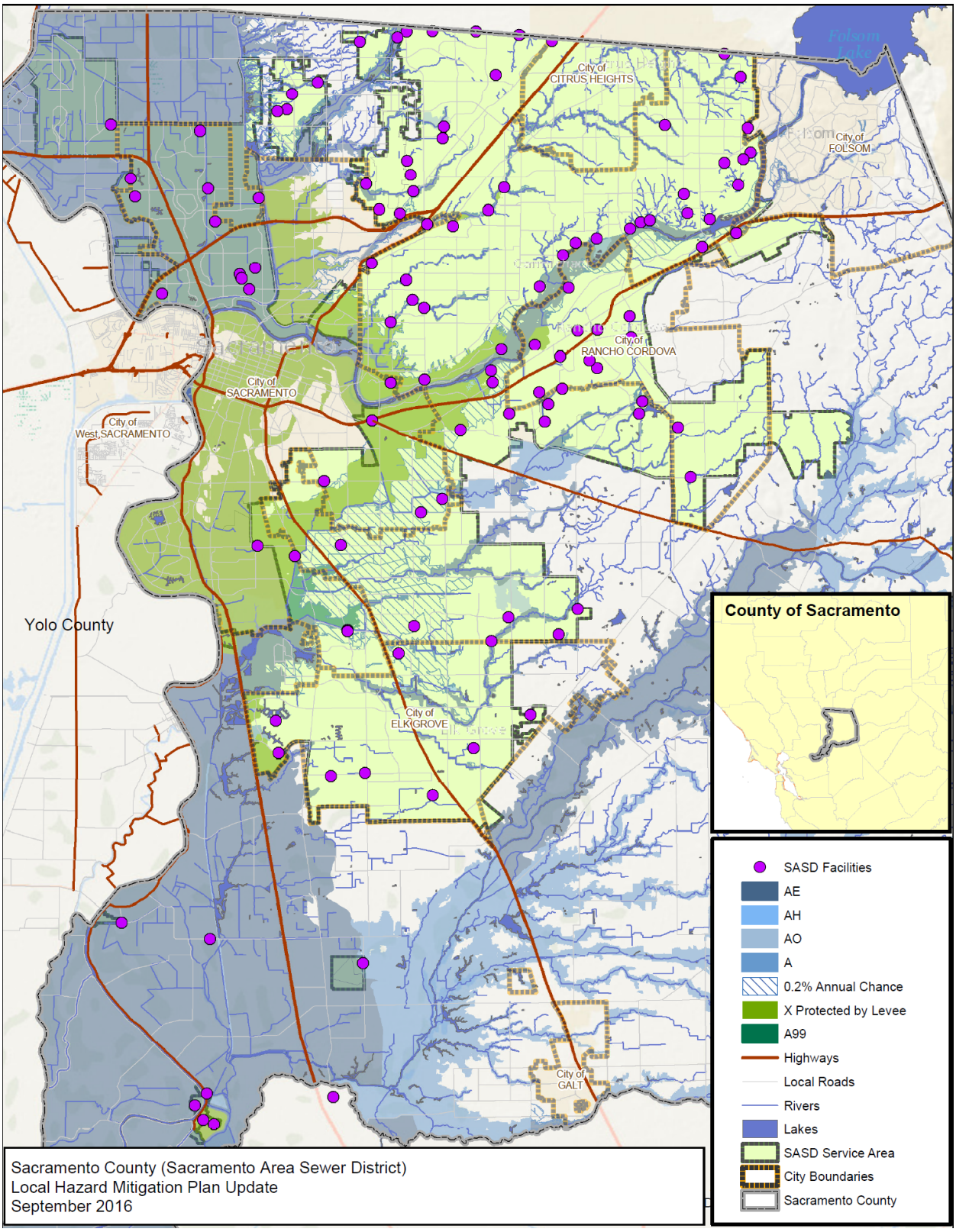
Table N-7 SASD Critical Facilities at Risk in the Floodplain

Flood	Critical Facility Category	Count
1%	Essential Services Facilities	25
1%	High Potential Loss Facility	0
1%	Transportation & Lifeline	0
	Total 1%	**25**
0.2%	Essential Services Facilities	6

Flood	Critical Facility Category	Count
0.2%	High Potential Loss Facility	0
0.2%	Transportation & Lifeline	0
	Total 0.2%	**6**

Source: SASD GIS

Figure N-4 SASD Critical Facilities in the Floodplain



Source: SASD

Natural Resources at Risk

The District Planning Team noted no natural resources at risk to flooding.

Historic and Cultural Resources at Risk

The District Planning Team noted no historic or cultural resources at risk to flooding.

Future Development

City and County jurisdictions determine what future development SASD will need. Facilities to be constructed in the floodplain identified in Figure N-4 may need to be replaced in case of a flood.

Flood: Localized Stormwater Flooding

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Localized flooding will have little effect to operations, however access to District assets may be temporarily limited.

Past Occurrences

Past occurrences of localized stormwater flooding are rare.

Vulnerability to Localized Flood

Assets/Critical Facilities at Risk

SASD assets at risk are pump stations and manholes.

Future Development

There is no additional risk to future development than what currently exists.

Levee Failure

Likelihood of Future Occurrence–Likely
Vulnerability–High

Hazard Profile and Problem Description

Note: This section includes a discussion of levees that are not owned or maintained by SASD.

Flooding caused by levee failure can occur as the result of partial or complete collapse of an impoundment, and often results from prolonged rainfall and flooding. The primary danger associated with dam or levee

failure is the high velocity flooding of properties downstream of the breach. Section 4.2.17 Levee Failure describes the levee inventory in the Sacramento County Planning Area.

Flooding caused by levee failure would vary in the District depending on which structure fails and the nature and extent of the failure and associated flooding. Flooding may present a threat to life and property depending on buildings or facilities flooded. Damage may include buildings, their contents and loss of critical services to the community. Large flood events can affect lifeline utilities (e.g., water, sewerage, and power), transportation, jobs, tourism, the environment, agricultural industry, and the local and regional economies.

Levee Flood Protection Zones estimate the maximum area that may be inundated if a project levee fails when water surface elevation is at the top of a project levee. Zones depicted on Figure 4.50 of the Base Plan do not necessarily depict areas likely to be protected from flow events for which project levees were designed. Figure 4.50 of the Base Plan illustrates the depths of flooding should a levee that protects that area fail.

Past Occurrences

SASD does not have a documented history of impacts, damages or costs associated with previous levee failure in the Sacramento region.

Vulnerability to Levee Failure

Unincorporated Sacramento County and its incorporated jurisdictions have mapped flood hazard areas. This includes areas protected by levees. GIS was used to determine the possible impacts of flooding in areas protected by levee within the County, and how the risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and values at risk to levee failure. However, this analysis was performed based on the most current 2015 DFIRMs which still reflect some levees as providing 100-year level of protection. According to the County, all levees have since been decertified as not providing a 100-year level of protection, so this analysis is based solely on the information presented in the DFIRMs. Further it is important to note that many levee improvement projects are ongoing throughout the Planning Area, some of which will be providing certification of area levees to both a 100-year and 200-year levels depending on applicable requirements. Thus, this analysis reflects a moment in time and while it does provide information on areas developed behind levees, the X Protected by Levee flood zone will continue to change as these projects are completed and new certifications obtained.

Assets a Risk

ASD assumes that the assets at risk in the X Protected by Levee Zone are the same assets at risk in the 100-year floodplain. Please see Table N-6.

Critical Facilities at Risk

The SASD critical facility inventory was overlayed on the Sacramento County DFIRM - X Protected by Levee hazard layer using GIS. Facility locations that were within the hazard area were selected and sorted by critical facility definition category; the summary results of this analysis are show in Table N-8. A

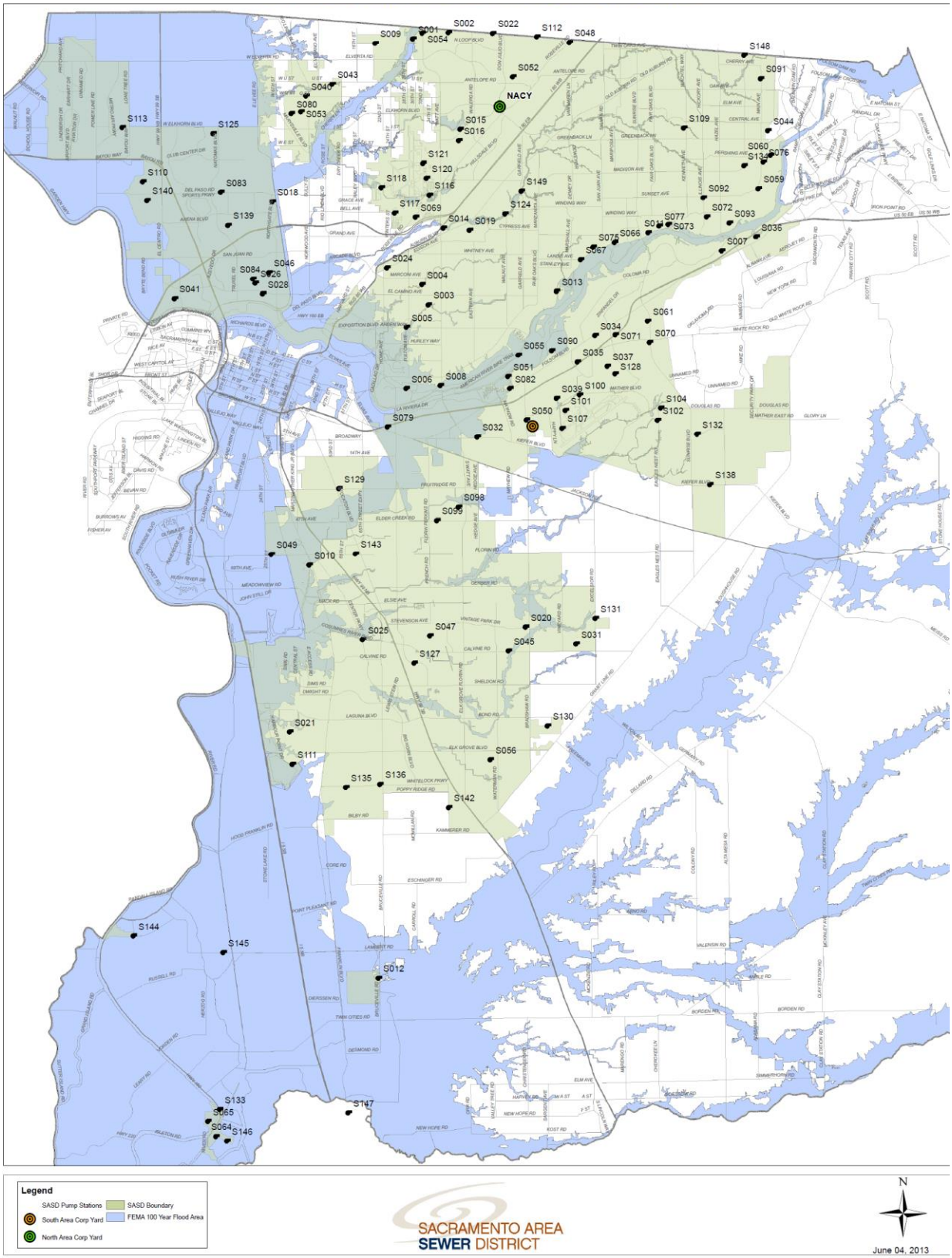
detailed critical facility table is included in the Base Plan as Appendix E; the levee failure hazard column on the right-hand side of that table denotes whether a particular facility is considered to be vulnerable to that hazard.

Table N-8 SASD Critical Facilities at Risk in the X Protected by Levee Zone

Critical Facility Definition	Count
Essential Services Facilities	108
High Potential Loss Facility	0
Transportation & Lifeline	0
Total	**108**

Source: SASD GIS

Figure N-5 SASD Critical Facilities in the X Protected by Levee



Source: SASD

Natural Resources at Risk

The District Planning Team noted no natural resources at risk to levee failure.

Historic and Cultural Resources at Risk

The District Planning Team noted no historic or cultural resources at risk to levee failure.

Future Development

City jurisdiction determines what future development SASD will need. Facilities to be constructed in the floodplain identified in Figure N-5 may need to be replaced in case of a levee failure.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Heavy rains and storm runoff is collected and conveyed in local creeks and channels. The District has approximately 700 creek crossings that could be impacted by this hazard.

Past Occurrences

SASD has had a few occurrences in which erosion has damaged assets.

Vulnerability to Erosion

Assets/Critical Facilities at Risk

SASD assets at risk are force mains, main lines, manholes, and lower laterals.

Future Development

There is no additional risk to future development than what currently exists.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

High winds cause power and communication outages that can affect multiple pump stations at once.

Past Occurrences

SASD has had occasional power outages during periods of high wind.

Vulnerability to Severe Weather: Wind and Tornadoes

Assets/Critical Facilities at Risk

SASD assets at risk are pump stations.

Future Development

There is no additional risk to future development than what currently exists.

Wildfire

Likelihood of Future Occurrence–Likely
Vulnerability–Medium

Hazard Profile and Problem Description

SASD has identified areas and District assets at risk to wildfire. Please reference Figure N-6 for details. The fire threat is based on the combined influence of the built environment, fuels, and topography

Past Occurrences

The District Planning Team noted no past wildfire occurrences.

Vulnerability to Wildfire

Assets a Risk

SASD has identified the following assets in Table N-9 as being potentially affected from a wildfire event.

Critical Facilities at Risk

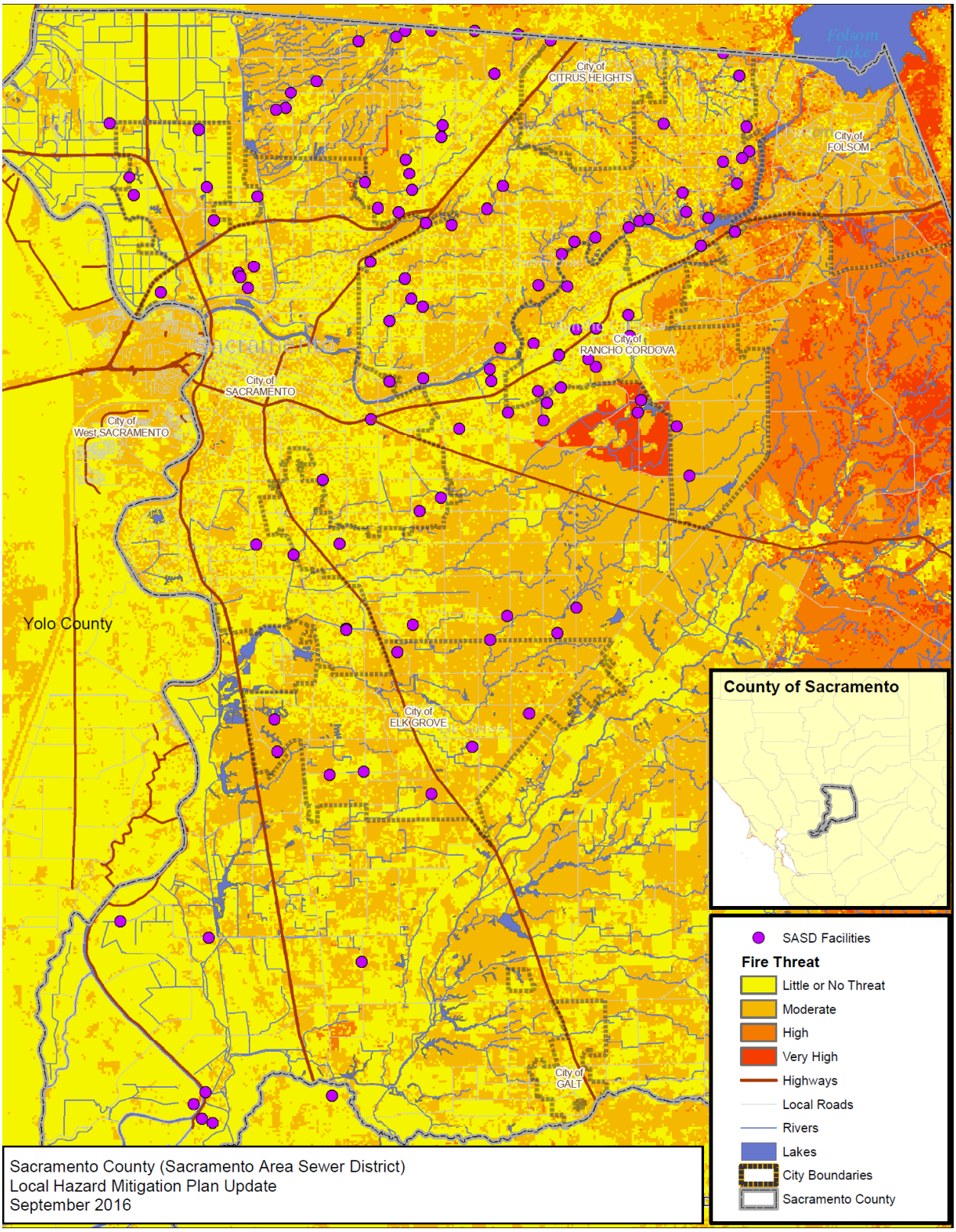
The SASD critical facility inventory was overlayed on the Sacramento County wildfire hazard layer using GIS. Facility locations that were within the hazard area were selected and sorted by critical facility definition category and key asset type; the summary results of this analysis are show in Table N-9. A detailed critical facility table is included in the Base Plan as Appendix E; the wildfire hazard column on the right-hand side of that table denotes whether a particular facility is considered to be vulnerable to that hazard.

Table N-9 SASD Critical Facilities in the Wildfire Threat Zone

Critical Facility Category	Fire Threat	Count
Historical Sites with multiple structures	Little or Moderate	0
Cultural Sites	Little or Moderate	0
Natural Resources (Bufferlands)	Little or Moderate	0
Essential Services Facilities	Little or No Threat	38
Essential Services Facilities	Moderate	56
Essential Services Facilities	High	7
Essential Services Facilities	Very High	9
High Potential Loss Facility	Little or No Threat	0
High Potential Loss Facility	Moderate	2
High Potential Loss Facility	High	0
High Potential Loss Facility	Very High	0

Source: SASD

Figure N-6 SASD Fire Threat and Critical Facilities



Source: SASD

Natural Resources at Risk

The District Planning Team noted no natural resources at risk in the District.

Historic and Cultural Resources

The District Planning Team noted no historic or cultural resources at risk in the District.

Future Development

City jurisdiction determines what future development SASD will need. Facilities to be constructed in the fire threat zones identified in Figure N-6 may need to be replaced in case of a wildfire.

N.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

N.6.1. Regulatory Mitigation Capabilities

Table N-10 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the SASD.

Table N-10 SASD's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N/A	
Capital Improvements Plan	N/A	
Economic Development Plan	N/A	
Local Emergency Operations Plan	N/A	
Continuity of Operations Plan	Y May 2015	Plan addresses hazards and provides a likelihood of occurrence.
Transportation Plan	N/A	
Stormwater Management Plan/Program	N/A	
Engineering Studies for Streams	N/A	
Community Wildfire Protection Plan	N/A	

Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N/A	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N/A	Score:
Fire department ISO rating:	N/A	Rating:
Site plan review requirements	N/A	
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning ordinance	N/A	
Subdivision ordinance	N/A	
Floodplain ordinance	N/A	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N/A	
Flood insurance rate maps	N/A	
Elevation Certificates	N/A	
Acquisition of land for open space and public recreation uses	N/A	
Erosion or sediment control program	N/A	
Other	N/A	
How can these capabilities be expanded and improved to reduce risk?		

Source: SASD

Sacramento Area Sewer District Continuity of Operations Plan (May 2015)

SASD prepared a Continuity of Operations Plan (COOP) to ensure continuity of essential SASD functions in the event of a major emergency or disaster affecting the community that the SASD serves. This plan was prepared using an all-hazards approach. The plan provides the decision-making framework and key information to be used by SASD personnel to implement business continuity operations, to restore essential functions within defined Recovery Time Objectives (RTO), and to sustain operations for up to 30 days following an event. This COOP incorporates best practices from the federal, state, and local levels and shall remain a living document with regular updates to ensure currency and relevance.

This plan supports SASD's vision, mission, and values and applies to SASD and its personnel. The COOP applies to potential hazards identified by SASD staff and uses an all-hazards continuity of operations strategy. This plan discusses the COOP's relationship to other SASD emergency response plans and the SASD Incident Command System, the different personnel types that are involved in a COOP implementation and the four phases that comprise continuity of operations:

- Phase 0: Normal Operations (Tan)
- Phase I: Alert (Yellow)
- Phase II: Activation (Orange)
- Phase III: Response (Red)
- Phase IV: Recovery (Green)

The COOP is used to restore essential SASD functions and support critical services as quickly as possible and to sustain these services for up to 30 days following an event.

N.6.2. Administrative/Technical Mitigation Capabilities

Table N-11 identifies the department(s) responsible for activities related to mitigation and loss prevention for SASD.

Table N-11 SASD's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Pump Station Maintenance
Mutual aid agreements	Y	CalWARN
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	FT	Yes
Floodplain Administrator	PT	Part time duty of various positions Facilities/GIS/Safety
Emergency Manager	PT	Part time duty of Safety
Community Planner	N	
Civil Engineer	FT	Part Time duties of current Engineering Dept staff
GIS Coordinator	FT	Full time GIS staff on site trained on Hazards
Other	FT	PIO and Communication specialists
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Reverse 911 and employee hotline
Hazard data and information	Y	Identified in COOP
Grant writing	Y	Policy & Planning Department
Hazus analysis	Y	COOP identified hazard analysis
Other		

How can these capabilities be expanded and improved to reduce risk?

Source: SASD

N.6.3. Fiscal Mitigation Capabilities

Table N-12 identifies financial tools or resources that the SASD could potentially use to help fund mitigation activities.

Table N-12 SASD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	Y	
Impact fees for new development	Y	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	N	
Community Development Block Grant	N	
Other federal funding programs	N	
State funding programs	N	
Other	N	
How can these capabilities be expanded and improved to reduce risk?		

Source: SASD

N.6.4. Mitigation Education, Outreach, and Partnerships

Table N-13 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table N-13 SASD's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N/A	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N/A	
Natural disaster or safety related school programs	N/A	
StormReady certification	N/A	
Firewise Communities certification	N/A	
Public-private partnership initiatives addressing disaster-related issues	N/A	
Other	N/A	
How can these capabilities be expanded and improved to reduce risk?		

N.6.5. Other Mitigation Efforts

Purchased redundant backup generators at our critical facilities.

N.7 Mitigation Strategy

N.7.1. Mitigation Goals and Objectives

SASD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

N.7.2. Mitigation Actions

The planning team for SASD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. MOU for Dedicated Cell Phone Tower and Cell Phone Pack

Hazards Addressed: Multi-hazard – Improve disaster prevention and minimization of impacts

Goals Addressed: 1, 2, 3

Issue/Background: Ensure communication capabilities in an emergency

Other Alternatives: Use of existing radios

Existing Planning Mechanisms through which Action will be Implemented:

Responsible Office: IT, Safety & Regulatory Compliance Sections

Priority (H, M, L): Medium

Cost Estimate: 10,000 per year

Potential Funding: Internal, Federal Grant

Benefits (avoided Losses): Communication within DOC

Schedule: Review capabilities, review vendors and possible MOU for emergency communication tower and bank of dedicated cell phones.

Annex O Southgate Recreation and Park District

O.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Southgate Recreation and Park District (Southgate RPD), a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the Southgate Recreation and Park District. This Annex provides additional information specific to Southgate RPD, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

O.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), Southgate RPD formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table O-1. Additional details on plan participation and Southgate RPD representatives are included in Appendix A.

Table O-1 Southgate RPD Planning Team

Name	Position/Title	How Participated
Juanita Cano	Temporary Planner I	Collected Data, Drafted Text
Paula Hansen	Administration Manager	Provided Data, Reviewed draft documents
Scott Hokama	Parks Manager	Provided information on impacts to District
Vincent King	Planner II	Attended Meetings, Reviewed draft document
Shalini Singh-Martin	Planner I	Attended Meetings
Erick Jones	Planner II	Reviewed draft document

Source: Southgate RPD

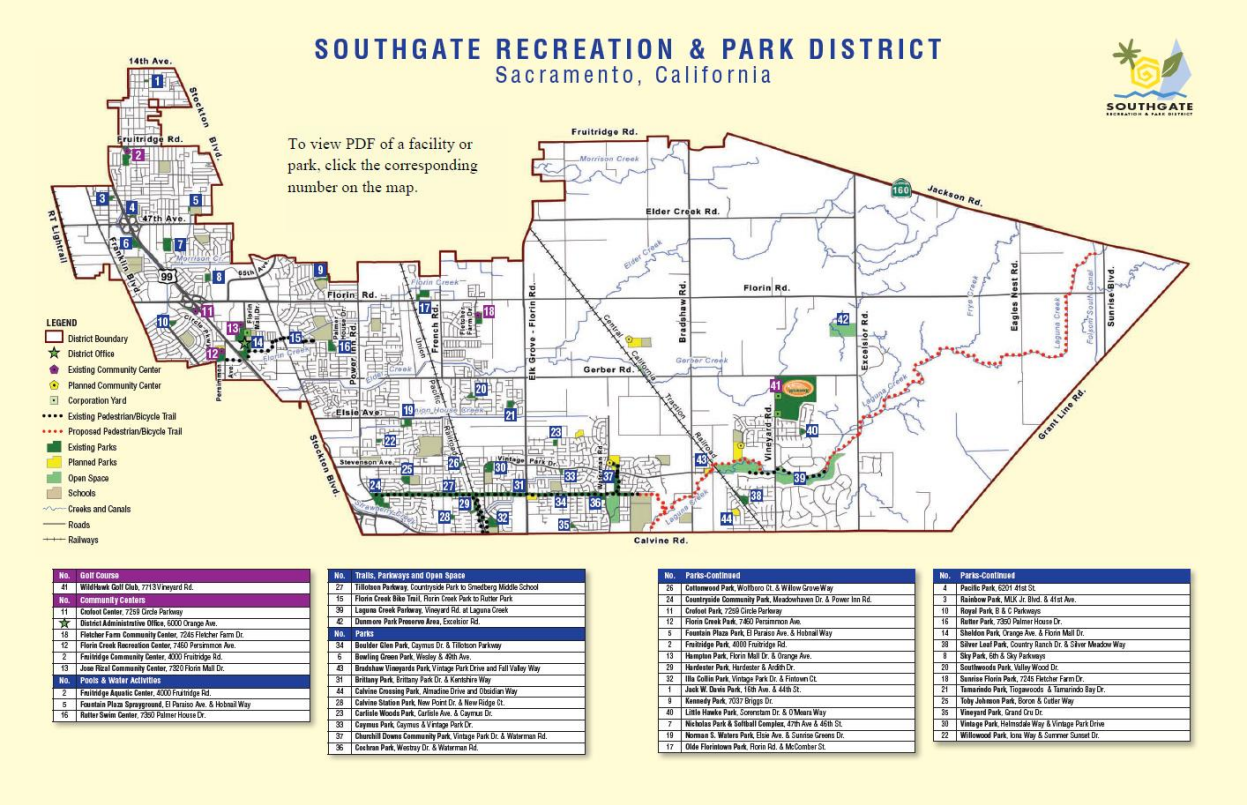
O.2.1. Coordination with Other District Planning Efforts

Coordination with other District planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the District integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Southgate RPD did not incorporate the 2011 LHMP into any planning mechanism since 2011 as no hazard specific planning has been done since that time.

O.3 Community Profile

The community profile for Southgate RPD is detailed in the following sections. Figure O-1 displays a map and the location of Southgate RPD boundaries within Sacramento County. The District lies east of Sacramento, south of Rancho Cordova and north of Elk Grove. The District's eastern boundary extends to Grant Line Road.

Figure O-1 Southgate Recreation and Park District Map



O.3.1. District Overview, History and Background

Southgate Recreation and Park District is an independent special district established in 1956 under the Public Resources Code. The District provides park and recreation services to 100,000 taxpayers in the rapidly urbanizing southeast area of Sacramento County, California. The District is managed by an elected five-member Board of Directors.

For over fifty years Southgate Recreation & Park District has been acquiring and developing parks and recreational facilities. The District encompasses a 52-square mile area of unincorporated South Sacramento County. In this area, the District currently maintains 47 parks, 6 community centers, 2 aquatic facilities and numerous landscape corridors and nature preserves. The District's primary goal and its public charge is to provide recreation and park services to the 120,000 residents it serves. The District employs professional management and staff who manage the diverse services and facilities for the South Sacramento community.

Over the next twenty years we expect to add approximately 500 acres of park land and green space as new subdivision development occurs. Our strong tradition of Parks, Programs & Partnerships will continue to guide us, enabling us to continue serving the park and recreation needs of our socially, economically and culturally diverse community.

O.4 Hazard Identification

Southgate RPD's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to Southgate RPD (see Table O-2).

Table O-2 Southgate RPD—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Unlikely	Limited	Low
Bird Strike	Limited	Unlikely	Negligible	Low
Climate Change	Limited	Unlikely	Limited	Low
Dam Failure	Extensive	Occasional	Critical	Low
Drought and Water Shortage	Limited	Unlikely	Negligible	Medium
Earthquake	Limited	Unlikely	Limited	Low
Earthquake: Liquefaction	Limited	Occasional	Limited	Low
Flood: 100/200/500-year	Limited	Occasional	Limited	Medium
Flood: Localized Stormwater Flooding	Limited	Unlikely	Negligible	Low
Landslides	Significant	Occasional	Limited	High
Levee Failure	Limited	Occasional	Negligible	High
River/Stream/Creek Bank Erosion	Limited	Likely	Negligible	Low
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Occasional	Limited	Low
Severe Weather: Extreme Temperatures – Heat	Extensive	Highly Likely	Critical	Medium
Severe Weather: Fog	Significant	Likely	Limited	Low
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Catastrophic	Medium
Severe Weather: Wind and Tornadoes	Limited	Unlikely	Limited	Low
Subsidence	Limited	Unlikely	Negligible	Low
Volcano	Limited	Unlikely	Negligible	Low
Wildfire:(Burn Area/Smoke)	Significant	Occasional	Negligible	Low

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

O.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile Southgate RPD's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Hazard Profiles and Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to Southgate RPD is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

O.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section O.5.3, includes a description as to how the hazard affects the Southgate RPD and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

O.5.2. Vulnerability Assessment

This section identifies Southgate RPD's assets at risk, including values at risk, critical facilities and infrastructure, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table O-3 lists particular critical facilities and other District assets identified by the Southgate RPD's planning team as important to protect in the event of a disaster. Southgate RPD's physical assets, valued at over $125 million, consist of the buildings and infrastructure to support the Southgate RPD operations.

Table O-3 Southgate RPD's Critical Facilities, Infrastructure, and Other District Assets

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Corporation Yard Bldgs.	Maintenance Shop		$611,040	Levee Failure, Tornado, Severe Storm
Crofoot Clubhouse	Recreation Center		$1,215,905	Levee Failure, Tornado, Severe Storm
Florin Creek Recreation Center	Recreation Center		$1,850,904	Levee Failure, Flood, Tornado, Severe Storm
Fruitridge Aquatic Center	Swim Pool		$2,153,554	Tornado, Severe Storm
Fruitridge Community Center	Community Center		$2,132,636	Tornado, Severe Storm
Rizal Community Center	Community Center		$4,173,730	Levee Failure, Tornado, Severe Storm
Rutter Swim Center	Swim Pool		$1,945,466	Levee Failure, Tornado, Severe Storm
Vineyard Community Center (Under Construction)	Community Center		$7,102,050	Tornado, Severe Storm
Vineyard Community Aquatic Center (Under Construction)	Swim Pool		$4,310,950	Tornado, Severe Storm
Sheldon Headquarters	Office		$2,539,000	Levee Failure, Tornado, Severe Storm
Fletcher Farm Community Center	Community Center		$1,045,000	Tornado, Severe Storm
WildHawk Golf Club	Clubhouse		$1,839,200	Tornado, Severe Storm
WildHawk Golf Club – Cart Barn	Cart Storage		$2,200,000	Tornado, Severe Storm
WildHawk Golf Club – Maintenance Bldg.	Maintenance Shop		$600,000	Tornado, Severe Storm
WildHawk Golf Course	Golf Course		$4,500,000	Drought, Flood, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Gerry Green Head Start Facility	Preschool		$1,705,858	Tornado Severe Storm
Boulder Glen Park	Park		$833,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Bowling Green Park	Park		$2,682,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Bradshaw Vineyards	Park		$1,280,000	Drought, Flood, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Brittany Park	Park		$525,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Calvine Crossing Park	Park		$1,960,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Calvine Station Park	Park		$1,019,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Carlisle Woods Park	Park		$1,325,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Caymus Park	Park		$931,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Churchill Downs Community Park	Park		$4,278,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Cochran Park	Park		$2,492,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Cottonwood Park	Park		$1,655,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Countryside Community Park	Park		$3,183,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Crofoot Park	Park		$906,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Florin Creek Park	Park		$3,870,000	Drought, Flood, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Fountain Plaza Park	Park		$1,378,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Fruitridge Park	Park		$3,412,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Hampton Park	Park		$3,430,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Hardester Park	Park		$2,204,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Illa Collin Park	Park		$3,060,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Jack W. Davis Park	Park		$483,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Kennedy Park	Park		$1,159,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Little Hawke Park	Park		$1,363,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Nicholas Park	Park		$3,461,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Norman S. Waters Park	Park		$2,611,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Olde Florintown Park	Park		$3,192,000	Drought, Flood, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Pacific Park	Park		$508,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Rainbow Park	Park		$1,408,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Royal Park	Park		$976,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Rutter Park	Park		$2,306,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Sheldon Park	Park		$3,822,000	Drought, Flood, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Silver Leaf Park	Park		$2,063,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Sky Park	Park		$1,582,000	Drought, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Southwoods Park	Park		$1,374,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Sunrise Florin Park	Park		$2,540,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Tamarindo Park	Park		$1,543,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Toby Johnson Park	Park		$2,143,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Vineyard Park	Park		$618,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Vineyard Creek Park	Park		Future Park	Drought, Flood, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Vineyard Point Park	Park		Future Park	Drought, Flood, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Vineyard Springs Community Park	Park		Future Park	Drought, Flood, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Vintage Park	Park		$2,960,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
WildHawk West Park	Park		Future Park	Drought, Flood, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Willowood Park	Park		$1,099,273	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Florin Creek Trail	Ped/Bike Trail		$950,400	Drought, Flood, Levee Failure, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat

Name of Asset	Facility Type	Address	Replacement Value	Hazard Info
Tillotson Parkway	Ped/Bike Trail		$5,552,000	Drought, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat
Laguna Creek Parkway	Ped/Bike Trail		$938,572	Drought, Flood, Insects/Pests, Severe Storms, Tornadoes, Extreme Heat, Wildfire

Source: Southgate RPD

Natural Resources

The Southgate Recreation & Park District has a variety of natural resources of value to the community:

- Laguna Creek Parkway (125.5 acres)
- Bradshaw Vineyards Open Space Preserve (3.08 Acres)
- Elder Creek Open Space Preserve (15.29 acres)
- Gerber Creek Open Space Preserve (4.93 acres)
- Kingsbridge Open Space Preserve (29.36 acres)
- Dunmore Park Preserve (32.87 acres)
- Gene Andal Park Preserve (Sacramento County)
- Various mitigation banks and conservancies also identified as the Vernal Pool Prairie Preserve not owned by Southgate

Historic and Cultural Resources

There are no nationally recognized landmarks but there are still a few scattered pre-world war II buildings along Florin Rd. The area previously known as Florin was a flourishing Japanese community of Issei and Nisei immigrant farmers. One of those buildings includes Florin East Grammer School which became a segregated school for kids of oriental decent in 1923 and is now owned by the County of Sacramento and operated by Southgate RPD under a lease agreement.

Growth and Development Trends

Growth within the Southgate RPD has increased. Planning areas such as the Vineyard Springs Comprehensive Plan, North Vineyard Station Specific Plan, Florin Vineyard Community Plan, Old Florin Town Special Planning Area, and the West Jackson Highway Master Plan accommodate new growth in the Southgate RPD.

Development since the 2011 Plan

The Southgate RPD has seen an increase in their service area population since the 2011 plan. Specifically, this includes:

- Population has increased from 110,000 in 2011 to over 123,000 residents.
- A Southgate RPD Support Facility is under construction and is expected to be completed early 2017. The project will include an approximate 6,500 sq. ft. building. This project will be included into the

master plan for the development of the entire Churchill Downs North Community Park site. The project also includes a Community Center & Aquatic Center.

- Florin Creek Park was expanded and converted into a multi-use basin to provide good control for areas within the 100-year flood plain of Florin Creek and improve recreational benefits at the park site. A parcel on Orange Avenue was purchased for future park land or open space. Jack Davis Park, Hampton Park, and Fruitridge Park gained additional acreage due to acquisition of new parkland and will be expanded.

Southgate RPD implemented several development projects since 2011 increasing the numbers and capacity of District assets. New development tracked by totals and hazard risk areas are shown in Table O-4. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people recreating in District areas potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the District to identified priority hazards.

Table O-4 Southgate RPD Total Development Since 2011

Asset Type	Year Built	Outside of Known Hazard Area	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Florin Creek Park Multi-Use Basin	2016		X	X		
Vineyard Community Center	2016\17	X				
Vineyard Aquatic Center	2016\17	X				
Vineyard Support Facility	2016\17	X				
Vineyard Point Park	2016\17		X			
WildHawk Estates West	2016\17		X			
Total						

Source: Southgate RPD

[1]Moderate or higher wildfire risk area

O.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table O-2 as high or medium significance hazards. Impacts of past events and vulnerability of the Southgate RPD to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. In general, the most vulnerable structures are those located within the floodplain or within levee and dam inundation areas, such as older facilities that may be constructed with unreinforced masonry and buildings built prior to the introduction of modern building codes. Buildings that contain electronic or electrically operated equipment are also vulnerable to flood inundation.

In general, the most vulnerable District assets include the levees and supporting structures that the District owns.

An estimate of the vulnerability of the Southgate RPD to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Drought and Water Shortage

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Drought would impact all of the vegetation of the parks and open space areas within the District and could potentially result in closure of aquatic facilities. Restrictions on water use would severely impact the maintenance of the parks, landscape corridors, aquatic facilities, and the golf course.

Past Occurrences

Recent drought conditions have had a significant impact on operations. There were four years of below average rainfall. In January, 2014 the Governor of California declared a State of Emergency projecting that 2014 would be the driest on record and asked Californians to conserve at least 20%. May, 2015 the State Water Resource Control Board required a 25% reduction in water use. The Southgate RPD reduced water consumption and irrigation to meet the requirements. The parks, golf course and landscape corridors were more dry than usual. The Southgate RPD owns and maintains over 12,000 trees. Because of the severe drought hundreds of trees died and were removed.

Vulnerability to Drought

The vulnerability is high because of the type of facilities the Southgate RPD owns and maintains which require lots of water in order to maintain them green, usable, and viable for recreational use by the community.

Assets/Critical Facilities at Risk

All park sites, parkways and landscape corridor vegetation; open space vegetation and wetlands; WildHawk Golf Club course; Fruitridge and Rutter aquatic centers.

Future Development

Future park development and maintenance practices have been changed in order to minimize water usage.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Flooding risks along Morrison Creek, Elder Creek, Gerber Creek, Florin Creek, and Laguna Creek could potentially impact several District facilities. Potential damages from flooding and flood debris would impact trees and landscaping of the parks, open spaces and the WildHawk golf course. Flood damage to park site structures and buildings could also occur.

Past Occurrences

The District Planning team noted that there have not been any flooding occurrences in that past 5 years.

Vulnerability to Flood

The western urbanized area of the Southgate RPD has historically been vulnerable to flooding from high water events in the Sacramento-San Joaquin Delta as well as high flows on Morrison Creek, Florin Creek, Elder Creek, and Gerber Creek.

Assets/Critical Facilities at Risk

WildHawk Golf Club, Florin Creek Recreation Center and Park, Florin Creek Trail, Laguna Creek Parkway Open Space and Trail, Bradshaw Vineyards Park and Open Space Preserve.

Natural Resources

Natural resources at risk in the District to flood include:

- Laguna Creek Parkway
- Bradshaw Vineyards Open Space Preserve
- Elder Creek Open Space Preserve
- Gerber Creek Open Space Preserve

Historic and Cultural Resources

None.

Future Development

Future developme at risk to flood includes Vineyard Creek Park, Vineyard Point Community Park, Wildhawk West Park and any proposed multi-use trails that go in along the Elder Creek, Gerber Creek, Laguna Creek, and Florin Creek.

Levee Failure

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

According to the California Department of Water Resources Levee Flood Protection Zone maps, levee failure would significantly impact the western portion of the District. Potential damages from flooding and flood debris would impact trees and landscaping of the parks. Flood damage to park site structures, equipment within the corporation yard and buildings could also occur.

Past Occurrences

The District Planning Team noted that there have not been any levee failures in the past 5 years.

Vulnerability to Levee Failure

Assets/Critical Facilities at Risk

Pacific Park, Bowling Green Park, Sky Park, Fountain Plaza Sprayground, Crofoot Park, Crofoot Clubhouse, Hampton Park, Rizal Community Center, Sheldon Park, Sheldon Headquarters, Florin Creek Park, Florin Creek Recreation Center, Florin Creek Trail, Corporation Yard, Kennedy Park, Rutter Park, and Rutter Swim Center.

Natural Resources at Risk

None.

Historic and Cultural Resources at Risk

None.

Future Development

The District Planning Team noted no future development at risk to levee failure.

Severe Weather: Extreme Temperatures – Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Extreme Heat could potentially impact parks maintenance workers, recreational programs participants, WildHawk Golf Club customers, and vegetation. Poor air quality also resulting from extreme heat would impact any recreational programs held outdoors, WildHawk Golf customers and parks maintenance workers. Rolling blackouts due to extreme heat would also impact district facilities.

Extreme heat impacts air quality on Spare the Air Days. Outdoor programs can be suspended or cancelled. Extreme heat also intensifies the need to water park sites, parkways and landscape corridors, and can also affect the ability to do outdoor work for maintenance staff. Extreme heat also aggravates the drought situation that is already affecting the amount of water available for watering.

Past Occurrences

The District Planning Team noted no extreme heat events in the past 5 years.

Vulnerability to Extreme Heat

Assets/Critical Facilities at Risk

Parks, landscape corridors, and open space vegetation; outdoor recreational programs; WildHawk Golf Club and park maintenance employees.

Future Development

Any future parks, landscape corridors, open space vegetation, and all outdoor activities are at risk.

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

Severe storms could potentially impact park structures, shade shelters and vegetation. In January 2009, a severe storm resulted in extensive damage and loss of trees throughout the District. Severe storms could also impact building structure features such as roofing and windows.

Past Occurrences

The District Planning Team noted that there has not been major damage from severe weather in the past 5 years.

Vulnerability to Heavy Rains

Assets/Critical Facilities at Risk

Parks, landscape corridors, and open space vegetation; park site play structures and shelters; all building structures and WildHawk Golf Club course.

Future Development

All future developments of buildings, parks, parkways, trails, and open spaces can be at risk for heavy rains.

O.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capability assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

O.6.1. Regulatory Mitigation Capabilities

Table O-5 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the Southgate RPD.

Table O-5 Southgate RPD's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	
Economic Development Plan	N	
Local Emergency Operations Plan	N	
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	N	
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)		

Building Code, Permitting, and Inspections	Y/N	Are codes adequately enforced?
Building Code	N	Version/Year:
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score:
Fire department ISO rating:	N	Rating:
Site plan review requirements	Y	District standards and specifications reviewed and updated on a regular basis
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	Y	District Policy Manual
How can these capabilities be expanded and improved to reduce risk?		

Source: Southgate RPD

O.6.2. Administrative/Technical Mitigation Capabilities

Table O-6 identifies the department(s) responsible for activities related to mitigation and loss prevention for Southgate RPD.

Table O-6 Southgate RPD's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	The District has maintenance crews.
Mutual aid agreements	N	
Other		

Staff	Y/N FT/PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	N	
Community Planner	N	
Civil Engineer	N	
GIS Coordinator	Y	
Other	Y	Parks Manager
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	N	
Hazard data and information	N	
Grant writing	Y	
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: Southgate RPD

O.6.3. Fiscal Mitigation Capabilities

Table O-7 identifies financial tools or resources that the Southgate RPD could potentially use to help fund mitigation activities.

Table O-7 Southgate RPD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	
Authority to levy taxes for specific purposes	N	
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	
Incur debt through private activities	Y	
Community Development Block Grant	Y	
Other federal funding programs		

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
State funding programs		
Other		Assessment Districts
How can these capabilities be expanded and improved to reduce risk?		

Source: Southgate RPD

O.6.4. Mitigation Education, Outreach, and Partnerships

Table O-8 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table O-8 Southgate RPD's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	N	
Natural disaster or safety related school programs	N	
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

O.6.5. Other Mitigation Efforts

The District works with both the County Department of Water Resources (DWR) and SAFCA related to creek and stream drainage issues as well as stormwater detention. The District currently has several joint-use detention basins planned with DWR that are either on District park sites or adjacent to them. These basins provide the County with adequate basins for storm water detention but at the same time during non-storm periods that land can be used for passive and active recreational purposes.

O.7 Mitigation Strategy

O.7.1. Mitigation Goals and Objectives

Southgate RPD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

O.7.2. Mitigation Actions

The planning team for Southgate RPD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. Drought Mitigation Actions/Drought Contingency Plan

Hazards Addressed: Drought and Water Shortage

Goals Addressed: 1, 2, 3, 4

Issue/Background: In 2015 California entered its fourth year of a record-breaking drought creating an extremely parched landscape. Governor Jerry Brown declared a drought State of Emergency in January 2015 and imposed strict conservation measures statewide. Gov. Jerry Brown demanded a 25 percent cut in urban water usage due to a severe drought affecting much of California and the West.

Project Description: Southgate RPD identifying water-saving measures and taking steps to use water more efficiently. Hope this helps, let me know if you need additional information.

Other Alternatives: Institute minimum reductions

Existing Planning Mechanism(s) through which Action Will Be Implemented: The Southgate RPD will continue with the implemented state mandated water conservation regulations. The Southgate RPD stopped watering by ET (evapo-transportation, i.e irrigating based on weather data). Also, with new parks and landscape development the District is "specing" drought tolerant vegetation, less turf areas, less water using sprinkler systems (i.e. netafim, subterranean drip system, internet based controllers, and MP rotators.) All of which promote water conservation.

Responsible Office/Partners: Southgate RPD – Park Maintenance Dept.

Project Priority: High

Cost Estimate: TBD

Benefits (Losses Avoided): Potential Fines

Potential Funding: Unknown

Timeline: Ongoing

Action 2. Flood Mitigation Actions/Land Acquisition

Hazards Addressed: Flood: 100/200/500-year

Goals Addressed: 1, 2, 3, 4

Issue/Background: Areas to the West of Southgate RPD have historically been vulnerable to flooding from high water flows on Morrison Creek, Florin Creek, and Elder Creek.

Project Description: Park lands within the North Vineyard Station Specific Plan area have been designated in locations adjacent to Elder Creek, Gerber Creek and Laguna Creek. The park sites will have storm water detentions basins with water quality treatment functions, and trail facilities. In addition there is also a proposed park with an integrated multi-use storm water detention basin with soccer fields adjacent to Laguna Creek within the Vineyard Springs Comprehensive Plan area. In 2016 Florin Creek Park was expanded and converted to a multi-use basin for recreational use. The basin will provide flood control for areas within the 100-year flood plain of Florin Creek and improve recreational benefits at the park site. Southgate RPD continues to pursue the acquisition of open space land when it makes geographic and economic sense and proves beneficial to Southgate RPD's long term acquisition goals.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: As new development comes along Southgate RPD will continue to pursue the acquisition of open space, and parkland, and seek joint-use opportunities with partner agencies.

Responsible Office/Partners: SAFCA, Southgate RPD, City of Sacramento, County of Sacramento, FEMA, Corps of Engineers, State Department of Water Resources

Project Priority: Medium

Cost Estimate: Unknown

Benefits (Losses Avoided): Potential flooding in urbanized areas.

Potential Funding: TBD

Timeline: Continuous

Action 3. Conservation Easements

Hazards Addressed: Protect open space and preserve critical habitat.

Goals Addressed: 1, 2, 3, 4

Issue/Background: Development has encroached into agricultural lands, and wetlands are being lost. Southgate RPD is making an effort to acquire those lands that are considered to contain rare wildlife habitat in order to limit certain types of uses or prevent development from taking place by protecting the land for future generations.

Project Description: Southgate RPD is in the process of acquiring property within the North Vineyard Station Specific Plan – Elder Creek and Gerber Creek open space preserve area associated with current subdivision developments and as a required by the U.S. Army Corps of Engineers. A conservation easement will be granted over each portion of the Preserve. The conservation easement will run with the land and protect the Preserve as wetland and wildlife habitat in perpetuity, subject to the long term management responsibilities of Southgate RPD and drainage maintenance responsibilities of Water Resources for the purpose of flood control maintenance. Wildlife Heritage Foundation will hold the Conservation Easement over the Preserve areas. Southgate RPD will manage and maintain the preserve as outline in the Open Space Preserve Operations and Management Plan for the North Vineyard Station Specific Plan – Elder and Gerber Creek.

Other Alternatives: Reduce General Plan open space requirements and increase developable land.

Existing Planning Mechanism(s) through which Action Will Be Implemented: As new development comes along Southgate RPD will continue to pursue the acquisition of open space, and parkland, and seek joint-use opportunities with partner agencies.

Responsible Office/Partners: Southgate RPD, Corps of Engineers, Sacramento County

Project Priority: Low

Cost Estimate: Unknown

Benefits (Losses Avoided): Provide permanent guarantee that the land will not be developed.

Potential Funding: TBD

Timeline: Ongoing

Action 4. Multi-jurisdictional Cooperation within Watersheds

Hazards Addressed: Flood: Localized Stormwater Flooding, Flood: 100/200/500-year, Severe Weather: Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: The Sacramento Area Flood Control Agency is proposing to construct flood control improvements at Florin Creek Park that will provide a minimum 100-year level of flood protection to residents in the Parkway Estates area. Once completed, these improvements, combined with improvements the U.S. Army Corps of Engineers is constructing along Florin Creek, will provide a higher level of flood protection and financial relief to over 450 property owners paying high-cost flood insurance.

Project Description: Southgate RPD has participated with SAFCA "Sacramento Area Flood Control Agency" to construct a multi-use basin at Florin Creek Park to provide flood control for areas within the 100-year flood plain of Florin Creek. The improvements included the reconstruction of a paved trail along the Florin Creek channel that connects Sheldon Park and Florin Creek Park. The U.S. Army Corps of Engineers proposed the construction of improvements to the creek in conjunction with SAFCA, the State Department of Water Resources, City of Sacramento and County of Sacramento.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: As new development comes along Southgate RPD will continue to pursue the acquisition of open space, and parkland, and seek joint-use opportunities with partner agencies.

Responsible Office/Partners: SAFCA, FEMA, City of Sacramento, County of Sacramento, Southgate RPD

Project Priority: Medium

Cost Estimate: Unknown

Benefits (Losses Avoided): Better flood control and improved recreational benefits at Florin Creek park.

Potential Funding: TBD

Timeline: January 2017

Action 5. Storm Water Management Practices – Implement Storm Water Management Practices as identified in Stormwater Quality Design Manual

Hazards Addressed: Flood: Localized Stormwater Flooding, Flood: 100/200/500-year, Severe Weather: Heavy Rains and Storms

Goals Addressed: 1, 2, 3, 4

Issue/Background: Heavy rains and severe storms occur during the fall, winter and spring. The heavy storms can cause flooding as well as extensive localized drainage issues. There is a lot of growth in some areas of Southgate RPD and if not planned accordingly there may be a lack of adequate drainage systems.

Project Description: Southgate RPD works collaboratively with the Sacramento County Department of Water Resources (DWR) to plan and design joint-use facilities that will provide both storm water management and recreation use to Southgate RPD residents. These types of projects keep creek drainage corridors in their natural state and provide storm water detention basins with compatible recreational uses such as trails and sports fields. These types of projects help improve the storm water quality and drainage capacity in our neighborhoods while at the same time providing additional recreation opportunities in the community. An example of these joint-use facilities includes the Laguna Creek Parkway open space which has preserved a 130 acre portion of the 100 year flood plain of Laguna Creek while providing a multi-use

trail and open space corridor for residents to enjoy. A similar joint-use open space corridor is planned for the Elder and Gerber Creek drainage corridors that traverse Southgate RPD. The Southgate RPD is also in the process of designing two storm water detention projects with the County DWR that will accommodate soccer fields within the basin areas.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented: As new development comes along Southgate RPD will continue to pursue the acquisition of open space, and parkland, and seek joint-use opportunities with partner agencies.

Responsible Office/Partners: Sacramento County Department of Water Resources (DWR), Southgate RPD

Project Priority: Medium

Cost Estimate: Unknown

Benefits (Losses Avoided): Flooding in mitigated in new areas and adds protection to existing areas.

Potential Funding: Unknown

Timeline: Ongoing

Action 6. Severe Weather: Heavy Rains and Storms Mitigation Actions/Tree Management

Hazards Addressed: Severe Weather: Heavy Rains and Storms

Issue/Background: Heavy rains and storms have caused trees to fall over especially when the ground becomes very saturated and the tree is weak or diseased. In past years many trees have died from the drought and will need to be removed before a big rain storm comes through and causes them to fall over or create a major hazard.

Goals Addressed: 1, 2, 3, 4

Project Description: In 2012 the Southgate RPD received a grant from the Urban Forestry Program Entitled, "An Urban Forest for Every City". This Program Grant funded the development and implementation of a management plan for our urban forest which determined reasonable maintenance goals and set a standard maintenance cycle to help the District proactively manage our forest in a way that reflects the values of our community within a set budget. The grant was used to conduct a tree inventory as the first step in better understanding the needs and distribution of its trees and the value of its forest asset. A consulting arborist and certified tree risk assessor provided an inventory of all the trees in the parks, parkways, open space and landscape corridors in the Southgate RPD. The inventory noted the location, species, size, health, and potential for infrastructure conflicts and hazards for each tree on Southgate RPD owned property as well as noting empty planting locations. High risk trees were identified and most have

been removed. Southgate RPD is still in the process of developing an Urban Forest Management Plan that aims to identify actions that will support a healthy and regenerative urban forest.

Other Alternatives: Do nothing

Existing Planning Mechanism(s) through which Action Will Be Implemented:

- Southgate RPD – Maintenance Dept.
- GIS inventory
- Planting trees with Sac Tree Foundation
- Implementing the Urban Forest Management Plan

Responsible Office/Partners: Southgate RPD

Project Priority: Medium

Cost Estimate: Unknown

Benefits (Losses Avoided): Those trees identified in poor condition can be removed in a timely manner to avoid a hazardous and dangerous situation at a later time.

Potential Funding: Unknown

Timeline: Ongoing

Annex P Twin Rivers School District

P.1 Introduction

This Annex details the hazard mitigation planning elements specific to the Twin Rivers School District (TRSD), a previously participating jurisdiction to the Sacramento County Local Hazard Mitigation Plan (LHMP) Update. This Annex is not intended to be a standalone document, but appends to and supplements the information contained in the Base Plan document. As such, all sections of the Base Plan, including the planning process and other procedural requirements apply to and were met by the Twin Rivers School District. This Annex provides additional information specific to the TRSD, with a focus on providing additional details on the planning process, risk assessment, and mitigation strategy for this District.

P.2 Planning Process

As described above, the District followed the planning process detailed in Section 3 of the Base Plan. In addition to providing representation on the Sacramento County Hazard Mitigation Planning Committee (HMPC), TRSD formulated its own internal planning team to support the broader planning process requirements. Internal planning participants, their positions, and how they participated in the planning process are shown in Table P-1. Additional details on plan participation and TRSD representatives are included in Appendix A.

Table P-1 TRSD Planning Team

Name	Position/Title	How Participated
Greg Rash	Director/Business	Information Gathering/Report drafting. Attended HMPC meetings.
Beth Brose	General Services Consultant	Information Gathering/Mitigation Projects Author. Attended HMPC meetings.
Bill McGuire	Deputy Superintendent	Document Review
Kimberly Barnett	Executive Director General Services	Document Review

Source: TRSD

P.2.1. Coordination with Other District Planning Efforts

Coordination with other District planning efforts is paramount to the successful implementation of this plan. This Section provides information on how the District integrated the previously-approved 2011 Plan into existing planning mechanisms and programs. Specifically, TRSD incorporated into or implemented the 2011 LHMP through other plans and programs shown in Table P-2.

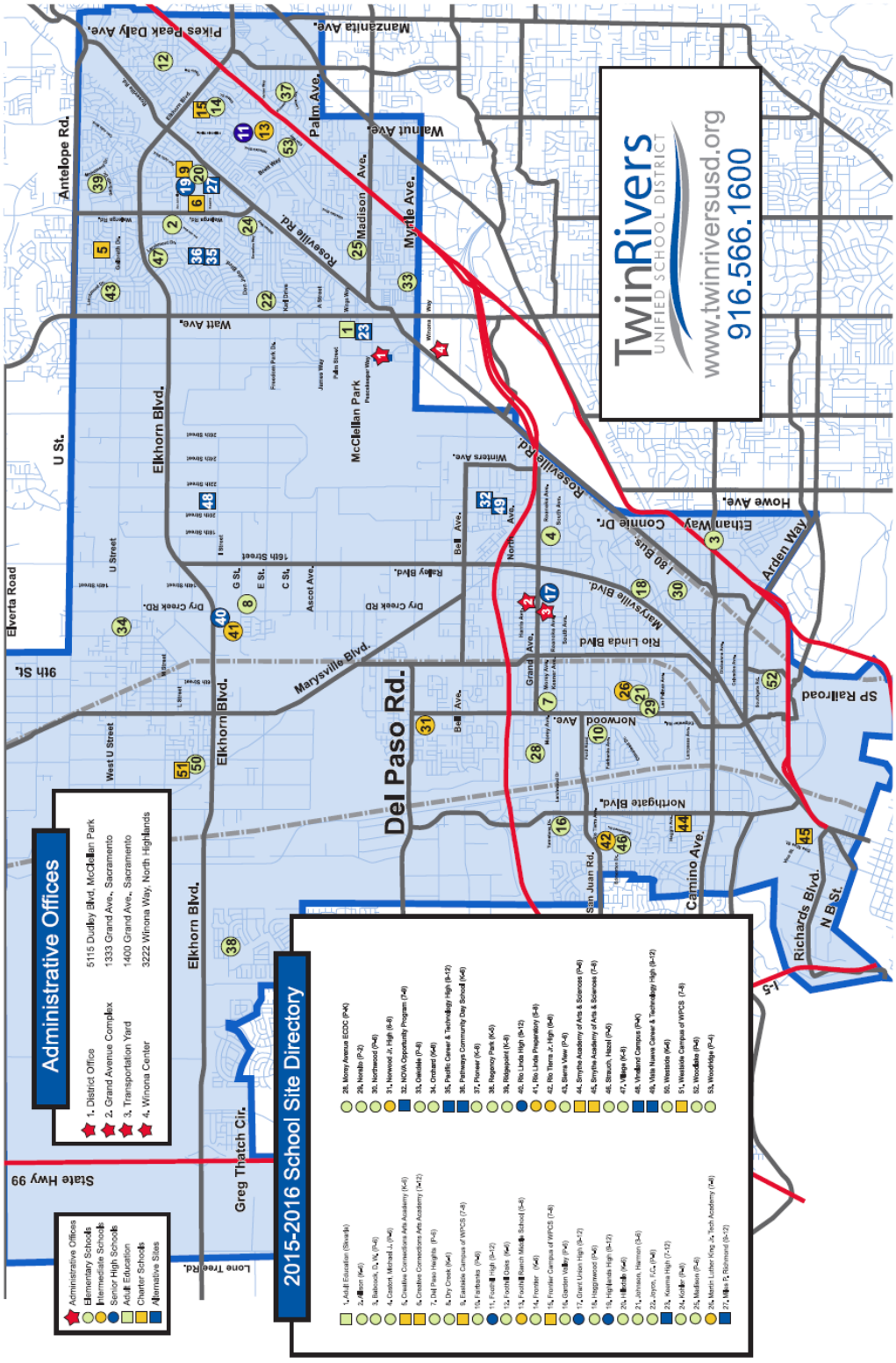
Table P-2 2011 LHMP Incorporation

Planning Mechanism 2011 LHMP Was Incorporated/Implemented In.	Details?
Emergency Operations Plan	Plans/Teams/Responses for most probable contingencies
Master Plan	Consideration for future designs

P.3 District Profile

The community profile for TRSD is detailed in the following sections. Figure P-1 displays a map and the location of TRSD boundaries within Sacramento County.

Figure P-1 Twin Rivers School District Map



P.3.1. District Overview, History and Background

The small community school districts that evolved in the North Sacramento communities were long a topic of discussion and debate. While most of the country's students receive a fully articulated and unified educational experience in preschool through 12th grade systems, students in the North Sacramento area attended a variety of schools and districts depending on their neighborhood and grade level. Many educational leaders saw the need for more consistency, financial stability, and realignment of resources, but others worried that a larger system would take away a family-friendly culture the smaller districts enjoyed. In the late 1990s, a small group of community members and educators embarked upon a vision to unify the north area districts. After more than 60 years and seven attempts, voters finally approved this new vision for unification involving four of the six area school districts: Grant Joint Union High School District, North Sacramento School District, Rio Linda Union School District, and Del Paso Heights School District. On November 7, 2007, the voters overwhelmingly adopted the unification proposal.

The voters chose a new board of trustees to lead this new unified district. They selected one trustee from each of seven geographic regions in the boundary area. The board requested that the community name our new district. After a month-long promotional contest and more than 500 suggestions, Twin Rivers Unified School District became the official name. On July 1, 2008, with much excitement and positive enthusiasm, the Twin Rivers Unified School District officially became the newest unified district in California.

The District is comprised of 760 acres utilizing over 3.4 million square feet of space, located in Sacramento County, in the northern region of the greater Sacramento area. Bordering Natomas district to the south and west, Sacramento City district to the south and San Juan district to the east, the District holds a total of 32,000 students in over 60 different schools. The District also owns a variety of other properties and buildings to house a variety of support facilities that include administrative offices, maintenance buildings, and park lands.

P.4 Hazard Identification

TRSD's planning team identified the hazards that affect the District and summarized their geographic extent, probability of future occurrences, potential magnitude/severity, and significance specific to TRSD (see Table P-3).

Table P-3 TRSD—Hazard Identification

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Agricultural Hazards	Limited	Occasional	Limited	Low
Bird Strike	Limited	Likely	Limited	Low
Climate Change	Extensive	Likely	Limited	Low
Dam Failure	Significant	Unlikely	Catastrophic	Medium
Drought and Water Shortage	Extensive	Likely	Limited	Low
Earthquake	Limited	Occasional	Critical	Medium
Earthquake: Liquefaction	Limited	Unlikely	Limited	Low
Flood: 100/200/500-year	Limited	Occasional	Limited	High
Flood: Localized Stormwater Flooding	Significant	Occasional	Critical	Medium
Landslides	Limited	Highly Likely	Limited	Low
Levee Failure	Limited	Unlikely	Negligible	High
River/Stream/Creek Bank Erosion	Significant	Occasional	Catastrophic	Medium
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Occasional	Limited	Medium
Severe Weather: Extreme Temperatures – Heat	Limited	Highly Likely	Negligible	Medium
Severe Weather: Fog	Extensive	Occasional	Limited	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, and Lightning)	Extensive	Highly Likely	Limited	Medium
Severe Weather: Wind and Tornadoes	Extensive	Highly Likely	Critical	Medium
Subsidence	Limited	Likely	Limited	Low
Volcano	Significant	Highly Likely	Limited	Low
Wildfire:(Burn Area/Smoke)	Limited	Occasional	Limited	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

P.5 Hazard Profile and Vulnerability Assessment

The intent of this section is to profile TRSD's hazards and assess the District's vulnerability separate from that of the Planning Area as a whole, which has already been assessed in Sections 4.2 and 4.3 Hazard Profiles and Vulnerability Assessment in the main plan. The hazard profiles in the main plan discuss overall impacts to the Planning Area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. Hazard profile information specific to TRSD is included in this Annex. This vulnerability assessment analyzes the property, population, critical facilities, and other assets at risk to hazards ranked of medium or high significance specific to the District. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

P.5.1. Hazard Profiles

Each hazard vulnerability assessment in Section P.5.3, includes a description as to how the hazard affects the TRSD and information on past occurrences. The intent of these section is to provide jurisdictional specific information on hazards and further describe how the hazards and risks differ across the Planning Area.

P.5.2. Vulnerability Assessment

This section identifies TRSD's assets at risk, including values at risk, critical facilities and infrastructure, population at risk, economic assets, natural resources, historic and cultural resources, and growth and development trends.

Assets at Risk and Critical Facilities

This section considers the District's assets at risk, with a focus on key District assets such as critical facilities, infrastructure, and other District assets and their values. With respect to District assets, the majority of these assets are considered critical facilities as defined for this plan:

> *Any facility (a structure, infrastructure, equipment or service), that is adversely affected during a hazardous event may result in interruption of services and operations for the District at any time before, during and after the hazard event. A critical facility is classified by the following categories: (1) Essential Services Facilities, (2) At-risk Populations Facilities, and (3) Hazardous Materials Facilities.*

Table P-4 lists particular critical facilities and other District assets identified by the TRSD's planning team as important to protect in the event of a disaster. TRSD's physical assets, valued at over $715 million, consist of the buildings and infrastructure to support the TRSD operations.

Table P-4 TRSD's Critical Facilities, Infrastructure and Other District Assets

Name of Asset	Occupancy	Address	Replacement Value	Hazard Info
Allison, Warren A. Elementary	275	4315 Don Julio Blvd., No. Highlands,	$6,432,540	
Allison, Warren A. Elementary	275	4315 Don Julio Blvd., No. Highlands	N/A	
Babcock Park	0	2400 Cormorant Way, Sacramento	N/A	
Babcock, D W Elementary	400	2400 Cormorant Way, Sacramento	$6,494,106	
Bell Avenue Property	0	1690 Bell Avenue, Sacramento,	N/A	
Castori, Michael J. Elementary	750	1801 South Ave., Sacramento,	$7,657,585	
Creative Conn. Arts Academy Charter (K-8)	540	7201 Arutas Dr., No. Highlands	$5,765,220	
Creative Conn. Arts Academy Charter(9-12)	105	6444 Walerga Rd, No. Highlands	$12,905,740	
Del Paso Heights Elementary	290	590 Morey Ave., Sacramento,	$7,596,650	
Del Paso Heights Elementary	290	590 Morey Ave., Sacramento,	N/A	
District Office	330	5115 Dudley Blvd, McClellan	$67,947,365	
DPH Park	0	590 Morey Ave., Sacramento	$0	
Dry Creek Elementary	115	1230 G St., Rio Linda	$6,852,660	
Dry Creek Elementary	115	1230 G St., Rio Linda	N/A	
Dry Creek Elementary	115	1230 G St., Rio Linda	N/A	
Dry Creek Elementary	115	1230 G St., Rio Linda	N/A	
East Natomas Educational Complex	0	5921 E. Levee Rd	N/A	
East Natomas Educational Complex	0	5922 E. Levee Rd	N/A	
East Natomas Educational Complex	0	5924 E. Levee Rd	N/A	
East Natomas Educational Complex	0	5925 E. Levee Rd	N/A	

Name of Asset	Occupancy	Address	Replacement Value	Hazard Info
East Natomas Educational Complex	0	5926 E. Levee Rd	$67,947,365	
East Natomas Educational Complex (Not Mapped)	0	5923 E. Levee Rd	N/A	
Fairbanks Elementary	435	227 Fairbanks Ave., Sacramento	$6,968,540	
Foothill High	1,270	5000 McCloud Dr., Sacramento	$32,080,190	
Foothill Oaks Elementary	580	5520 Lancelot Dr., Sacramento	$7,980,830	
Foothill Ranch Jr. High	765	5001 Diablo Dr., Sacramento	$14,581,580	
Frito-Lay Land Purchase	0	1710 Ascot Ave., Rio Linda	N/A	
Frontier Elementary	545	6691 Silverthorne Cir., Sacramento	$7,039,520	
Future Charter School (7-12)	565	3701 Stephen Dr., No. Highlands	N/A	
Garden Valley Elementary	410	3601 Larchwood Dr., Sacramento	$3,601,260	
Grant High	1,035	1400 Grand Ave., Sacramento	$45,591,240	
Grant West	1,035	1221 South Ave., Sacramento	$15,369,260	
Hagginwood Elementary	455	1418 Palo Verde Ave., Sacramento	$6,989,112	
Hayer Park (RLPA) Park	0	1101 "G" St., Rio Linda	N/A	
Higher Learning Academy	115	2625 Plover St., Sacramento	$800,000	
Higher Learning Academy	115	2625 Plover St., Sacramento	N/A	
Highlands Academy of Art & Design	925	6601 Guthrie Way, No. Highlands	$30,536,620	
Hillsdale Elementary	460	6469 Guthrie Way, No. Highlands	$7,069,330	
Johnson, Harmon Elementary 2.0	635	577 Las Palmas Ave., Sacramento	$12,644,380	
Johnson, Harmon Elementary, Old (demolished lot)	0	2591 Edgewater Rd., Sacramento	N/A	
Joyce, Frederick C. Elementary	605	6050 Watt Ave., No. Highlands	$7,371,345	
Keema High School	0	1281 North Ave., Sacramento	$5,694,600	

Name of Asset	Occupancy	Address	Replacement Value	Hazard Info
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	0	547 Arcade Blvd, Sacramento	N/A	
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	0	549 Arcade Blvd	N/A	
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	0	555 Arcade Blvd	N/A	
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	0	557 Arcade Blvd	N/A	
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	0	559 Arcade Blvd	N/A	
King, Jr,. Martin Luther Technology Academy	365	3051 Fairfield St., Sacramento	$19,448,020	
King, Jr,. Martin Luther Technology Academy	365	3051 Fairfield St., Sacramento	N/A	
Kohler Elementary	510	4004 Bruce Way, No. Highlands	$6,663,290	
Larchmont Elementary	170	6560 Melrose Dr., No. Highlands	$6,179,100	
Madison Elementary	680	5241 Harrison St., No. Highlands	$7,832,480	
Maint./Food/Transp. - Taft Street	15	2628 Taft St., Sacramento	$2,212,790	
Maint./Oper./Transp. - Rio Linda	75	6619 6th Ave., Rio Linda	$1,563,560	
Meister Site	0	Bridgeford & Chuckwagon	N/A	
Morey Avenue Pre K - K	30	155 Morey Ave., Sacramento	$3,230,960	
Morey Avenue Pre K - K	30	155 Morey Ave., Sacramento	N/A	
Morey Avenue Pre K - K	30	155 Morey Ave., Sacramento	N/A	
Morey Avenue Pre K - K	30	155 Morey Ave., Sacramento	N/A	
Murchison Center	0	5703 Skvarla, Bldg. 1407, McClellan	$4,037,430	
Noralto Elementary	750	477 Las Palmas Ave., Sacramento	$8,155,470	
Northwood Elementary	535	2630 Taft St., Sacramento	$8,629,790	
Norwood Jr. High	405	4601 Norwood Ave., Sacramento	$12,819,160	
Norwood Jr. High	405	4601 Norwood Ave., Sacramento	N/A	

Name of Asset	Occupancy	Address	Replacement Value	Hazard Info
Nutrition - I Street Rio Linda	0	2041 I St, Rio Linda	$585,300	
Oakdale Elementary	555	3708 Myrtle Ave., No. Highlands	$7,243,120	
Office Building – unused	50	5201 Arnold Way, McClellan	N/A	
Orchard Elementary	255	1040 Q St., Rio Linda	$10,369,190	
Orchard Elementary	255	1040 Q St., Rio Linda	$0	
Pacific Career & Technology High	150	3800 Bolivar Ave., No. Highlands	$14,282,860	
Pioneer Elementary	695	5816 Pioneer Way, Sacramento	$6,730,628	
Regency Park Elementary	915	5901 Bridgecross Dr. Way, Sacramento	$9,635,770	
Richmond, Miles P. School	60	4330 Keema Ave., North Highlands	$2,729,260	
Ridgepoint Elementary	745	4680 Monument Dr., Sacramento	$7,132,630	
Rio Linda Elementary	0	631 L St., Rio Linda	$7,586,880	
Rio Linda High	1,930	6309 Dry Creek Rd., Rio Linda	$33,047,090	
Rio Linda High Stadium	0	6411 Dry Creek Rd., Rio Linda	N/A	
Rio Linda Prep Academy	500	1101 "G" St., Rio Linda	$10,315,100	
Rio Tierra Jr. High	625	201 Northstead Dr., Sacramento	$12,245,530	
Robinson, Fred K. Admin. Offices	0	670 Dixieanne Ave., Sacramento	$7,281,330	
Sierra View Elementary	505	3638 Bainbridge Dr., No. Highland	$6,133,590	
Smythe, Alethea B. Charter (7-8)	455	700 Dos Rios St., Sacramento	$5,972,380	
Smythe, Alethea B. Charter (K-6)	665	2781 Northgate Blvd. Sacramento	$6,249,880	
Strauch, Hazel Elementary	600	3141 Northstead Dr., Sacramento	$6,281,010	
Terrace Park	0	Undeveloped/Greg Thatch Circle	N/A	

Name of Asset	Occupancy	Address	Replacement Value	Hazard Info
Terrace Park	0	Undeveloped/Greg Thatch Circle	N/A	
TR Police Admin Offices	55	1333 Grand Ave., Sacramento	$7,604,370	
Transportation - Grand Ave.	60	1400B Grand Ave., Sacramento	$976,300	
United Cerebral Palsey (leased out)	190	5450 Georgia Dr., No. Highlands,	$6,133,070	
Village Elementary	645	6845 Larchmont Dr., No. Highlands	$6,210,970	
Vineland (Pre) / Pathways (Alt.)	55	6450 20th St., Rio Linda	$7,916,235	
Vista Nueva Career & Tech High/NOVA	185	2035 North Ave., Sacramento	$5,584,650	
West 4th Ave / E Street	0	Undeveloped	N/A	
West 4th Ave / Q Street	0	Undeveloped	N/A	
Westside Elementary	585	6537 West 2nd St., Rio Linda	$5,961,960	
Winona Admin Center	105	3222 Winona Way, No. Highlands	$33,840,000	
Woodlake Elementary	480	700 Southgate Rd., Sacramento	$5,606,435	
Woodridge Elementary	515	5761 Brett Dr., Sacramento	$7,486,120	

Source: TRSD

Populations at Risk

Table P-4 above includes information on the occupancy for each identified asset. This represents the potential population that may be within the TRSD buildings during operational hours. Accordingly, nearly 30,000 students and staff are in District facilities on any given day, but generally Monday through Friday during school hours.

Natural Resources

The area is home to a number of endangered species and in fact, is included in the Natomas Habitat Conservation Plan. While these species are not necessarily on the existing school grounds, they do exist in undeveloped areas nearby and within district boundaries.

Historic and Cultural Resources

The Planning Team for the District noted that there are sites that originated in the 1930's and 1940's, but they are not currently on the historical registry.

Growth and Development Trends

During the process of unification, a master plan was prepared outlining future growth potential. The area of growth will be minimal and will be contained within the western section of the District.

While there were no new schools planned for the immediate future, two new properties were purchased, known as Terrace Park and Greenbriar. At some point in the next five years, pending financing, the district intends to begin the planning process for these sites. During that planning, the district will implement the new district standards that will clearly define the new building techniques and guidelines for building in potentially natural hazard zones, such as flooding, earthquake and tornado.

In addition, there are tentative plans to reconfigure sites and to adjust grade levels. During the planning for this work, the district should be able to provide standards to any design professional to implement safer and more substantial buildings.

Development since the 2011 Plan

The Planning Team for the District noted that no new facilities been built since 2011.

P.5.3. Vulnerability to Specific Hazards

This section provides the vulnerability assessment, including any quantifiable loss estimates, for those hazards identified above in Table P-3 as high or medium significance hazards. Impacts of past events and vulnerability of the TRSD to specific hazards are further discussed below (see Section 4.1 Hazard Identification in the Base Plan for more detailed information about these hazards and their impacts on the Sacramento County Planning Area). Methodologies for calculating loss estimates are the similar to those described in Section 4.3 of the Base Plan and are based on data provided by the District as described further below. The most vulnerable district assets to natural hazards would be the sites and properties within the Rio Linda area that are in close proximity to waterways, are situated on flat ground and are prone to flood. Buildings that contain electronic or electrically operated equipment are also vulnerable to flood inundation.

An estimate of the vulnerability of the TRSD to each identified priority hazard, in addition to the estimate of probability of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.

- **Extremely High**—Very widespread with catastrophic impact.

Dam Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–Medium

Hazard Profile and Problem Description

Dam failures can result from a number of natural or man made causes such as earthquakes, erosion of the face or foundation, improper siding, rapidly rising flood waters, structural/design flaws, and deliberate human actions. Folsom Dam is the major dam which affects the District and the student populations in the inundation areas. Of prime concern are the failures of the Folsom Dam, which is owned by the US Bureau of Reclamation. The flood waters from the dam would affect the District.

Other dams could affect the District, but inundation zones for the following dams were not mapped for this plan. The Sacramento Municipal Utility District (SMUD) inundation map indicates that a failure of the Rancho Seco Dam would flow to the Laguna Creek Basin and stop approximately at Stockton Boulevard. Failure of Shasta Dam would affect populations south along the Sacramento River basin to about Knights Landing where the water would lose momentum. An Oroville Dam failure would impact populations southwest along the Feather River basin to about the Yolo Bypass.

Warning ability is generally determined by the frequency of inspections for structural integrity, the flood wave arrival time (the time it takes for the flood wave to reach its maximum distance of inundation), or the ability to notify persons downstream and their ability to evacuate. The existence and frequency of updating and exercising an evacuation plan that is site-specific assists in warning and evacuation functions. A failure of the Folsom Dam would leave little time for evacuation of District properties downstream.

The Folsom Dam is currently being worked on to increase capacity, and lower the risk of dam failure.

Past Occurrences

The Planning Team for the District, noted that there have been no past occurrences of dam failure that have affected the District.

Vulnerability to Dam Failure

A dam failure will cause loss of life, damage to property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path. Damage to electric generating facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas.

A catastrophic dam failure, depending on size of dam and population downstream, could exceed the response capability of local communities. Damage control and disaster relief support would be required from other local governmental and private organizations, and from the state and federal governments.

Figure 4.71 in Section 4.3.6 in the Base Plan shows the areas of Sacramento County at risk to a dam failure of the Folsom Dam.

Assets at Risk

Sacramento County provided inundation as a GIS layer for the Folsom Dam system, as part of the following breaks:

- Folsom Right Wing
- Folsom Mormon
- Folsom Dike 4
- Folsom Dike 5
- Folsom Dike 6
- Folsom Dike 7
- Folsom Dike 8
- Folsom Dam

GIS was used to determine the possible impacts of dam failure flooding to District facilities. The methodology described in Section 4.3.6 of the Base Plan was followed in determining structures and values at risk in potential dam inundation areas. Table P-5 shows the property name, address, occupancy, and total values and estimated loss of parcels that fall in an inundation zone in the District.

Table P-5 Twin Rivers School District – Buildings, Values, and Populations in Dam Inundation Zone

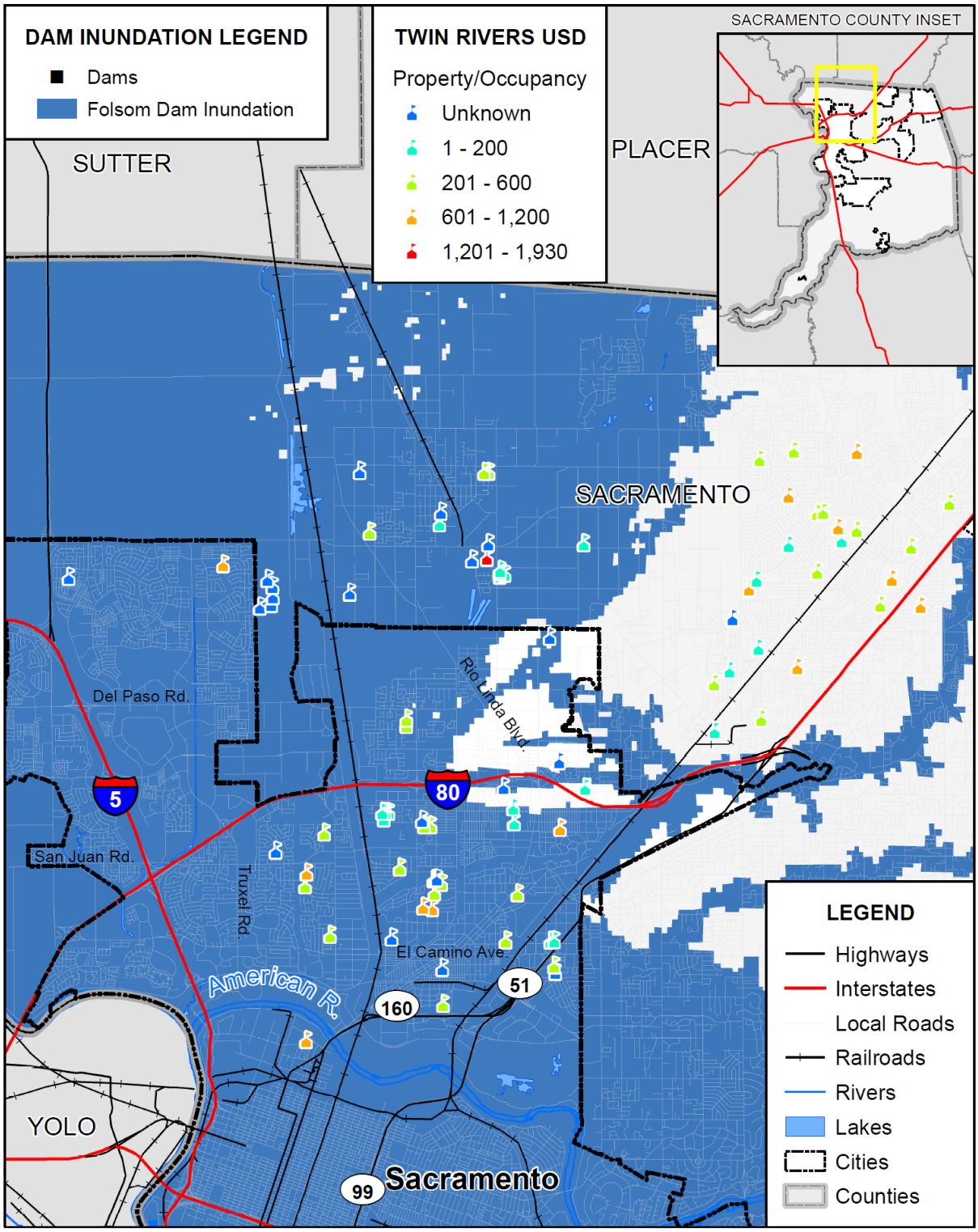
Property Name	Physical Address	Occupancy	Structure Value
Babcock Park	2400 Cormorant Way, Sacramento, 95815	0	N/A
Babcock, D W Elementary	2400 Cormorant Way, Sacramento, 95815	400	$6,494,106
Castori, Michael J. Elementary	1801 South Ave., Sacramento, 95838	750	$7,657,585
Del Paso Heights Elementary	590 Morey Ave., Sacramento, 95838	290	$7,596,650
Del Paso Heights Elementary	590 Morey Ave., Sacramento, 95838	290	N/A
DPH Park	590 Morey Ave., Sacramento, 95838	0	$0
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	$6,852,660
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	N/A
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	N/A
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	N/A
East Natomas Educational Complex	5926 E. Levee Rd	0	N/A
East Natomas Educational Complex	5925 E. Levee Rd	0	N/A
East Natomas Educational Complex	5922 E. Levee Rd	0	N/A

Property Name	Physical Address	Occupancy	Structure Value
East Natomas Educational Complex	5921 E. Levee Rd	0	N/A
East Natomas Educational Complex	5924 E. Levee Rd	0	$67,947,365
Fairbanks Elementary	227 Fairbanks Ave., Sacramento, 95838	435	$6,968,540
Frito-Lay Land Purchase (Undeveloped)	1710 Ascot Ave., Rio Linda 95673	0	N/A
Garden Valley Elementary	3601 Larchwood Dr., Sacramento, 95834	410	$3,601,260
Grant High	1400 Grand Ave., Sacramento, 95838	55	$7,604,370
Grant West	1221 South Ave., Sacramento, 95838	1,035	$45,591,240
Hagginwood Elementary	1418 Palo Verde Ave., Sacramento, 95815	1,035	$15,369,260
Hayer Park (RLPA) Park	1101 "G" St., Rio Linda, 95673	455	$6,989,112
Higher Learning Academy	2625 Plover St., Sacramento, 95815	0	N/A
Higher Learning Academy	2625 Plover St., Sacramento, 95815	115	$800,000
Johnson, Harmon Elementary	577 Las Palmas Ave., Sacramento, 95815	115	N/A
Keema High School	1281 North Ave., Sacramento, 95838	0	$5,694,600
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	547 Arcade Blvd, Sacramento, 95815	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	549 Arcade Blvd	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	555 Arcade Blvd	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	557 Arcade Blvd	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	559 Arcade Blvd	0	N/A
King, Jr,. Martin Luther Technology Academy	3051 Fairfield St., Sacramento, 95815	365	$19,448,020
King, Jr,. Martin Luther Technology Academy	3051 Fairfield St., Sacramento, 95815	365	N/A
Maintenance - Taft Street	2628 Taft St., Sacramento, 95815	15	$2,212,790
Maintenance Warehouse	2041 I St, Rio Linda, 95673	0	N/a
Meister Site (Undeveloped)	Bridgeford & Chuckwagon	0	N/A
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	$3,230,960
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	N/A
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	N/A

Property Name	Physical Address	Occupancy	Structure Value
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	N/A
Noralto Elementary	477 Las Palmas Ave., Sacramento, 95815	750	$8,155,470
Northwood Elementary	2630 Taft St., Sacramento, 95815	535	$8,629,790
Norwood Jr. High	4601 Norwood Ave., Sacramento, 95838	405	$12,819,160
Norwood Jr. High	4601 Norwood Ave., Sacramento, 95838	405	N/A
Old Harmon Johnson (Demolished -Lot)	2591 Edgewater Rd., Sacramento, 95815	0	N/A
Orchard Elementary	1040 Q St., Rio Linda, 95673	255	$10,369,190
Orchard Elementary	1040 Q St., Rio Linda, 95673	255	$0
Regency Park Elementary	5901 Bridgecross Dr. Way, Sacramento, 95835	915	$9,635,770
Rio Linda High	6309 Dry Creek Rd., Rio Linda, 95673	1,930	$33,047,090
Rio Linda High Stadium	6411 Dry Creek Rd., Rio Linda, 95673	0	N/A
Rio Linda Prep Academy	1101 "G" St., Rio Linda, 95673	500	$10,315,100
Rio Tierra Jr. High	3201 Northstead Dr., Sacramento, 95833	625	$12,245,530
Robinson, Fred K. Admin. Offices (Unused)	670 Dixieanne Ave., Sacramento, 95815	0	$7,281,330
Smythe, Alethea B. Charter (7-8)	700 Dos Rios St., Sacramento, 95811	455	$5,972,380
Smythe, Alethea B. Charter (K-6)	2781 Northgate Blvd. Sacramento, 95833	665	$6,249,880
Strauch, Hazel Elementary	3141 Northstead Dr., Sacramento, 95833	600	$6,281,010
Terrace Park (Undeveloped)	Parcel Number 20110700760000	0	N/A
Transportation - Grand Ave.	1400B Grand Ave., Sacramento, 95838	60	$976,300
Transportation - Rio Linda	6619 6th Ave., Rio Linda, 95673	75	$1,563,560
Vineland (Pre)	6450 20th St., Rio Linda, 95673	55	$7,916,235
West 4th Ave / E Street	Undeveloped	0	N/A
West 4th Ave / Q Street	Undeveloped	0	N/A
Westside Elementary	6537 West 2nd St., Rio Linda, 95673	585	$5,961,960
Woodlake Elementary	700 Southgate Rd., Sacramento, 95815	480	$5,606,435

Source: Sacramento County 2016 Parcel/2015 Assessor's Data

Figure P-2 Twin Rivers School District – Buildings in Dam Inundation Zone



Data Source: Twin Rivers Unified School District, Sacramento County GIS, Cal-Atlas, National Inventory of Dams; Map Date: 05/2016.

Natural Resources

Historic and Cultural Resources

Most of the existing school sites built prior to 1950. While not on a historical registry, the oldest school in the district was built around 1938.All other historic and cultural resources in the District would be at risk to dam inundation.

Future Development

Any future development in the District could be affected by a Folsom Dam failure.

Earthquake

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Ground shaking is the primary earthquake hazard. Many factors affect the survivability of structures and systems from earthquake-caused ground motions. These factors include proximity to the fault, direction of rupture, epicenter location and depth, magnitude, local geologic and soils conditions, types and quality of construction, building configurations and heights, and comparable factors that relate to utility, transportation, and other network systems. Ground motions become structurally damaging when average peak accelerations reach 10 to 15 percent of gravity, average peak velocities reach 8 to 12 centimeters per second, and when the Modified Mercalli Intensity Scale is about VII (18-34 percent peak ground acceleration), which is considered to be very strong (general alarm; walls crack; plaster falls).

Past Occurrences

The Planning Team for the District noted no past occurrences that have affected the District.

Vulnerability to Earthquake

Assets at Risk

Earthquake losses will vary across the District depending on the source and magnitude of the event and the nature and type of building construction. A map showing peak ground accelerations in Sacramento County and the District is shown in Figures4-32 and 4-33 of the Base Plan. The earthquake scenario run for the 2011 LHMP for Sacramento County provides a good estimate of loss to the Planning Area based on a realistic earthquake scenario. The results of this scenario are described in Section 4.3.8 of the Base Plan. Specific damages to facilities owned by the District were not available in this analysis.

Natural Resources

Earthquake could affect water sources by damaging underground natural springs and wells, trees and landscape.

Historic and Cultural Resources

Most of the existing school sites were built prior to 1950. While not on a historical registry, the oldest school in the district was built around 1938 and has not been retrofit to updated seismic requirements.

Future Development

While there are no immediate plans for new schools or structures; any future development, albeit seismically considered, has the potential of damage during an earthquake.

Flood: 100/200/500-year

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

The District is traversed by several stream systems and is at risk to both riverine flooding and localized stormwater flooding. Flooding is of primary concern in the low, flat areas that exist in the TRUSD boundaries. As shown in the plan, there are 50-100 year flood zones, creeks, waterways and tributaries that have the potential to create a hazardous and possibly catastrophic situation. The name of the district, "Twin Rivers" is suggestive to this issue. Located near the apex of two major rivers; the Sacramento and American Rivers, flooding is always a concern.

Past Occurrences

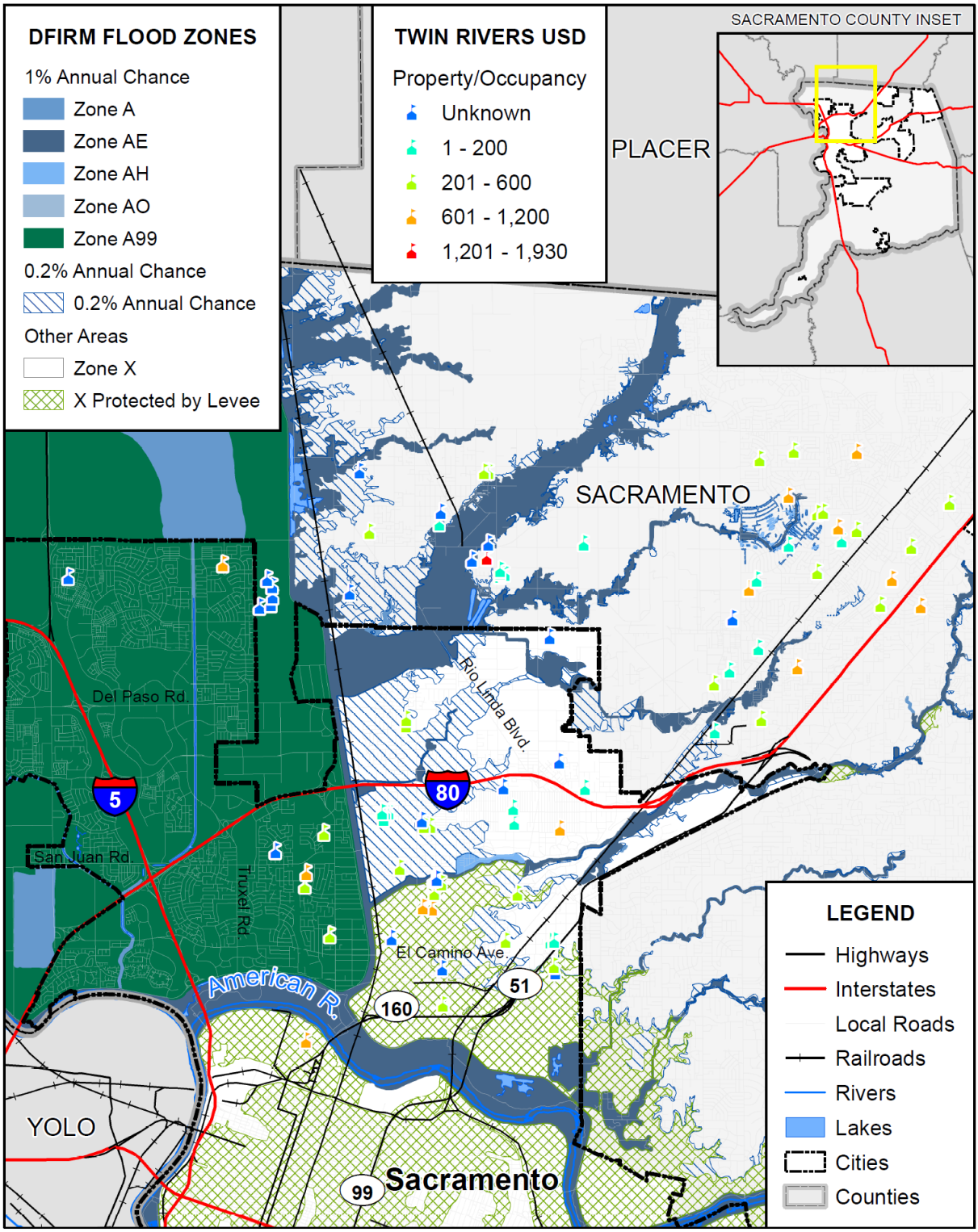
Flood waters in 1986 and 1998 caused damage to roads, structures and district properties. The many creeks and tributaries are still a risk for downstream flooding, in spite of corrections to local levees and upriver dams. While some damage occurred at this time, the records indicating repairs and corrections are not available. Twin Rivers USD is the culmination of four school districts, which unified in 2008. Records prior to this time are not available.

Vulnerability to Flood

Assets at Risk

The District's school locations were used as the basis for this analysis. The District provided occupancy and building values for each school. GIS was used to create a centroid, or a point representing the center of the School's parcel polygon. DFIRM flood data was then overlaid on the school centroids. For the purposes of this analysis, the flood zone that intersected a school centroid was assigned the flood zone for the entire school. District properties by DFIRM zones are shown on Figure P-3 and in Table P-6.

Figure P-3 Twin Rivers School District – Properties in DFIRM Flood Zones



Data Source: Twin Rivers Unified School District, Sacramento County GIS, Cal-Atlas, FEMA NFHL 04/16/2016; Map Date: 05/2016.

Table P-6 Twin Rivers School District – Properties in DFIRM Flood Zones

School Property	Physical Address	Occupancy	Structure Value
Zone A99			
East Natomas Educational Complex	5926 E. Levee Rd	0	$67,947,365
East Natomas Educational Complex	5925 E. Levee Rd	0	N/A
East Natomas Educational Complex	5922 E. Levee Rd	0	N/A
East Natomas Educational Complex	5921 E. Levee Rd	0	N/A
East Natomas Educational Complex	5924 E. Levee Rd	0	N/A
Garden Valley Elementary	3601 Larchwood Dr., Sacramento, 95834	410	$3,601,260
Meister Site (Undeveloped)	Bridgeford & Chuckwagon	0	N/A
Regency Park Elementary	5901 Bridgecross Dr. Way, Sacramento, 95835	915	$9,635,770
Rio Tierra Jr. High	3201 Northstead Dr., Sacramento, 95833	625	$12,245,530
Smythe, Alethea B. Charter (7-8)	700 Dos Rios St., Sacramento, 95811	455	$5,972,380
Strauch, Hazel Elementary	3141 Northstead Dr., Sacramento, 95833	600	$6,281,010
Terrace Park (Undeveloped)	Parcel Number 20110700760000	0	N/A
Zone AE			
Rio Linda High Stadium	6411 Dry Creek Rd., Rio Linda, 95673	1,930	$33,047,090
0.2% Annual Chance			
Babcock, D W Elementary	2400 Cormorant Way, Sacramento, 95815	400	$6,494,106
DPH Park	590 Morey Ave., Sacramento, 95838	0	N/A
Fairbanks Elementary	227 Fairbanks Ave., Sacramento, 95838	435	$6,968,540
Hagginwood Elementary	1418 Palo Verde Ave., Sacramento, 95815	455	$6,989,112
Keema High School	1281 North Ave., Sacramento, 95838	0	$5,694,600
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	$3,230,960
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	N/A
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	N/A
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	N/A
Norwood Jr. High	4601 Norwood Ave., Sacramento, 95838	405	$12,819,160
Norwood Jr. High	4601 Norwood Ave., Sacramento, 95838	405	N/A
Transportation - Rio Linda	6619 6th Ave., Rio Linda, 95673	75	$1,563,560
West 4th Ave / E Street	Undeveloped	0	N/A
West 4th Ave / Q Street	Undeveloped	0	N/A
Zone X			
Allison, Warren A. Elementary	4315 Don Julio Blvd., No. Highlands, 95660	275	$6,432,540
Allison, Warren A. Elementary	4315 Don Julio Blvd., No. Highlands, 95660	275	N/A
Bell Avenue Property (Undeveloped)	1690 Bell Avenue, Sacramento, 95838	0	N/A
Castori, Michael J. Elementary	1801 South Ave., Sacramento, 95838	750	$7,657,585

School Property	Physical Address	Occupancy	Structure Value
Creative Conn. Arts Academy Charter (K-8)	7201 Arutas Dr., No. Highlands, 95660	540	$5,765,220
Creative Conn. Arts Academy Charter(9-12)	6444 Walerga Rd, No. Highlands, 95660	105	$12,905,740
Del Paso Heights Elementary	590 Morey Ave., Sacramento, 95838	290	$7,596,650
Del Paso Heights Elementary	590 Morey Ave., Sacramento, 95838	290	N/A
District Office	5115, 5107, 5049, 5039 Dudley Blvd, McClellan, 95652	330	$67,947,365
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	$6,852,660
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	N/A
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	N/A
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	N/A
Foothill High	5000 McCloud Dr., Sacramento, 95842	1,270	$32,080,190
Foothill Oaks Elementary	5520 Lancelot Dr., Sacramento, 95842	580	$7,980,830
Foothill Ranch Jr. High	5001 Diablo Dr., Sacramento, 95842	765	$14,581,580
Frito-Lay Land Purchase (Undeveloped)	1710 Ascot Ave., Rio Linda 95673	0	
Frontier Elementary	6691 Silverthorne Cir., Sacramento, 95842	545	$7,039,520
Future Charter School (7-12)	3701 Stephen Dr., No. Highlands, 95660	565	N/A
Grant High	1400 Grand Ave., Sacramento, 95838	1,035	$45,591,240
Grant West	1221 South Ave., Sacramento, 95838	1,035	$15,369,260
Hayer Park (RLPA) Park	1101 "G" St., Rio Linda, 95673	0	N/A
Higher Learning Academy	2625 Plover St., Sacramento, 95815	115	$800,000
Higher Learning Academy	2625 Plover St., Sacramento, 95815	115	N/A
Highlands Academy of Art & Design	6601 Guthrie Way, No. Highlands, 95660	925	$30,536,620
Hillsdale Elementary	6469 Guthrie Way, No. Highlands, 95660	460	$7,069,330
Joyce, Frederick C. Elementary	6050 Watt Ave., No. Highlands, 95660	605	N/A
Kohler Elementary	4004 Bruce Way, No. Highlands, 95660	510	$6,663,290
Larchmont Elementary	6560 Melrose Dr., No. Highlands, 95660	170	$6,179,100
Madison Elementary	5241 Harrison St., No. Highlands, 95660	680	$7,832,480
Maintenance - Taft Street	2628 Taft St., Sacramento, 95815	15	$2,212,790
Maintenance Warehouse	2041 I St, Rio Linda, 95673	75	$1,563,560
Murchison Center (Adult Ed)	5703 Skvarla, Bldg. 1407, McClellan, 95652	0	$4,037,430
"Northwood Elementary "	2630 Taft St., Sacramento, 95815	535	$8,629,790
Oakdale Elementary	3708 Myrtle Ave., No. Highlands, 95660	0	$585,300
Office Building (Unused)	5201 Arnold Way, McClellan, 95652	555	$7,243,120
Orchard Elementary	1040 Q St., Rio Linda, 95673	255	$10,369,190
Orchard Elementary	1040 Q St., Rio Linda, 95673	255	$0

School Property	Physical Address	Occupancy	Structure Value
Pacific Career & Technology High/Pathways	3800 Bolivar Ave., No. Highlands, 95660	150	$14,282,860
Pioneer Elementary	5816 Pioneer Way, Sacramento, 95841	695	$6,730,628
Richmond, Miles P. School	4330 Keema Ave., North Highlands, 95660	60	$2,729,260
Ridgepoint Elementary	4680 Monument Dr., Sacramento, 95842	745	$7,132,630
Rio Linda High	6309 Dry Creek Rd., Rio Linda, 95673	0	$7,586,880
Rio Linda Prep Academy	1101 "G" St., Rio Linda, 95673	0	N/A
Rio Linda PreSchool (Head Start)	631 L St., Rio Linda, 95673	500	$10,315,100
Sierra View Elementary	3638 Bainbridge Dr., No. Highlands, 95660	505	$6,133,590
TR Police Admin. Offices	1333 Grand Ave., Sacramento, 95838	55	$7,604,370
Transportation - Grand Ave.	1400B Grand Ave., Sacramento, 95838	60	$976,300
United Cerebral Palsey (Leased Out)	5450 Georgia Dr., No. Highlands, 95660	190	$6,133,070
Village Elementary	6845 Larchmont Dr., No. Highlands, 95660	645	$6,210,970
Vineland (Pre)	6450 20th St., Rio Linda, 95673	55	$7,916,235
Vista Nueva Career & Tech High/NOVA	2035 North Ave., Sacramento, 95838	185	$5,584,650
Westside Elementary	6537 West 2nd St., Rio Linda, 95673	585	$976,300
Winona Admin Center	3222 Winona Way, No. Highlands, 95660	105	$6,210,970
Woodridge Elementary	5761 Brett Dr., Sacramento, 95842	515	$5,584,650
X Protected by Levee			
Babcock Park	2400 Cormorant Way, Sacramento, 95815	0	N/A
Johnson, Harmon Elementary	577 Las Palmas Ave., Sacramento, 95815	635	$12,644,380
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	547 Arcade Blvd, Sacramento, 95815	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	549 Arcade Blvd	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	555 Arcade Blvd	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	557 Arcade Blvd	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	559 Arcade Blvd	0	N/A
King, Jr,. Martin Luther Technology Academy	3051 Fairfield St., Sacramento, 95815	365	$19,448,020
King, Jr,. Martin Luther Technology Academy	3051 Fairfield St., Sacramento, 95815	365	N/A
Noralto Elementary	477 Las Palmas Ave., Sacramento, 95815	750	$8,155,470
Old Harmon Johnson (Demolished - Lot)	2591 Edgewater Rd., Sacramento, 95815	0	N/A

School Property	Physical Address	Occupancy	Structure Value
Robinson, Fred K. Admin. Offices (Unused)	670 Dixieanne Ave., Sacramento, 95815	0	$7,281,330
Smythe, Alethea B. Charter (K-6)	2781 Northgate Blvd. Sacramento, 95833	665	$6,249,880
Woodlake Elementary	700 Southgate Rd., Sacramento, 95815	480	$7,916,235

Source: TRUSD, FEMA 4/16/2016 DFIRM

National Flood Insurance Program and Repetitive Loss Properties

TRUSD is not an eligible community for purposes of the National Flood Insurance Program and thus does not participate in the program. The NFIP defines a community for purposes of the NFIP as, "any State or area or political subdivision thereof, or any Indian Tribe or authorized tribal organization, or Alaska Native Village or authorized native organization, which has the authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction." The TRUSD does not have authority to establish floodplain regulations within District boundaries, but instead follows the regulations of the City or unincorporated area in which District property is located.

The District did not identify any District-owned repetitive loss or severe repetitive loss properties.

Natural Resources

All natural resources including grounds, wells, trees, landscaping are at risk to flooding.

Historic and Cultural Resources

Flood risks the historical integrity of some of the original schools in this district. Some built in the 1930's and 1940's would not withstand major flooding.

Future Development

While there are no immediate plans for new schools, and this issue has been considered in the new Master Plan, any future development has the potential for damage during flood.

Flood: Localized Stormwater

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

Historically, the District has been at risk to flooding primarily during the spring months when river systems in the County swell with heavy rainfall.

Past Occurrences

Flood waters in 1986 and 1998 caused considerable damage to roads, structures and district properties. The many creeks and tributaries are still a risk for downstream flooding, in spite of corrections to local levees and upriver dams.

Vulnerability to Localized Flood

Localized flooding also occurs throughout the Planning Area at various times throughout the year with several areas of primary concern unique to the District.

Assets at Risk

Mapping of these areas is an ongoing effort by the County and countywide maps that include the area covered by the District should be available by the next plan update. However, known affected localized flood areas and associated values identified by the County are included in Section 4 of the Base Plan. The District floods easily and each year during storm season, sand bags are pulled out. These instances are only recorded by work orders carried out by the maintenance department. The District could not provide any specific data on areas of localized flooding that directly affect District properties.

Natural Resources

All natural resources including grounds, wells, trees, landscaping are at risk to flooding

Historic and Cultural Resources

Stormwater/localized flooding risks the historical integrity of some of the original schools in this district. Some built in the 1930's and 1940's would not withstand major flooding.

Future Development

The risk of stormwater/localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater will reduce future risks of losses due to stormwater/localized flooding.

Levee Failure

Likelihood of Future Occurrence–Unlikely
Vulnerability–High

Hazard Profile and Problem Description

Generally, levees fail due to overtopping or collapse. A catastrophic levee failure resulting from collapse probably will occur very quickly with relatively little warning. Such a failure would occur where the levee is saturated and the high hydrostatic water pressure on the river side, coupled with erosion of the levee from high water flows or an inherent defect in the levee that causes an almost instant collapse of a portion of the levee. Under such circumstances, structures located relatively near the break will suffer immediate and

extensive damage. Several hundred yards away from the break the energy of the flood waters will be dispersed sufficiently to reduce, but not eliminate, flooding damage to structures in its path. The flood water will flow in a relatively shallow path toward any low point in the affected area. Flood water will collect in these low areas and the levels will rise as the flow continues. When the rivers are high, it is not possible to close or repair a levee break until the water surface in the river and the flooded area equalize.

Past Occurrences

Other than the levee failure in 1986 and the floods of 1998, there are no other past occurrences.

Vulnerability to Levee Failure

Floods can threaten the District from several sources. Usually, the possibility of flooding can be anticipated from eight to twenty hours before the "Emergency Period" is reached. However, as demonstrated in Linda, California, in February 1986, it is possible for a levee to collapse with little or no warning when there are still four or more feet of freeboard available. Sections 4.2.17 and 4.3.12 of the Base Plan provides additional information on levees within the Sacramento County Planning Area. Although Folsom Dam and surrounding levees have been improved, there is still the risk of failure.

Unincorporated Sacramento County and its incorporated jurisdictions have mapped flood hazard areas. This includes areas protected by levees. GIS was used to determine the possible impacts of flooding in areas protected by levee within the County, and how the risk varies across the Planning Area. The following methodology was followed in determining improved parcel counts and values at risk to levee failure. However, this analysis was performed based on the most current 2015 DFIRMs which still reflect some levees as providing 100-year level of protection. According to the County, all levees have since been decertified as not providing a 100-year level of protection, so this analysis is based solely on the information presented in the DFIRMs. Further it is important to note that many levee improvement projects are ongoing throughout the Planning Area, some of which will be providing certification of area levees to both a 100-year and 200-year levels depending on applicable requirements. Thus, this analysis reflects a moment in time and while it does provide information on areas developed behind levees, the X Protected by Levee flood zone will continue to change as these projects are completed and new certifications obtained.

Assets at Risk

The District's school locations were used as the basis for this analysis. The District provided occupancy and building values for each school. GIS was used to create a centroid, or a point representing the center of the School's parcel polygon. DFIRM flood data was then overlaid on the school centroids to determine if the centroid lies in and X Protected by Levee Zone. For the purposes of this analysis, the flood zone that intersected a school centroid was assigned the flood zone for the entire school. District properties in DFIRM X Protected by Levee zones are shown on Figure P-3 and in Table P-7.

Table P-7 Twin Rivers School District – Properties in DFIRM Levee Protected Flood Zones

School Property	Physical Address	Occupancy	Structure Value
Babcock Park	2400 Cormorant Way, Sacramento, 95815	0	N/A

School Property	Physical Address	Occupancy	Structure Value
Johnson, Harmon Elementary	577 Las Palmas Ave., Sacramento, 95815	635	$12,644,380
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	547 Arcade Blvd, Sacramento, 95815	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	549 Arcade Blvd	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	555 Arcade Blvd	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	557 Arcade Blvd	0	N/A
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	559 Arcade Blvd	0	N/A
King, Jr,. Martin Luther Technology Academy	3051 Fairfield St., Sacramento, 95815	365	$19,448,020
King, Jr,. Martin Luther Technology Academy	3051 Fairfield St., Sacramento, 95815	365	N/A
Noralto Elementary	477 Las Palmas Ave., Sacramento, 95815	750	$8,155,470
Old Harmon Johnson (Demolished -Lot)	2591 Edgewater Rd., Sacramento, 95815	0	N/A
Robinson, Fred K. Admin. Offices (Unused)	670 Dixieanne Ave., Sacramento, 95815	0	$7,281,330
Smythe, Alethea B. Charter (K-6)	2781 Northgate Blvd. Sacramento, 95833	665	$6,249,880
Woodlake Elementary	700 Southgate Rd., Sacramento, 95815	480	$7,916,235

Source: TRUSD, FEMA 4/16/2016 DFIRM

Natural Resources

All natural resources including grounds, wells, trees, landscaping are at risk to flooding.

Historic and Cultural Resources

Flood risks the historical integrity of some of the original schools in this district. Some built in the 1930's and 1940's would not withstand major flooding.

Future Development

Future development would be in the northern section of the District, where small streams and tributaries abound, as well as levees. Although recently improved, there is still a risk of failure.

River/Stream/Creek Bank Erosion

Likelihood of Future Occurrence–Occasional
Vulnerability–Medium

Hazard Profile and Problem Description

The District is situated on a thermal belt in a relatively flat area, as is much of the central California area, resulting in flooding and erosion in the spring. The District Planning Team noted that there are many creeks and tributaries of the Sacramento and American rivers that traverse the District.

Past Occurrences

There are no records showing damage from erosion. Most improvements were done during the course of "maintenance" work.

Vulnerability to Erosion

Since the Districts is located in a relatively flat area, the District has experienced a number of problems, including flooding due to eroded stream banks. The Rio Linda area, specifically Rio Linda High, Dry Creek ES, Rio Linda Prep are bordered by creeks (Dry Creek & Linda Creek) that are subject to overflow and bank erosion. The District intends, as a matter of policy, to address these issues in the hazard mitigation plan and as a matter of course for district procedure.

Section 4.2.18 of the Base Plan provides additional information on the erosion hazard within the Sacramento County Planning Area.

Assets at Risk

The District Planning Team noted that buildings in the Rio Linda area have some risk to erosion. Specific details on this were unavailable.

Natural Resources

The District Planning Team noted that a loss of vegetation and erosion in parkways in District areas may occur.

Historic and Cultural Resources

The Planning Team for the District noted no risk to historic and cultural resources from erosion.

Future Development

The District Planning Team noted that only buildings to be constructed in northern section would be at risk; but will be designed with this risk considered.

Severe Weather: Extreme Temperatures – Cold and Freeze

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Extreme cold often accompanies a winter storm or is left in its wake. It is most likely to occur in the winter months of December, January, and February. Prolonged exposure to the cold can cause frostbite or hypothermia and can become life-threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in buildings that are poorly insulated or without heat. Extreme cold can disrupt or impair communications facilities.

Past Occurrences

The District Planning Team noted that there is no list showing damage from freeze, although there have been broken water pipes, damaged equipment and lost vegetation. Repairs were done during the course of "maintenance" work.

Vulnerability to Cold and Freeze

Vulnerability to winter storms and extreme cold is difficult to quantify, as these are not mapped or geographically specific hazards. Most losses in the District associated with this hazard come in the form of power outages or and bursting pipes. Severe ice is often associated with winter storms. An icy roadway on a bridge or in a busy intersection threatens the safety of students on buses. Delays in emergency response services and a halt of public utilities' services are of concern.

In the event of a severe winter storm or extreme cold, populations with special needs such as elementary school students are of particular concern; as they are most vulnerable to adverse conditions and temperatures. Approximately 16,570 students in elementary or pre-kindergarten these would be at risk to severe weather.

Section 4.2.2 of the Base Plan provides additional information on freeze within the Sacramento County Planning Area.

Assets at Risk

The District Planning Team noted that specific assets at risk to cold and freeze are the agriculture classrooms and livestock associated with them. In addition, tanks, well components, and various building components on older buildings would be at risk.

Natural Resources

The District Planning Team noted that vegetation and agricultural areas in the District are at risk from cold and freeze.

Historic and Cultural Resources

The District Planning Team noted no risk to historic and cultural resources in the District from cold and freeze.

Future Development

The District Planning Team noted that there is a negligible risk to future properties – future development will consider this risk.

Severe Weather: Extreme Temperatures – Heat

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

The District is situated on a thermal belt in a relatively flat area, as is much of the central California area, resulting in excessive heat during late spring and early fall seasons. Due the age of most schools, the HVAC equipment has long since passed it's intended usage. The district continues to install new equipment, when able. This has been a very real problem in the district for years, due to the extreme temperatures, over 100 degrees in the beginning and end of the school year.

Past Occurrences

The district has had to provide fans, temporary AC units and other devices to cool classrooms during extreme heat.

Vulnerability to Heat

As a result of the flat central California area and resulting heat, the District has experienced a number of problems, including a death from heat exhaustion. In the event of extreme heat, populations with special needs such as elementary school students are of particular concern; as they are most vulnerable to extreme temperatures. Approximately 16,570 students in elementary or pre-kindergarten these would be at risk to extreme heat. The District intends, as a matter of policy, to address these issues in the hazard mitigation plan and as a matter of course for district procedure.

Section 4.2.3 of the Base Plan provides additional information on the extreme heat within the Sacramento County Planning Area.

Assets at Risk

The District Planning Team noted that all facilities are at risk to extreme temperatures. While the structures themselves do not have risk from heat, the students who use them do.

Natural Resources

The extreme heat has killed many trees and planted areas. Along with the drought, the extreme heat has exacerbated these issues over the past few years

Historic and Cultural Resources

There are historic (not registered) buildings that currently have no AC systems, that become damaged in the extreme heat. The district allows various groups and communities, such as Hmong, to participate in neighborhood garden programs. The extreme heat and drought have impacted this.

Future Development

Future development will have little risk as this will be considered in new designs however; extreme temperatures have a tendency to prematurely age roofs/equipment/buildings.

Severe Weather: Fog

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

The District is situated on a thermal belt in a relatively flat area, as is much of the central California area, resulting in fog in the winter.

Past Occurrences

The District Planning Team noted that no past occurrences of fog have affected the District since 2011.

Vulnerability to Fog

The District has experienced a number of problems, including fog-related accidents. In the event of fog, transporting children to and from elementary school students is of particular concern. Approximately 16,570 students in elementary or pre-kindergarten these would be at risk to transportation incidents resulting from fog. The District intends, as a matter of policy, to address these issues in the hazard mitigation plan and as a matter of course for district procedure.

Section 4.2.4 of the Base Plan provides additional information on the fog within the Sacramento County Planning Area.

Assets at Risk

The District Planning Team noted that fog is a safety issue for those who drive their children to school, as well as for bus drivers and passengers traveling to and from District schools.

Natural Resources

The District Planning Team noted no issues related to fog and natural resources.

Historic and Cultural Resources

The District Planning Team noted no issues related to fog and historic and cultural resources.

Future Development

The District Planning Team noted no issues related to fog and future development.

Severe Weather: Heavy Rain and Storms

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

According to historical hazard data, severe weather is an annual occurrence in the District and Sacramento County as a whole. Damage and disaster declarations related to severe weather have occurred and will continue to occur in the future.

Past Occurrences

Heavy rains have created drainage and flooding problems and damaged structures.

Vulnerability to Heavy Rains

Heavy rain and thunderstorms are the most frequent type of severe weather occurrences in the District. Wind and lightning often accompany these storms and have caused damage in the past. However, actual damage associated with the primary effects of severe weather has been limited. It is the secondary hazards caused by weather, such as floods and fires that have had the greatest impact on the District.

Sections 4.2.5 and 4.3.15 of the Base Plan provides additional information on heavy rains and storms within the Sacramento County Planning Area.

Assets at Risk

The District Planning Team note that all District assets are at risk to heavy rains leading to probable flooding.

Natural Resources

As shown in the plan, there are 50- and 100-year flood zones, creeks, waterways and tributaries that have the potential to create a hazardous and possibly catastrophic situation in heavy rain conditions.

Historic and Cultural Resources

The District allows various groups and communities, such as Hmong, to participate in neighborhood garden programs. As with extreme heat and drought, heavy rains have impacted these types of ventures.

Future Development

Future development will be designed to withstand heavy rains better than older buildings, however, there is still the risk of flood and damage due to this weather condition.

Severe Weather: Wind and Tornadoes

Likelihood of Future Occurrence–Highly Likely
Vulnerability–Medium

Hazard Profile and Problem Description

All District properties are at risk to wind and tornadoes. When the randomness of tornado location and the random location of schools within the District are considered, the planning team does not consider any one area at a greater risk to tornadoes than any other. Thus, the risk of tornadoes is the same across the District. The risk does not vary from school to school. This is because tornadoes are just as likely to hit one location as another within the District.

Past Occurrences

The District Planning Team noted no past occurrences of tornado or high winds causing damage in the District.

Vulnerability to Tornadoes

The exposure to tornadoes does vary from school to school, as indicated by the building values and occupancy differences in each school. The area that tornadoes strike is random, depending upon the location of the weather system spawning them.

Tornadoes need to be given serious consideration in this assessment, because if and when they do strike a school, the impact can be devastating. Tornadoes can impact the District by destroying buildings and infrastructure within seconds. Tornadoes can cause numerous human injuries or fatalities. They can create tremendous debris removal problems, overwhelm building departments, and psychologically scar students, faculty, and staff.

There are limited things that can be done to reduce the damages caused by tornadoes – though recently, significant strides have been made to improve life safety during these events – most notably through improved warning systems and the building of designated shelters.

Section 4.2.6 of the Base Plan provides additional information on tornadoes within the Sacramento County Planning Area.

Assets at Risk

The District Planning Team noted that any District building, particularly the many portable buildings within this District have risk from wind and tornadoes.

Natural Resources

The District Planning Team noted that there are old growth trees, natural landscaping and wells that could be affected.

Historic and Cultural Resources

There are many historical buildings in the District which are culturally sensitive.

Future Development

Although the damage lessens with newer construction, any new buildings, signage, structures with height are at risk to tornadoes.

Wildfire

Likelihood of Future Occurrence–Occasional
Vulnerability–High

Hazard Profile and Problem Description

Major fires are generally categorized as either a conflagration or wildland/forestland. A conflagration may involve residential or commercial areas and spreads across both natural and constructed barriers. Wildland is associated with open range grasslands and into the foothills of a particular area. Because of development in rural areas adjacent to and within the District, a third classification is emerging, the Wildland Urban Interface (WUI) wildfire. The WUI wildfire is one that burns along the urban/rural interface and can result in major losses of property and structures. The WUI wildfire hazard is what is addressed in this LHMP.

A number of factors affect the behavior of wildland and interface fires, including terrain, weather, wind, fuels and seasons. It is well known that fire travels faster uphill than down and is more difficult to fight on steep slopes than on level ground. When weather is hot and the humidity is low, wildland fires can explode with intensity of rapid combustion. Even in the absence of strong winds, a fast-moving fire can generate its own updrafts, particularly in canyons, causing burning brands to be carried high in the air and drop a long distance ahead. This results in spot fires over a wide radius as the wind changes its direction.

Past Occurrences

The District Planning Team noted that there are no records of wildfire impacts that have occurred in the District.

Vulnerability to Wildfire

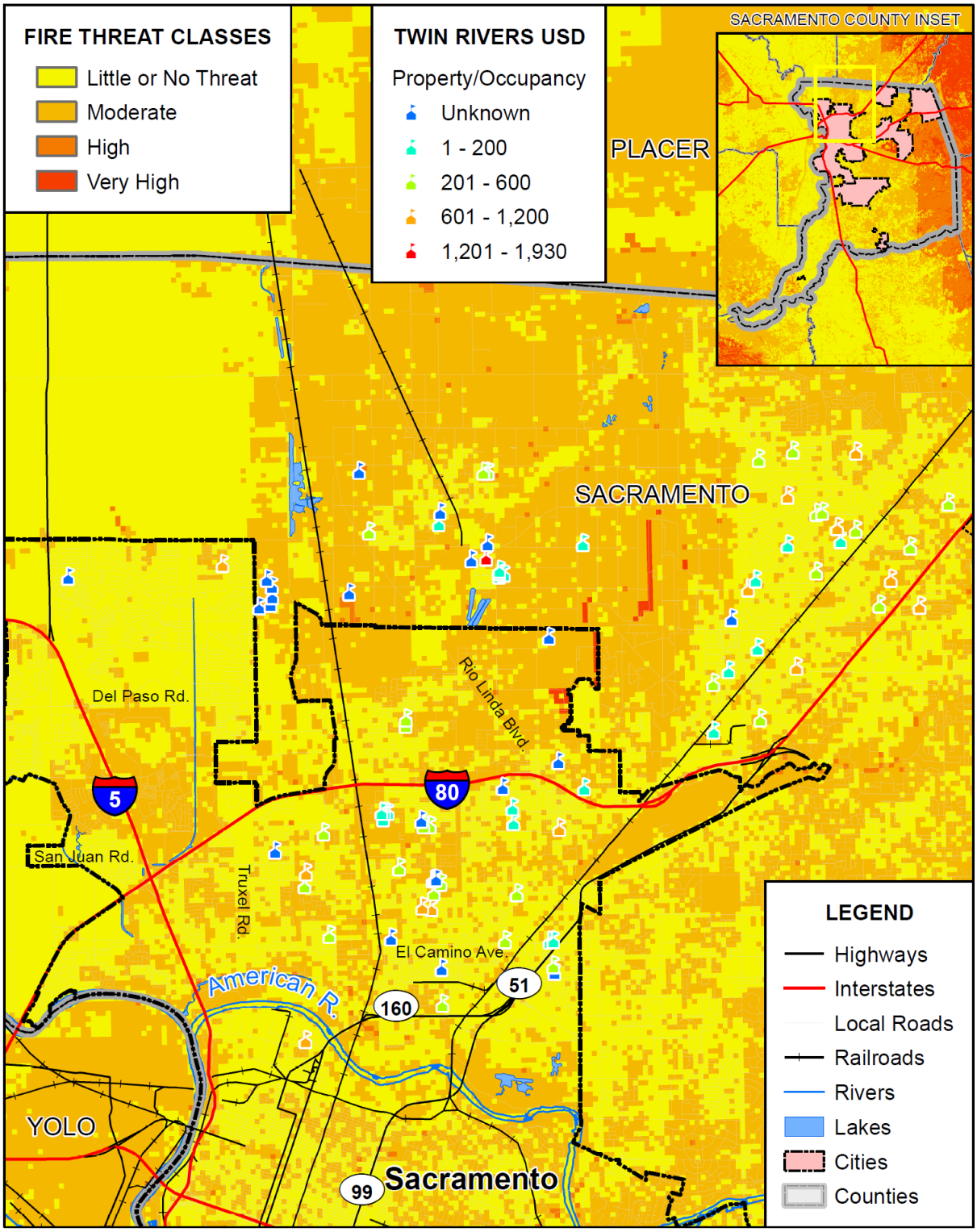
The District is not immune to numerous types of grass and brush fires and any one of them may accelerate into a large urban interface wildfire. Such a situation could lead to evacuation of large portions of the population and the potential for significant loss of personal property, structures and rangeland. The natural fuels available near District properties vary greatly in the rate and intensity of burning. Fires in heavy brush and stands of trees burn with great intensity but more slowly than in dry grass and leaves. Dense fuels will propagate fire better than sparse fuels. The local fire season generally extends from June through late September or early October.

During extremely windy conditions, both small and large-scale fires will generate enough smoke to necessitate the closing of key transportation routes. It may be necessary to close streets and/or re-route traffic to maintain traffic lanes and access for firefighting apparatus. Large parking areas may be cordoned off for the staging of various types of resources needed during large-scale emergencies. All of these may affect busing and transportation of students, faculty, and staff to and from District schools.

Assets at Risk

The District's school locations were used as the basis for this analysis. The District provided occupancy and building values for each school. GIS was used to create a centroid, or a point representing the center of the School's parcel polygon. Cal Fire's Fire Threat layer was then overlaid on the school centroids. For the purposes of this analysis, the fire threat zone that intersected a school centroid was assigned the fire threat zone for the entire school. District properties by Fire Threat Zones s are shown on Figure P-4 and in Table P-8.

Figure P-4 Twin Rivers School District – Properties by Fire Threat Zones



Data Source: Twin Rivers Unified School District, Sacramento County GIS, Cal-Atlas, Cal-Fire 2004 Fire Threat Data; Map Date: 05/2016.

Table P-8 Twin Rivers School District – Properties by Fire Threat Zones

School Property	Physical Address	Occupancy	Structure Value
Little or No Threat			
Allison, Warren A. Elementary	4315 Don Julio Blvd., No. Highlands, 95660	275	
Babcock, D W Elementary	2400 Cormorant Way, Sacramento, 95815	400	$6,494,106
Castori, Michael J. Elementary	1801 South Ave., Sacramento, 95838	750	$7,657,585
Creative Conn. Arts Academy Charter (K-8)	7201 Arutas Dr., No. Highlands, 95660	540	$5,765,220
Del Paso Heights Elementary	590 Morey Ave., Sacramento, 95838	290	$7,596,650
District Office	5115, 5107, 5049, 5039 Dudley Blvd, McClellan, 95652	330	$67,947,365
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	
Frontier Elementary	6691 Silverthorne Cir., Sacramento, 95842	545	$7,039,520
Higher Learning Academy	2625 Plover St., Sacramento, 95815	115	$800,000
Higher Learning Academy	2625 Plover St., Sacramento, 95815	115	
Hillsdale Elementary	6469 Guthrie Way, No. Highlands, 95660	460	$7,069,330
Johnson, Harmon Elementary	577 Las Palmas Ave., Sacramento, 95815	635	$12,644,380
Keema High School	1281 North Ave., Sacramento, 95838	0	$5,694,600
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	547 Arcade Blvd, Sacramento, 95815	0	
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	549 Arcade Blvd	0	
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	555 Arcade Blvd	0	
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	557 Arcade Blvd	0	
King, Jr,. Martin Luther JHS Off-Site (Old Maintenance Site)	559 Arcade Blvd	0	
King, Jr,. Martin Luther Technology Academy	3051 Fairfield St., Sacramento, 95815	365	$19,448,020
King, Jr,. Martin Luther Technology Academy	3051 Fairfield St., Sacramento, 95815	365	
Larchmont Elementary	6560 Melrose Dr., No. Highlands, 95660	170	$6,179,100
Madison Elementary	5241 Harrison St., No. Highlands, 95660	680	$7,832,480
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	$3,230,960
Murchison Center (Adult Ed)	5703 Skvarla, Bldg. 1407, McClellan, 95652	0	$4,037,430
Norwood Jr. High	4601 Norwood Ave., Sacramento, 95838	405	$12,819,160

School Property	Physical Address	Occupancy	Structure Value
OfficeBuilding (Unused)	5201 Arnold Way, McClellan, 95652	555	$7,243,120
Orchard Elementary	1040 Q St., Rio Linda, 95673	255	$0
Pioneer Elementary	5816 Pioneer Way, Sacramento, 95841	695	$6,730,628
Regency Park Elementary	5901 Bridgecross Dr. Way, Sacramento, 95835	915	$9,635,770
Richmond, Miles P. School	4330 Keema Ave., North Highlands, 95660	60	$2,729,260
Ridgepoint Elementary	4680 Monument Dr., Sacramento, 95842	745	$7,132,630
Rio Linda PreSchool (Head Start)	631 L St., Rio Linda, 95673	500	$10,315,100
Robinson, Fred K. Admin. Offices (Unused)	670 Dixieanne Ave., Sacramento, 95815	0	$7,281,330
Sierra View Elementary	3638 Bainbridge Dr., No. Highlands, 95660	505	$6,133,590
Smythe, Alethea B. Charter (7-8)	700 Dos Rios St., Sacramento, 95811	455	$5,972,380
Terrace Park (Undeveloped)	Parcel Number 20110700760000	0	
Transportation - Rio Linda	6619 6th Ave., Rio Linda, 95673	75	$1,563,560
United Cerebral Palsey (Leased Out)	5450 Georgia Dr., No. Highlands, 95660	190	$6,133,070
Village Elementary	6845 Larchmont Dr., No. Highlands, 95660	645	$6,210,970
Winona Admin Center	3222 Winona Way, No. Highlands, 95660	105	$6,210,970
Moderate			
Allison, Warren A. Elementary	4315 Don Julio Blvd., No. Highlands, 95660	275	$6,432,540
Babcock Park	2400 Cormorant Way, Sacramento, 95815	0	
Bell Avenue Property (Undeveloped)	1690 Bell Avenue, Sacramento, 95838	0	
Creative Conn. Arts Academy Charter(9-12)	6444 Walerga Rd, No. Highlands, 95660	105	$12,905,740
Del Paso Heights Elementary	590 Morey Ave., Sacramento, 95838	290	
DPH Park	590 Morey Ave., Sacramento, 95838	0	
Dry Creek Elementary	1230 G St., Rio Linda, 95673	115	$6,852,660
East Natomas Educational Complex	5926 E. Levee Rd	0	$67,947,365
East Natomas Educational Complex	5925 E. Levee Rd	0	
East Natomas Educational Complex	5922 E. Levee Rd	0	
East Natomas Educational Complex	5921 E. Levee Rd	0	
East Natomas Educational Complex	5924 E. Levee Rd	0	
Fairbanks Elementary	227 Fairbanks Ave., Sacramento, 95838	435	$6,968,540
Foothill High	5000 McCloud Dr., Sacramento, 95842	1,270	$32,080,190
Foothill Oaks Elementary	5520 Lancelot Dr., Sacramento, 95842	580	$7,980,830
Foothill Ranch Jr. High	5001 Diablo Dr., Sacramento, 95842	765	$14,581,580

School Property	Physical Address	Occupancy	Structure Value
Frito-Lay Land Purchase (Undeveloped)	1710 Ascot Ave., Rio Linda 95673	0	
Future Charter School (7-12)	3701 Stephen Dr., No. Highlands, 95660	565	
Garden Valley Elementary	3601 Larchwood Dr., Sacramento, 95834	410	$3,601,260
Grant High	1400 Grand Ave., Sacramento, 95838	1,035	$45,591,240
Grant West	1221 South Ave., Sacramento, 95838	1,035	$15,369,260
Hagginwood Elementary	1418 Palo Verde Ave., Sacramento, 95815	455	$6,989,112
Hayer Park (RLPA) Park	1101 "G" St., Rio Linda, 95673	0	
Highlands Academy of Art & Design	6601 Guthrie Way, No. Highlands, 95660	925	$30,536,620
Joyce, Frederick C. Elementary	6050 Watt Ave., No. Highlands, 95660	605	
Kohler Elementary	4004 Bruce Way, No. Highlands, 95660	510	$6,663,290
Maintenance - Taft Street	2628 Taft St., Sacramento, 95815	15	$2,212,790
Maintenance Warehouse	2041 I St, Rio Linda, 95673	75	$1,563,560
Meister Site (Undeveloped)	Bridgeford & Chuckwagon	0	N/A
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	N/A
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	N/A
Morey Avenue Pre K - K	155 Morey Ave., Sacramento, 95838	30	N/A
Noralto Elementary	477 Las Palmas Ave., Sacramento, 95815	750	$8,155,470
"Northwood Elementary "	2630 Taft St., Sacramento, 95815	535	$8,629,790
Norwood Jr. High	4601 Norwood Ave., Sacramento, 95838	405	N/A
Oakdale Elementary	3708 Myrtle Ave., No. Highlands, 95660	0	$585,300
Old Harmon Johnson (Demolished - Lot)	2591 Edgewater Rd., Sacramento, 95815	0	
Orchard Elementary	1040 Q St., Rio Linda, 95673	255	$10,369,190
Pacific Career & Technology High/Pathways	3800 Bolivar Ave., No. Highlands, 95660	150	$14,282,860
Rio Linda High	6309 Dry Creek Rd., Rio Linda, 95673	0	$7,586,880
Rio Linda High Stadium	6411 Dry Creek Rd., Rio Linda, 95673	1,930	$33,047,090
Rio Linda Prep Academy	1101 "G" St., Rio Linda, 95673	0	
Rio Tierra Jr. High	3201 Northstead Dr., Sacramento, 95833	625	$12,245,530
Smythe, Alethea B. Charter (K-6)	2781 Northgate Blvd. Sacramento, 95833	665	$6,249,880
Strauch, Hazel Elementary	3141 Northstead Dr., Sacramento, 95833	600	$6,281,010
TR Police Admin. Offices	1333 Grand Ave., Sacramento, 95838	55	$7,604,370
Transportation - Grand Ave.	1400B Grand Ave., Sacramento, 95838	60	$976,300
Vineland (Pre)	6450 20th St., Rio Linda, 95673	55	$7,916,235
Vista Nueva Career & Tech High/NOVA	2035 North Ave., Sacramento, 95838	185	$5,584,650
West 4th Ave / E Street	Undeveloped	0	

School Property	Physical Address	Occupancy	Structure Value
West 4th Ave / Q Street	Undeveloped	0	
Westside Elementary	6537 West 2nd St., Rio Linda, 95673	585	$976,300
Woodlake Elementary	700 Southgate Rd., Sacramento, 95815	480	$7,916,235
Woodridge Elementary	5761 Brett Dr., Sacramento, 95842	515	$5,584,650

Source: TRUSD, CAL FIRE

Natural Resources

The District Planning Team noted that the District covers a large area, with many old growth trees, natural park areas that would be affected by wildfire.

Historic and Cultural Resources

The District Planning Team noted that there are many old, historical buildings that would be considered an historic loss in event of fire.

Future Development

The District Planning Team noted that there is minimal risk, as new building will be constructed to avoid this issue.

P.6 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities, administrative and technical mitigation capabilities, fiscal mitigation capabilities, mitigation education, outreach, and partnerships, and other mitigation efforts.

P.6.1. Regulatory Mitigation Capabilities

Table P-9 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the TRSD.

Table P-9 TRSD's Regulatory Mitigation Capabilities

Plans	Y/N Year	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
Comprehensive/Master Plan	Y 2009	District Organization and Implementation Planning Process
Capital Improvements Plan	Y	Facilities master plan
Economic Development Plan	N	

Local Emergency Operations Plan	Y	Emergency Management Plan
Continuity of Operations Plan	N	
Transportation Plan	N	
Stormwater Management Plan/Program	Y	TRUSD SWWP-continuously updated
Engineering Studies for Streams	N	
Community Wildfire Protection Plan	Y	Natomas Habitat Conservation Plan
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y	Safety Plan
Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**
Building Code	N	Dept. of State Architect / Title 24
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	Score: unknown
Fire department ISO rating:	N	Rating: unknown
Site plan review requirements	Y	By CDE as required and to verify preventative measures established. By DSA for final plan check.
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts? Y** **Is the ordinance adequately administered and enforced? Y**
Zoning ordinance	N	
Subdivision ordinance	N	
Floodplain ordinance	N	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	N	
Elevation Certificates	N	
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	N	
Other	Y	District Policy Manual
How can these capabilities be expanded and improved to reduce risk?		

Source: TRSD

P.6.2. Administrative/Technical Mitigation Capabilities

Table P-10 identifies the department(s) responsible for activities related to mitigation and loss prevention for TRSD.

Table P-10 TRSD's Administrative and Technical Mitigation Capabilities

Administration	Y/N	Describe capability Is coordination effective?
Planning Commission	N	
Mitigation Planning Committee	N	
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	N	
Mutual aid agreements	N	
Other		
Staff	**Y/N FT/PT**	**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	N	
Floodplain Administrator	N	
Emergency Manager	Y FT	Risk Manager
Community Planner	N	
Civil Engineer	Y FT	Facilities/Planning – Director of Facilities & Construction
GIS Coordinator	Y	Facilities/Planning
Other		
Technical		
Warning systems/services (Reverse 911, outdoor warning signals)	Y	IT Department
Hazard data and information	N	
Grant writing	N	
Hazard analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: TRSD

P.6.3. Fiscal Mitigation Capabilities

Table P-11 identifies financial tools or resources that the TRSD could potentially use to help fund mitigation activities.

Table P-11 TRSD's Fiscal Mitigation Capabilities

Funding Resource	Access/ Eligibility (Y/N)	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Used for all types of improvement projects
Authority to levy taxes for specific purposes	Y	School Impact Fees
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	Developer Fees used on various projects
Storm water utility fee		
Incur debt through general obligation bonds and/or special tax bonds	Y	Bonds-for specific site improvements
Incur debt through private activities	Y	Private Loans
Community Development Block Grant	N	
Other federal funding programs	Y	Grants
State funding programs	Y	Modernization Funding
Other		
How can these capabilities be expanded and improved to reduce risk?		

Source: TRSD

In addition, there are a number of Federal sources of funding for hazard mitigation projects, including;

- Federal Emergency Management Agency (FEMA)
- Housing and Urban Development (HUD)
- US Army Corps of Engineers (USACE)
- Small Business Administration (SBA)
- US Department of Agriculture (USDA)
- Natural Resource Conservation Service (NRCS)
- National Oceanic and Atmospheric Administration (NOAA)
- Federal Homeland Security Grants
- Bureau of Land Management (BLM)
- CA Dept. of Water Resources Flood Safe Program

P.6.4. Mitigation Education, Outreach, and Partnerships

Table P-12 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table P-12 TRSD's Mitigation Education, Outreach, and Partnerships

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	Safe Schools, Energy Management; solar and water retention programs.
Natural disaster or safety related school programs	Y	In Emergency Plan
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		

P.6.5. Other Mitigation Efforts

The district is in the process of partnering with appropriate agencies, such as the California Department of Natural Resources, County of Sacramento, Rio Linda/Elverta Water Department, Sacramento Regional Flood Control Agency, Arcade Creek Parks and Recreation and neighborhood efforts to minimize loss of property and casualties of potential catastrophic event.

The district works closely with the local efforts to monitor ongoing efforts to provide safe levee systems. The district also works closely with neighboring water districts to minimize flooding and provide adequate drainage at sites within flood zones. The district plans to prepare and activate a community protection/assistance initiative for the area most critical.

The County of Sacramento, Rio Linda/Elverta Water Department, SAFCO, Arcade Creek Parks and Recreation and Sacramento County Libraries will become partners in mitigation efforts.

The District is in the process of implementing an assessment and protection plan based on National Clearinghouse of Educational Facilities (NCEF) guidelines. In addition to this, the District has made efforts to compile emergency supplies such as emergency communications, power, fuel and water as a part of the Emergency Preparedness Plan.

The District is creating District Standard Construction Specifications, outlining in detail the mandatory building procedures and techniques that will be implemented in all future building. These "standards" will include raised foundations, drainage systems and detention ponds, earthen berms and other natural resource

protection, structural systems designed for high winds or tornados and "safe areas" in a particular building where staff and students will collect during catastrophic events, natural or by man.

In 2007, during the construction of a new school compound known as ENEC, various mitigation efforts were implemented in the design. Detention ponds were constructed on a larger than needed scale to be included as infrastructure for surrounding areas and adjacent development.

Drainage from the building and site flowed directly into the detention ponds with overflow going directly into the County flood channels. This project was designed and constructed in partnership with SAFCA (Sacramento Area Flood Control Agency), the County of Sacramento and local developers.

P.7 Mitigation Strategy

P.7.1. Mitigation Goals and Objectives

TRSD adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

P.7.2. Mitigation Actions

The planning team for TRSD identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included.

Action 1. New drainage plans to sites within the flood areas including, site drainage, storm drain upgrades and re-grading fields to shed water (on-site) away from buildings

Hazards Addressed: Flooding/Drainage

Goals Addressed: 1, 2, 3, 4

Issue/Background: Many of the Northern area schools within the Rio Linda community and Eastern schools within the Natomas community have been designated as potential catastrophic flood zones and do not have adequate drainage. The District is in the planning phases of identifying those specific areas, assessing the existing drainage systems and prioritizing the potential risk. The District intends to begin work with civil engineers to begin design and planning to engage in this work in the 2017/18 school year. The current District is a culmination of five smaller districts that incorporated in 2008, therefore, paper records are difficult to trace, but there is evidence of damage in the surrounding communities that prove difficulties during heavy storms and rains. Once this action is completed and depending upon adequate funding, the District will begin the design process for upgrading and increasing drainage systems.

Other Alternatives: During the assessment process, the District will identify drainage systems that require interim maintenance such as removing debris, clearing perimeter drains and verifying that the existing drains are working as well as possible.

Existing Planning Mechanisms through which Action will be Implemented: The District Facilities Services and Maintenance departments will work in tandem to create a workable plan.

Responsible Office: Facility Services

Priority (H, M, L): High

Cost Estimate: $2,250,000

Benefits (Losses Avoided): Reduction of District property and life safety

Potential Funding: FEMA Funding, TRUSD facility funding/CDE, any other grant or funding programs available.

Schedule: The District is currently planning the improvements and will begin this portion of work as soon as possible.

Action 2. ***Work with City/County/Water departments to create defensible spaces at sites where nearby creeks are prone to flooding. Build-up earthen berms (off-site) to shed water away from critically located schools.***

Hazards Addressed: Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: Many of the district sites are located in the County of Sacramento and are within the perimeter of various water districts and city and county agencies, particularly Sacramento Regional Flood Control Agency, County of Sacramento and Rio Linda/Elverta Water District. TRUSD intends to participate in any improvement discussions led by the various agencies, to provide perimeter protection including levee rebuilding. This will be a partnering effort to create a program of corrective and preventative measures for reducing flood damage.

Other Alternatives: The District will build earthen berms and provide grading to shed overflow water away from sites to adjacent storm drainage.

Existing Planning Mechanisms through which Action will be implemented: The Facilities Services Department is in the assessment phases of determining which sites will be best suited for this type of work

Responsible Office: Facility Services

Priority (H, M, L): High

Cost Estimate: $2,800,000

Benefits (Losses Avoided): Loss of property and personal safety.

Potential Funding: FEMA funding, local agency participation, other district sources, if available.

Schedule: ASAP

Action 3. Working with the Department of the State Architect (DSA) on Earthquake Retrofit Plan on all sites.

Hazards Addressed: Earthquakes

Goals Addressed: 1, 2, 3, 4

Issue/Background: There are a number of buildings within the TRUSD District boundaries that were construction prior to 1970. Those building require earthquake retrofitting or structural enhancement to make buildings safe during earthquake. It is the District's intention to assure that all buildings are safe for students, staff and visitors and to eliminate potentially disastrous property loss should an earthquake occur. The Facility Services Department will work closely with the Department of the State Architect to provide facility assessment and determine best cause of action.

Other Alternatives: The Facility Services Department will undergo a facility assessment with the use of a Structural Engineer to determine potentially dangerous buildings and areas, costs to correct and schedule action. The Risk Management Department will verify adequate earthquake insurance and verify that emergency plans and subsequent materials are in place should earthquake occur.

Existing Planning Mechanisms through which Action will be implemented: The Facility Services Department has been in touch with DSA to begin the process of Earthquake Retrofit.

Responsible Office: Facility Services and Risk Management.

Priority (H, M, L): Medium

Cost Estimate: Unknown to $10,000,000.00

Benefits (Losses Avoided): Property and life.

Potential Funding: FEMA, Department of the State Architect, California Department of Education, California Earthquake Authority, District Funds (if available) any available grant programs.

Schedule: The District intends to contact DSA for this in the 2016/17 school year, after current projects start. It is anticipated that funding may become available to proceed with improvements.

Action 4. Revise and update district-wide Storm Water Prevention Plan

Hazards Addressed: Drainage/Erosion/Flooding

Goals Addressed: 1, 2, 3, 4

Issue/Background: The District practices storm water prevention during construction projects as mandated by the state and federal agencies. The District would like to implement these same procedures

in the Hazard Mitigation Plan and as a matter of policy to deter debris from drainage systems, circumvent flooding to protect land and property.

Other Alternatives: N/A

Existing Planning Mechanisms through which Action will be implemented: The Facility Services Department including Maintenance and Operations is determining the best way to create a procedural manual and implement this policy.

Responsible Office: Facilities Services with Maintenance & Operations.

Priority (H, M, L): Medium

Cost Estimate: $150,000

Benefits (Losses Avoided): Property, environment and life safety.

Potential Funding: FEMA, any state or other agency with grant funds.

Schedule: In process now.

Action 5. Create defensible perimeter space – for fire areas. Trees trimmed and vegetation removed to minimize impact during fire season.

Hazards Addressed: Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: Various schools in the District are in less densely populated areas where the threat of fire risk due to excessive vegetation is high. While the District attempts to minimize this risk, it has been not been accomplished as a priority. It is the intention of the District to create and implement new policy and procedures and to purchase the tools and equipment necessary to minimize these concerns.

Other Alternatives: Prepare a recurring work order that stipulates drain proper tree trimming and vegetation removal as part of a program and on an annual basis.

Existing Planning Mechanisms through which Action will be Implemented: The Grounds section of the Facility Services Department is preparing a work plan and equipment list to accomplish this goal.

Responsible Office: Facility Services and Grounds.

Priority (H, M, L): M

Cost Estimate: $75,000

Benefits (Losses Avoided): Protection of life and property

Potential Funding: FEMA, TRUSD Deferred Maintenance funds for yearly

Schedule: The M&O department has initiated this work as part of the Preventative Maintenance Plan and has begun the work for the 2016 season. As funding allows, the District will continue this as part of the bi-yearly preventative plan.

Appendix A Planning Process

A.1 Sacramento County Step 1: Organize to Prepare a Plan

(a). Involvement of Community Land Use and Comprehensive Planning

In addition to attending meetings, providing draft text for inclusion in the plan, reviewing plan documents, and coordinating input from other departments and stakeholders, Sacramento County planners also provided information on development since the last plan, mapping and details on future development areas, input on current mitigation capabilities, coordination with other planning mechanisms, and in-progress modifications to the General Plan and associated documents specific to Sacramento County's floodplain management provisions for regulating to the 200-year level of flood protection.

Sacramento County Planners

- Todd Taylor – Associate Planner, Community Development Department
- Mike Winter – Senior Planner, Community Development Department

City of Sacramento Planners

- Remi Mendoza – Associate Planner, Community Development Department/Long Term Planning

Other planners to the process included Jeanine Foster and Chris Morrison, professional planners with Foster Morrison, the consultant for this LHMP Update, as well as other planners and staff from the incorporated communities and other participating jurisdictions involved in future land use development decisions for the Sacramento County Planning Area.

(b). Staff of Community Departments on HMPC with Expertise on CRS Step 7 Activities

In order to promote the integration of CRS into this planning process, the representatives from the County were selected based on their areas of expertise relative to the CRS mitigation categories as detailed in Table A-1.

Table A-1 Sacramento County Staff Capability with Six Mitigation Categories

Jurisdiction/Departments	Prevention	Property Protection	Natural Resource Protection	Emergency Services	Structural Flood Control Projects	Public Information	Other
Sacramento County							
Community Development Department/Planning and Environmental Review Division, Long Range Planning Section– Todd Taylor	X	X	X			X	X

Jurisdiction/Departments	Prevention	Property Protection	Natural Resource Protection	Emergency Services	Structural Flood Control Projects	Public Information	Other
Emergency Services – Steve Catalme/Roger Ince	X	X	X	X	X	X	X
Department of Water Resources, Flood Management and Engineering/Sacramento County Water Agency- George Booth	X	X	X	X	X	X	X
Department of Water Resources, Flood Management and Engineering- Celine Livengood	X	X	X			X	X
County Sustainability Manager, Department of Waste Management and Recycling - Judy Robinson	X					X	X
Public Information- Diane Margetts/Mathew Robinson	X					X	X
City of Sacramento							
Community Development Department/Long Term Planning – Remi Mendoza	X	X	X			X	X
*Emergency Services – Jason Sirney	X	X	X	X	X	X	X
Department of Utilities – Floodplain Management/Engineering – Kelly Sherfey	X	X	X	X	X	X	X
Public Information – Rhea Serran						X	X

(c) Sacramento County Resolution formally recognizing and establishing the planning process/planning committee

APPROVED
BOARD OF SUPERVISORS
BY RESO# 2016-0091
FEB 09 2016
BY Florence Evans
Clerk of the Board

COUNTY OF SACRAMENTO
CALIFORNIA

26

For the Agenda of:
February 9, 2016

To: Board of Supervisors

From: Department of Water Resources

Subject: Authorization To Apply For And Accept A Federal Emergency Management Agency (FEMA) Grant To Update The Local Hazard Mitigation Plan

Supervisorial District(s): All

Contact: George Booth, Senior Civil Engineer 874-6484

Overview
The Department of Water Resources (DWR) applied through the California Office of Emergency Services (OES) for a Pre-Disaster Mitigation Program grant from FEMA, to update the multi-jurisdictional Local Hazard Mitigation Plan (Plan). This action seeks approval for the Plan update, authorization to apply for and accept the FEMA grant, and designation of the applicant's agent authorized to execute the grant using the special resolution form required by OES.

Recommendations
1. Approve the Resolution authorizing the Director of the Department of Water Resources to update the Local Hazard Mitigation Plan and to apply for and accept the FEMA grant to fund the update.
2. Approve the OES resolution form (Attachment 1) designating the applicant's agent(s).

Measures/Evaluation
Not applicable to this item.

Fiscal Impact
The Plan update will cost $145,000 and the FEMA grant amount will be $108,750, with a required 25 percent local (non-federal) cost share totaling $36,250. The local share will be split between the City of Sacramento ($12,600) and Sacramento County Water Agency (SCWA) Zone 13 ($23,650). The cost of the update is included in the Fiscal Year 2015-16 SCWA Zone 13 Adopted Budget.

BACKGROUND

The Robert T. Stafford Disaster Mitigation Act of 2000 (Stafford Act) requires communities to prepare a local hazard mitigation plan and to update that plan every five years in order to be eligible for federal disaster mitigation grants.

The current Plan was approved by the Board of Supervisors and by the Sacramento County Water Agency Board of Directors on December 6, 2011, by resolutions 2011-0886 and WA2818, respectively. FEMA approved the Plan on April 11, 2012, therefore setting the 5-year Plan update to be completed April 2017.

DISCUSSION

Maintaining an updated Plan is a federal requirement encouraged by the FEMA Community Rating System, critical for applying for hazard mitigation grant funding, and assists in attracting disaster assistance funds if the County experiences a declared disaster requiring federal assistance. Local hazard mitigation plans are important for:

- Identifying natural hazards, their risks, and actions to help mitigate those risks
- Engaging the public in a dialogue regarding natural hazards
- Identifying and reducing risks from natural hazards
- Improving community standing in the FEMA Community Rating System
- Providing policy guidance for decision makers

A local hazard mitigation plan should address all natural hazards that could affect the community and contain risk and vulnerability assessments that describe susceptibility in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the plan area.

As flood hazards are a significant concern in Sacramento County, the County's Plan update must incorporate all the floodplain management changes and changes to the flood risks in Sacramento County that have occurred since the creation of the current Plan including:

- Changes to levee accreditations and floodplain map revisions
- Construction of the Folsom Dam spillway
- Revision to the National Flood Insurance Program motivating many property owners to consider mitigation measures
- Issuance of 2015 Executive Order, E.O. 13690, establishing a federal flood risk management standard as part of a national policy on resilience and risk reduction consistent with the President's Climate Action Plan calling for assessment of flood risk associated with climate change.

The Plan will contain modules with up-to-date hazard mitigation information tailored for those communities who choose to participate in the Plan update.

Input from the stakeholders and public will be gathered in an open and inclusive manner. Each city and special district will be invited to participate in the update and widespread public outreach will be conducted. The update process will include review of the 2011 document and will apply new updated hazard data regarding changes in land use, and development trends in order to update the calculation of the resulting risk assessment. The risk mitigation measures will also be discussed in several open public forums to gather comments and suggestions for additional prioritizing of risk mitigation measures.

By approving the attached Resolutions, the Board will affirm its support of the update of the Local Hazard Mitigation Plan, authorize the Director of the Department of Water Resources to apply for and accept the FEMA grant funds to fund the update, and designate the applicant's agents authorized to execute the FEMA grant.

FINANCIAL ANALYSIS

The Plan update will cost $145,000 and the FEMA grant amount will be $108,750, with a required 25 percent local (non-federal) cost share totaling $36,250. The local share will be split between the City of Sacramento ($12,600) and Sacramento County Water Agency (SCWA) Zone 13 ($23,650). The cost of the update is included in the Fiscal Year 2015-16 SCWA Zone 13 Adopted Budget.

Respectfully submitted,

MICHAEL L. PETERSON, Director
Department of Water Resources

APPROVED:
NAVDEEP S. GILL
Interim County Executive

By: _____
ROBERT B. LEONARD
Chief Deputy County Executive

Attachments:
Resolution
ATT 1 – Cal OES form designating the Applicant's Agents

COUNTY OF SACRAMENTO

RESOLUTION NO. 2016-0091

AUTHORIZATION TO APPLY FOR AND ACCEPT A FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) GRANT TO UPDATE THE LOCAL HAZARD MITIGATION PLAN

WHEREAS, Sacramento County (County) is subject to natural hazards including floods, earthquakes, wildfires, high wind, drought, and pestilence; and

WHEREAS, hazard mitigation planning will create a framework for reducing losses from these hazards; and

WHEREAS, natural disaster mitigation planning is a requirement of the federal Robert T. Stafford Disaster Mitigation Act of 2000 (Act) including a requirement for updates every five years; and

WHEREAS, the current Sacramento County Local Hazard Mitigation Plan (Plan) was approved December 6, 2011, by Resolution 2011-0886; and

WHEREAS, updating the Plan is required in order to maintain eligibility for certain sources of federal mitigation funding programs aimed at reducing damage due to natural hazards; and

WHEREAS, unincorporated County is a community in good standing with FEMA and the Community Rating System (CRS) within the National Flood Insurance Program (NFIP) and maintaining a current Plan is a requirement of CRS; and

WHEREAS, in accordance with the Act, a multi-jurisdictional and public planning committee, led by a consultant with expertise in developing hazard mitigation plans, will analyze the hazards that threaten our community, determine our vulnerability to those hazards, and evaluate alternatives to minimize or eliminate their impacts; and

WHEREAS, the cost will be offset by a FEMA grant with a required local cost share equal to or greater than 25 percent of the grant amount.

AUTHORIZATION TO APPLY FOR AND ACCEPT A FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) GRANT TO UPDATE THE LOCAL HAZARD MITIGATION PLAN

BE IT RESOLVED AND ORDERED that the Chair of the Board of Supervisors hereby

1. Supports the hazard mitigation planning effort as it works through the hazard data and analyzes risk with inter-departmental and inter-agency coordination input; and
2. Supports inclusion of members of the public in the planning effort; and
3. Supports the responsibilities of the planning effort, which include the following activities:
    a. Identifying each natural hazard that affects the County,
    b. Analyzing the risks posed by each hazard,
    c. Assessing the community's vulnerability to the hazards,
    d. Reviewing and evaluating appropriate local regulations, programs, and policies in terms of their effectiveness towards mitigating the impacts of the identified natural hazards,
    e. Developing a hazard mitigation strategy with goals and objectives,
    f. Implementing the hazard mitigation strategies with annual evaluation; and
4. Authorizes the Director of the Department of Water Resources to apply for and to accept a FEMA grant in the amount of $108,750 to fund the Local Hazard Mitigation Plan update; and
5. Designates the Director of Water Resources, Michael Peterson; the Division Chief of Water Resources, Cecilia Jensen; and Principal Civil Engineer, Todd Peterson to act as the authorized agents to further the FEMA Pre-Disaster Mitigation grant program.

AUTHORIZATION TO APPLY FOR AND ACCEPT A FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) GRANT TO UPDATE THE LOCAL HAZARD MITIGATION PLAN

ON A MOTION by Supervisor Kennedy, and seconded by Supervisor Nottoli, the foregoing resolution was passed and adopted by the Board of Supervisors of the County of Sacramento, State of California, this 9th day of February, 2016, by the following vote, to wit:

AYES: Supervisors, Kennedy, Nottoli, Peters, Serna, MacGlashan

NOES: Supervisors, None

ABSENT: Supervisors, None

ABSTAIN: Supervisors, None

RECUSAL: Supervisors, None
(PER POLITICAL REFORM ACT (§ 18702.5.)

Roberta MacGlashan
Chair of the Board of Supervisors
Sacramento County, California

COUNTY OF SACRAMENTO (SEAL) CALIFORNIA

ATTEST: Florence Evans
Interim Clerk, Board of Supervisors

In accordance with Section 25103 of the Government Code of the State of California a copy of the document has been delivered to the Chair of the Board of Supervisors, County of Sacramento on 2.9.16
By: S. Studdt
Deputy Clerk, Board of Supervisors

FILED
BOARD OF SUPERVISORS
FEB 09 2016
BY Florence Evans
CLERK OF THE BOARD

ATTACHMENT 1

STATE OF CALIFORNIA
CALIFORNIA GOVERNOR'S OFFICE OF EMERGENCY SERVICES
CAL OES 130

Cal OES ID No: _____

DESIGNATION OF APPLICANT'S AGENT RESOLUTION
Hazard Mitigation Grant Program and Pre-Disaster Mitigation Program

BE IT RESOLVED BY THE Board of Supervisors (Governing Body) OF THE County of Sacramento (Name of Applicant)

THAT Michael L. Peterson, Director, Department of Water Resources (Title of Authorized Agent), OR

Cecilia Jensen Chief, Department of Water Resources (Title of Authorized Agent), OR

Todd Peterson Principal Engineer, Department of Water Resources (Title of Authorized Agent)

is hereby authorized to execute for and on behalf of the County of Sacramento, Department of Water Resources (Name of Applicant), a public entity established under the laws of the State of California, this application and to file it with the California Governor's Office of Emergency Service. for the purpose of obtaining certain federal financial assistance under Public Law 93-288 as amended by the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, and/or state financial assistance under the California Disaster Assistance Act.

THAT the County of Sacramento, Department of Water Resources (Name of Applicant) a public entity established under the laws of the State of California, hereby authorizes its agent(s) to provide to the California Governor's Office of Emergency Service for all matters pertaining to such state disaster assistance the assurances and agreements required.

Please check the appropriate box below:

☒ This is a universal resolution and is effective for all open and futures Disasters/Grants up to three (3) years following the date of approval below.

☐ This is a Disaster/Grant specific resolution and is effective for only Disaster/Grant name/number(s) _____

Passed and approved this 9th day of February, 2016

Phil Serna District 1 Supervisor
(Name and Title of Governing Body Representative)

Patrick Kennedy District 2 Supervisor
(Name and Title of Governing Body Representative)

Susan Peters District 3 Supervisor
(Name and Title of Governing Body Representative)

Roberta MacGlashan District 4 Supervisor, Chair
(Name and Title of Governing Body Representative)

Don Nottoli District 5 Supervisor, Vice Chair
(Name and Title of Governing Body Representative)

CERTIFICATION

I, Florence Evans (Name), duly appointed and Interim Clerk of the Board (Title) of the County of Sacramento (Name of Applicant), do hereby certify that the above is a true and correct copy of a Resolution passed and approved by the Board of Supervisors (Governing Body) of the County of Sacramento (Name of Applicant)

on the 9th day of February, 2016.

Florence Evans
(Signature)

Interim Clerk of the Board
(Title)

Cal OES 130 (Rev.7/13)

Page 1

A.1.1. HMPC and Steering Committee Invitation List

Agency	Name	Email
Sacramento County	Todd Peterson	petersont@saccounty.net
Sacramento County	George Booth	boothg@saccounty.net
Sacramento County	Mark Rains	rainsm@saccounty.net
Sacramento County	Celine Livengood	livengoodc@saccounty.net
Sacramento County Planning Dept	Don Thomas	thomasdon@saccounty.net
Sacramento County Planning Dept	Rich Radmacher	radmacherr@saccounty.net
Sacramento County	Mathew Darrow	darrowm@saccounty.net
Sacramento County	Dave Tamayo	tamayod@saccounty.net
Sacramento County	Michael Johnson	johnsonm@saccounty.net
Sacramento County - Airports	Glen Rickelson	RickeltonG@saccounty.net
Sacramento County - Ag	Diane Acosta	AcostaD@saccounty.net
Sacramento county - Sustainability Coordinator	Judy Robinson	Robinsonju@saccounty.net
Sacramento County - Water Quality	Archie Wright	WrightAr@SacCounty.NET
Sacramento County	Todd Taylor	Taylorto@saccounty.net
Sacramento County	Mike Winter	winterm@saccounty.net
Sac County Public		
Sacramento - resident	Joan Alston	alstonjoan@comcast.net
Sacramento - resident	George Whitney	
Point Pleasant - resident	Walt Hoppe	walterjhoppe@gmail.com
Woodside Condominiums - resident	Adriana Nand	manager@woodsidehoa.com]
Flood and Levee Control		
SAFCA	Pete Ghelfi, Director	ghelfip@saccounty.net
America River Flood Control	Tim Kerr	
Reclamation District #1601	Chris Neudeck	rd1601@frontiernet.net; cneudeck@ksninc.com
Reclamation District #2111 (dead horse is)	Steve Sinnock	ssinnock@ksninc.com
Reclamation District #563	Chris Neudeck	cneudeck@ksninc.com
Reclamation District #755	Gilbert Cosio	cosio@mbkengineers.com
Reclamation District #755	Ginny McClain	ginny@greeneandhemly.com
Reclamation District #1002	Gilbert Cosio	
Reclamation District #1002	Raber Crombie	rabercrombie@tfewines.com
Reclamation District #551	Gilbert Cosio	cosio@mbkengineers.com
Reclamation District #2110	Gilbert Cosio	
Reclamation District #3	Gilbert Cosio	

Agency	Name	Email
Reclamation District #1000	Paul Devereux	pdevereux@rd1000.org
Reclamation District Maintenance #9		pcarey@water.ca.gov
Reclamation District #800	Henry Matsunaga & Patrick Ervin	pwervin@wbecorp.com
Reclamation District #341	Henry Matsunaga	henry@wbecorp.com
Reclamation District #369	Clarence Chu	ckchu52@comcast.net
Reclamation District #317	Gil Labrie	Glabrie@dccengineering.net
Reclamation District #349	Gil Labrie	
Reclamation District #407	Gil Labrie	
Reclamation District #554	Gil Labrie	
Reclamation District #744	Russ Van Loben	msvls@cwo.com
Reclamation District #2111	Daniel Wilson	daniel@kaydix.com
Regional Water Authority	John Woodling	jwoodling@rwah2o.org
CA DWR Maintenance Area 9	Russ Eckman	eckman@water.ca.gov
Cal DWR	Maria Lorenzo-Lee	mlorenzo@water.ca.gov
GEI Consultants	Chris Ferrari	chrisferrari@geiconsultants.com
Weather Analysis		
NOAA/NWS Sacramento Region	Michelle Mead	michelle.mead@noaa.gov
Emergency Responders - Hazard Mitigation		
County OES	Mary Jo Flynn	FlynnM@saccounty.net
County OES	Roger Ince	incer@saccounty.net
County OES	Steve Cantelme	cantelmes@saccounty.net
CalOES	Jose Lara	Jose.Lara@caloes.ca.gov
CalOES	Megan Walton	Megan.Walton@caloes.ca.gov
CalOES	Victoria	Victoria.LaMar-Haas@CalOES.ca.gov
Placer County OES	Young Rodriquez	YRodrigu@placer.ca.gov
Incorporated Cities		
Citrus Heights		
Citrus Heights	Kevin Becker	kbecker@citrusheights.net
Elk Grove		
Elk Grove Public Works	Bob Murdoch	bmurdoch@elkgrovecity.org
Elk Grove	Brian Fragiao	bfragiao@elkgrovecity.org
Elk Grove	Connie Nelson	cnelson@elkgrovecity.org
Elk Grove PD	Eric White	
Elk Grove - resident	John and Julie Cline	jcline@elkgrovecity.org
Folsom		
Folsom Fire	Chief Ron Phillips	rphillips@folsom.ca.us

Agency	Name	Email
Folsom Fire Safe Council	Johe Leighton	leighton.johe@folsomfsc.org
Folsom	Sarah Staley, Engineer	sstaley@folsom.ca.us
Fair Oaks		
Fair Oaks Recreation and Park District		communitysuggestion@fairoakspark.org
Orangevale Friends of Arden Bluffs	Carrie Clark	carriec51@earthlink.net
Fair Oaks Water District	Michael Misenboym	mnisenboym@fowd.com
Fairoaks Rec & Parks	Kris Borders	kborders@fairoakspark.org
Galt		
City of Galt	Jason Behrmann	jbehrmann@ci.galt.ca.us
City of Galt	Bill Forrest	wforrest@ci.galt.ca.us
City of Galt	Alice Bernardino	abernardino@ci.galt.ca.us
City of Galt	Steven Winkler	swinkler@ci.galt.ca.us
Isleton		
Isleton	Daniel J. Hinrichs	djhengineering@hughes.com
Isleton	Sandra Rutledge	sandra.rutledge@cityofisleton.com
Isleton	Romi Balbini	romi.balbini@gmail.com
Orangevale		
Orangevale	Javed Siddiqui	javed.siddiqui@jtsengineering.com
Ranch Cordova		
Rancho Cordova	Allen Quynn	aquynn@cityofranchocordova.org
Sacramento (City)		
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City of Sacramento - resident	Alan Haynes	alan.haynes@noaa.gov
City of Sacramento - resident	Jeff Beck - Insurance Services	jeff@sactoflood.com
City of Sacramento - resident	Derek Larsen	derek@larsenwurzel.com
City of Sacramento - resident	Dan Henderson	Dhenderson@esri.com
City of Sacramento - resident	Tracey Ferguson	tferguson@nwhm.com
Districts		
Sewer Districts		

Agency	Name	Email
Sewer District	Steve Moore	moorest@sacsewer.com
Sacramento County	Steve Nebozuk	nebozuks@sacsewer.com
School Districts		
CSUS	Hitomi, Bob Y	hitomib@csus.edu
Los Rios	Debbie Turner	turnerd@losrios.edu
Arcohe Union School District	Lori Salfen	salfen@arcohe.net
Twin Rivers Unified School District	Greg Rash	Greg.Rash@twinriversusd.org
Twin Rivers Unified School District	Beth Brose	Beth.Brose@twinriversusd.org
Center Unified School District	Mike Jordan	mikejordan@centerusd.k12.ca.us
Elverta Joint Unified School District	Elizabeth Golchert	
Water Districts		
Elk Grove Water District	Ellen Carlson	ecarlson@egwd.org
Golden State Water	Karla Tejada	karla.tejada@gswater.com
Golden State Water	Brandyn Hancocks	brandyn.hancocks@gswater.com
Sac Suburban Water District	Fred Gayle	fgayle@sswd.org;
Carmichael Water District	Laura Strand	laura@carmichaelwd.org;
Fruitridge Vista Water District	Danilo Sanchez	des@cpuc.ca.gov
California-American Water Company	joseph tanner	joseph.tanner@amwater.com
Del Paso Manor Water District	Debra Sedwick	debrasedwick@sbcglobal.net
Natomas Water District		nwadmin@natomaswater.com
Park Districts		
Arcade Creek Recreation and Park District	Stepher Fraher	sfraher@acrpd.com
Carmichael Recreation and Park District		mail@carmichaelwd.org
Southgate Parks and Recreation	Shalin Singh	ssingh-martin@southgaterecandpark.net
Emergency Service - General		
Police and Sheriff		
Sacramento County Sheriff	Kim Love	klove@sacsheriff.com
Elk Grove PD	Eric White	ewhite@elkgrovepd.org
Elk Grove PD	Brian Noblett	bnoblett@elkgrovepd.org
Sacramento Police Department		rooney@pd.cityofsacramento.org
Fire Depts		
Herald Fire Department	Chief Henricks	James-hendricks@heroldfiredistrict.com
Cosumnes Fire	Troy Bair Deputry Chief/ Kris Hubbard Battation Cheif	krishubbard@csdfire.com
Sacramento Metro Fire	Greg Casentini	casentini.gregory@metrofire.ca.gov
Courtland Fire Dept	david welch	davidwelch@courtlandfire.com
Emergency Preparedness		

Agency	Name	Email
Valley Vision	Meg Arnold	meg.arnold@valleyvision.org
Public - General		
Private Citizens	Jim Gillum and Ed Gillum	jim@gillumco.com
Orangevale, Fair Oaks, Folsom	Harold E. Hillmann	hehillmann@comcast.net
DeAngelo Brothers, Inc.	Alexia Pascua	alexia.berlanda@dbiservices.com
	George Whitney	gbwhitney@gmail.com
Realtors		
Sacramento - Lyon Real Estate	Stacie Davis	sdavis@golyon.com
Others Invited		
Resident - Locke	Thomas Herzog	123her@citilink.net
VCS Consulting (land use)	Alan Vail	arvail@sbcglobal.net
Natural Resources Agency	Julia Kim	jkim@lgc.org
SMUD	Kathy Ave	Kathleen.Ave@smud.org
Environmental Coalition for Water Justice	Amanda	amanda@ejcw.org
Environmental Coalition for Water Justice	Colin Bailey	colin@ejcw.org
Rio Linda/Elverta	Charlea Moore	Charhorseranch@aol.com
Public	Kate Meis	kmeis@lgc.org
Public	Amber Mace	mace.ucdavis@gmail.com
Public	Curtis Alling	curtis.alling@ascentenvironmental.com
Public	Larry Greene	Lgreene@airquality.org
Public	Jenny Woods	jwoods@lgc.org
Resident	Katie Velenzuela	katie@vgconsulting.org.
citizen - Sac City	Emmerson Zapapata	ezapata@cityofsacrmento.org
GEI consultants	Chris Ferrari	cferrari@geiconsultants.com
Resident	Rob Mead	Rob.Mead@comcast.net
Sacramento County DHHS	Karen Olson	OlsonK@SacCounty.net
City Resident	Asad Akhtar	asadakhtar@csus.edu
City Resident	William Olmsted	wolmsted@comcast.net
City Resident	Richard Coombs	rec1146@aol.com
City Resident	Ivan Gennis	ivan.gennis@gmail.com
	Michael Monasky	generalwelfare@surewest.com
Elk Grove	Lance Armstrong	lance.egcitizen@gmail.com
	Dawn Pimental	pimentald@sccounty.net
Elk Grove		rlane@cityofsacramento.org
Added after first meeting		
County Resident	Linda Amelia	linda@chaplaw.us

Agency	Name	Email
Added from Delta meeting		
Walnut Grove Fire	Warren & Katherine Teteak	giranch@frontiernet.net
	Bill Virvitch	virvitch@aol.com
	Ross Dibble	redibble@gmail.com
	Joyce Dibble	jedibble@gmail.com
	Pam	spammyrussell@gmail.com
	Tim Hodgson	tim@timhodgson.us
	Paul & Michelle Franusich	michelle_franusich@yahoo.com
	Homer Herod	Hkhapp@aol.com
	Walt Hoppe	WaterJHoppe@gmail.com
	Bob Berger	Bob33Berger@gmail.com
	Peter Stone	Peterwestleystone@gmail.com
	Emily Pappalardo	Emily@dccengineering.net
	Harry & Loree Saberin	saberin@frontiernet.net
Added from public **meeting**		
CSUS	Kirtland Stout	kirtland@csus.edu
CA DWR	Sami Nall	saminall@water.ca.gov
	Robert Mead	rob.mead@comcast.net
public	Rebecca Lane	rlane@cityofsacramento.org
	Larry Greene	lgreene@airquality.net
Sac Metro AQMD	Amber Mace	ajmace@ucdavis.edu
	Shelley Jiang	sjiang@airquality.org
Added on July 12, 2016		
ILS Committee - Campus Commons	Rfichard Coombs	rec1146@aol.com
Sr. Planner - city of Rancho Cordova	June Cowles	jcowles@cityofranchocordova.org
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SC Dept of Transportation	Kyle Hines	hinesk@saccounty.net
GEI consultants	Mike Mirmanaheri	mmirmanaheri@geiconsultants.ccom
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Twin Rivers Unified School District	Beth Brose	beth.brose@twinriversusd.org
Sacramento Metro Fire	Mike Teague	teague.michael@metrofire.ca.gov
City of Folsom (replacing S. Stanley)	Dave Nugen	dnugen@folsom.ca.us
SCDWR Water Quality	Archie Wright	WrightAr@SacCounty.NET

A.1.2. HMPC Member List

Name	Department/Agency	Email
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Mathew Darrow	Department of Transportation	darrowm@saccounty.net
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Judy Robinson	Waste Management and Recycling, Sustainability Coordinator	Robinsonju@saccounty.net
Todd Taylor	Community Development, Planning & Environmental Review	Taylorto@saccounty.net
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Roger Ince	Office of Emergency Services	incer@saccounty.net
Steve Cantelme	Office of Emergency Services	cantelmes@saccounty.net
Dawn Pimental	Department of Water Resources, Storm Water Quality, CRS	pimentald@sccounty.net
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Archie Wright	Department of Water Resources, Water Quality	WrightAr@SacCounty.NET
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Ronnie Richards	GIS Manager	richardsr@saccounty.net
Diane Margetts	Public Information	margettsd@saccounty.net
Mathew Robinson	Communications and Media	robinsonm@saccounty.net
Kim Love	Sheriff's Office	klover@sacsheriff.com
Kelly Kirk	Sheriff's Office	kkirk@sacsheriff.com
Kylie Hines	Department of Transportation	hinesk@saccounty.net
Etienne Ozorak	Division of Waste Management	ozorake@saccounty.net
Mary Maret	Regional Parks	maretm@SacCounty.NET
Green Team Members	Various	Various

Name	Department/Agency	Email
Incorporated Communities		
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Connie Nelson	Elk Grove Public Works	cnelson@elkgrovecity.org
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Chief Ron Phillips	Folsom Fire	rphillips@folsom.ca.us
Allan Laca	Folsom Public Works	alaca@folsom.ca.us
Sarah Staley	Folsom Public Works	sstaley@folsom.ca.us
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Other Agency, Stakeholder , and Public Representatives		
Gil Labrie	BALMD (RDs 317, 407, 2067) RDs 554, 556, 1002	Glabrie@dccengineering.net
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Brenna Howell	RD 563, 1601, 2111	brenna@brennahowell.com

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Juanita Cana	Southgate Parks and Recreation	jcano@southgaterecandpark.net
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Frederick Gayle	Resident/Sac Suburban Water District	fgayle@sswd.org;

HMPC & Steering Committee Meeting #1 –Kickoff Meeting

Email invite to Kickoff Meeting – County

From: Livengood. Celine
Sent: Monday, March 21, 2016 4:14 PM
To: Peterson. Todd; Booth. George; Rains. Mark; Livengood. Celine; Pimentel. Dawn; Margetts. Diane; Underwood. Dave; Thomas. Daniel; Radmacher. Richard; Darrow. Matthew; tamayod@sacounty.net; Johnson. Michael; Bolen. David; rickelsong@saccounty.net; AGCOMM; Robinson. Judy; Taylorto@sacounty.net; Winter. Mike; Ghelfi. Pete; tkerr@afrcd.org; rd1601@frontiernet.net; ssinnock@ksninc.com; pcarey@water.ca.gov; stahlt@sacoes.org; eckman@water.ca.gov; mlorenzo@water.ca.gov; henry@wbecorp.com; ckchu52@comcast.net; debbie.whaley@csus.edu; Moore. Stephen (SDA); Nebozuk. Steven (SDA); Voight. Lysa (SDA); mikedee@skymail.csus.edu; turnerd@losrios.edu; salfen@arcohe.net; mikejordan@centerusd.k12.ca.us; egolchert@elverta.k12.ca.us; ecarlson@egwd.org; seantwilla@gswater.com; dyork@sswd.org; laura@carmichaelwd.org; des@cpuc.ca.gov; joseph.tanner@amwater.com; debrasedwick@sbcglobal.net; nwadmin@natomaswater.com; sfraher@acrpd.com; mail@carmichaelwd.org; Eric Jones; Kevin Becker; bmurdoch@elkgrovecity.org; bfragiao@elkgrovecity.org; fduenas@elkgrovecity.org; cnelson@elkgrovecity.org; jcline@elkgrovecity.org; rphillips@folsom.ca.us; leighton.johe@folsomfsc.org; sstaley@folsom.ca.us; communitysuggestion@fairoakspark.org; carriec51@earthlink.net; mnisenboym@fowd.com; Kristopher Borders (FOPD); jbehrmann@ci.galt.ca.us; wforrest@ci.galt.ca.us; swinkler@ci.galt.ca.us; djhengineering@hughes.com; sandra.rutkedge@cityofisleton.com; romi.balbini@gmail.com; marquez@yahoo.com; javed.siddiqui@jtsengineering.com; aquynn@cityofranchocordova.org; rsavorn@comcast.net; tjburkenrc@sbcglobal.net; cperkins@cityofsacramento.org; ksherfey@cityofsacramento.org; rmendoza@cityofsacramento.org; rserran@cityofsacramento.org; jsirney@cityofsacramento.org; swinton@pd.cityofsacramento.org; Brian.Heiland@water.ca.gov; alan.haynes@noaa.gov; jeff@sactoflood.com; derek@larsenwurzel.com; Dhenderson@esri.com; tgerguson@nwhm.com; Flynn. MaryJo; stahlt@sacoes.org; incer@SacEOS.Org; Cantelme. Steve; Victoria.LaMar-Haas@caloes.ca.gov.; Jose.Lara@caloes.ca.gov; jwoodling@rwah2o.org; eckman@water.ca.gov; mlorenzo@water.ca.gov; Sheehan. Tim (SacSheriff); Doupe. Karlene (SacSheriff); rooney@pd.cityofsacramento.org; Janine-Belluomini@haroldfiredistrict.com; johnmichelini@csdfire.com; hambrick.michael@metrofire.ca.gov; davidwelch@courtlandfire.com; meg.arnold@valleyvision.org
Subject: 2016 LHMP Update - Invitation for Planning Committee Participation

Robert B. Leonard
Chief Deputy County Executive

Department of Water Resources
Michael L. Peterson, Director

Navdeep S. Gill
Interim County Executive

You are Invited to the
Sacramento County Local Hazard Mitigation Plan Update: Kickoff meeting

Sacramento, CA: Sacramento County and City of Sacramento will begin the process for the 2016 Local Hazard Mitigation Plan update.

We request your participation in this County-wide effort to update the Multi-jurisdictional Local Hazard Mitigation Plan. This Plan must be updated every five years, therefore, this April we will begin the process again and we hope you'll join us in making recommendations for the 2016 Plan.

By participating in this process your agency may be eligible for FEMA grants to mitigate natural hazards that are identified in the Plan and have an opportunity to combine efforts on local projects.

There will be five meetings held between April and October. Please confirm your participation or forward contact information for those that will represent your agency on the planning committee if other than those individuals on this email..

Your commitment would involve the following:

- Attending 5 afternoon meetings over the next 6 months
- Reviewing and providing comments on the plan drafts via email

Kickoff meetings will be held in the following locations; please select the date and location that works best for you.

April 5, 2016
Planning Committee 2pm-5pm
Laguna Town Hall
3020 Renwick Ave,
Elk Grove, CA 95758

April 6, 2016
Planning Committee 2pm-5pm
South Natomas Community Center, Room
2921 Truxel Rd,
Sacramento, CA 95833

Planning Committee Meeting will be followed by an informational evening meeting for the general public from 6:00 to 7:30. You are welcome to attend the evening meetings as well, but your attendance is not required.
Please RSVP and plan on attending this important planning process. For additional information, contact Celine Livengood at 916-874-3130 or email at livengood@saccounty.net.

For more information and a copy of the Hazard mitigation Plan, please go to Saccounty.net and type Local Hazard Mitigation Plan in the search window at the top of the page.

Reminder Email invite to Kickoff Meeting – County

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Tuesday, March 29, 2016 12:06 PM
To: Peterson. Todd <petersont@SacCounty.NET>; Booth. George <boothg@SacCounty.NET>; Rains. Mark <rainsm@SacCounty.NET>; Livengood. Celine <LivengoodC@saccounty.net>; Pimentel. Dawn <pimenteld@SacCounty.NET>; Margetts. Diane <margettsd@SacCounty.NET>; Underwood. Dave <underwoodd@SacCounty.NET>; Thomas. Daniel <ThomasD@SacCounty.Net>; Radmacher. Richard <RADMACHERR@saccounty.net>; Darrow. Matthew <DarrowM@SacCounty.NET>; tamayod@sacounty.net; Johnson. Michael <johnsonm@SacCounty.NET>; Bolen. David <bolend@SacCounty.NET>; Rickelton. Glen <RickeltonG@saccounty.net>; AGCOMM <AGCOMM@saccounty.net>; Robinson. Judy <robinsonju@SacCounty.NET>; Taylorto@sacounty.net; Winter. Mike <WINTERM@saccounty.net>; Ghelfi. Pete <ghelfip@SacCounty.NET>; tkerr@afrcd.org; rd1601@frontiernet.net; Flynn. MaryJo <FlynnM@saccounty.net>; Kathleen.Ave@smud.org; esther@ejcw.org; colin@ejcw.org; meg.arnold@valleyvision.org; johnmichelini@csdfire.com; hambrick.michael@metrofire.ca.gov; davidwelch@courtlandfire.com; rooney@pd.cityofsacramento.org; sfraher@acrpd.com; mail@carmichaelwd.org; Eric Jones <ejones@southgaterecandpark.net>; Vincent King (vking@southgaterecandpark.net) <vking@southgaterecandpark.net>; ecarlson@egwd.org; seantwilla@gswater.com; dyork@sswd.org; laura@carmichaelwd.org; des@cpuc.ca.gov; joseph.tanner@amwater.com; debrasedwick@sbcglobal.net; nwadmin@natomaswater.com; mikejordan@centerusd.k12.ca.us; egolchert@elverta.k12.ca.us; debbie.whaley@csus.edu; mikedee@skymail.csus.edu; turnerd@losrios.edu; salfen@arcohe.net; Moore. Stephen (SDA) <moorest@sacsewer.com>; Nebozuk. Steven (SDA) <nebozuks@sacsewer.com>; swinton@pd.cityofsacramento.org; jsirney@cityofsacramento.org; cperkins@cityofsacramento.org; ksherfey@cityofsacramento.org; rmendoza@cityofsacramento.org; rserran@cityofsacramento.org; aquynn@cityofranchocordova.org; rsavorn@comcast.net; tjburkenrc@sbcglobal.net; djhengineering@hughes.com; sandra.rutledge@cityofisleton.com; romi.balbini@gmail.com; jbehrmann@ci.galt.ca.us; wforrest@ci.galt.ca.us; swinkler@ci.galt.ca.us; communitysuggestion@fairoakspark.org; carriec51@earthlink.net; mnisenboym@fowd.com; Kristopher Borders (FOPD) <kborders@fairoakspark.org>; rphillips@folsom.ca.us; leighton.johe@folsomfsc.org; sstaley@folsom.ca.us; bmurdoch@elkgrovecity.org; bfragiao@elkgrovecity.org; fduenas@elkgrovecity.org; cnelson@elkgrovecity.org; jcline@elkgrovecity.org; Becker, Kevin (MSA) <kbecker@citrusheights.net>; incer@SacEOS.Org; Cantelme. Steve <cantelmes@sacoes.org>; Jose.Lara@caloes.ca.gov; eckman@water.ca.gov; mlorenzo@water.ca.gov; jwoodling@rwah2o.org; Gil <Labrie@dcengineering.net>; henry@wbecorp.com; ckchu52@comcast.net; pdevereux@rd1000.org; pcarey@water.ca.gov; ssinnock@ksninc.com; ginny@greenandhemly.com; rabercrombie@tfewines.com; psiebensohn@rmcsd.com; jsjehendricks@sbcglobal.net; rickelsong@saccounty.net; sandra.rutledge@cityofisleton.com
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: Local Hazard Mitigation Plan Update - Committee Participation - Reminder

Hello to you all.

Attached is the updated informational sheet about next week's kick-off meeting(s) for the LHMP update. Please note, meetings will held in two different locations, April 5th and 6th to make it more convenient for you to attend.

If you haven't already done so, please send an email to confirm that you will be attending so we know the reserved room will accommodate everyone.

If you would like more information on benefits to your agency from participation in this process, please give me a call.

Thank you and I look forward to seeing you all next week.
Best regards, Celine

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net

Email invite to Kickoff Meeting – City of Sacramento

From: Rhea Serran <RSerran@cityofsacramento.org>
Date: March 31, 2016 at 10:18:34 AM PDT
To: Council-All <Council-All@cityofsacramento.org>, Executive-Team <Executive-Team@cityofsacramento.org>, CManager - All <CManager-All@cityofsacramento.org>
Cc: Bobby Mann <BMann@cityofsacramento.org>, "Benjamin A. Sosenko" <BSosenko@cityofsacramento.org>, Carlos Eliason <CEliason@cityofsacramento.org>, Marycon Razo <MRazo@cityofsacramento.org>, Chris Hobson <CHobson@cityofsacramento.org>, "Morse, Doug" <DMorse@pd.cityofsacramento.org>, Erin Treadwell <ETreadwell@cityofsacramento.org>, Gina Knepp <geKnepp@cityofsacramento.org>, "Harvey, Christopher" <charvey@sfd.cityofsacramento.org>, "Swafford, Jena" <JSwafford@pd.cityofsacramento.org>, "Brown, Justin" <JUBrown@pd.cityofsacramento.org>, Kelli Trapani <KTrapani@cityofsacramento.org>, Natasha Greer <NGreer@cityofsacramento.org>, Wendy Klock-Johnson <WKlock-Johnson@cityofsacramento.org>, Linda Tucker <LTucker@cityofsacramento.org>, Susan Goodison <SGoodison@cityofsacramento.org>, Dan Sherry <DSherry@cityofsacramento.org>, Michael Malone <MMalone@cityofsacramento.org>, Jim Peifer <JPeifer@cityofsacramento.org>, Bill Busath <WBusath@cityofsacramento.org>, Drew Farmer <afarmer@cityofsacramento.org>, Joe Robinson <JRobinson@cityofsacramento.org>, Kelly Sherfey <KSherfey@cityofsacramento.org>, Connie Perkins <CPerkins@cityofsacramento.org>
Subject: Media Release: Sacramento County Local Hazard Mitigation Plan Update: Kickoff meeting

Good morning,

The following announcement will be sent to the media today. The City, in partnership with Sacramento County and surrounding cities, is updating the countywide Local Hazard Mitigation Plan.

--

Sacramento County Local Hazard Mitigation Plan Update: Kickoff meeting

FEMA defines Hazard Mitigation as any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards. While natural hazards cannot be prevented, a Hazard Mitigation Plan forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction.

Sacramento County is partnering with the Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and several special districts to update their countywide 2010 Local Hazard Mitigation Plan (LHMP).

Communities with a FEMA- approved LHMP are eligible for FEMA pre- and post-disaster grant funding and for lower costs of flood insurance to residents through the National Flood Insurance Program's (NFIP) Community Rating System (CRS).

The 2016 LHMP Update is a multi-jurisdictional effort being developed by a planning committee comprised of representatives from various County and City departments; neighboring jurisdictions, key federal state and local agency stakeholders, and the public.

To be part of our planning committee your commitment would involve the following:

- Attending 5 afternoon meetings over the next 6 months

- Reviewing and providing comments on the plan drafts via email

Kickoff meetings will be held in the following locations; please select the date and location that works best for you.

April 5, 2016
Planning Committee 2pm-5pm
Laguna Town Hall
3020 Renwick Ave,
Elk Grove, CA 95758

April 6, 2016
Planning Committee 2pm-5pm
South Natomas Community Center, Room
2921 Truxel Rd,
Sacramento, CA 95833

Planning Committee Meeting will be followed by an informational evening meeting for the general public from 6:00 to 7:30. You are welcome to attend the evening meetings as well, but your attendance is not required.

Please RSVP and plan on attending this important planning process. For additional information, contact Celine Livengood at 916-874-3130 or email at livengood@saccounty.net.

For more information and a copy of the Hazard mitigation Plan, please go to Saccounty.net and type Local Hazard Mitigation Plan in the search window at the top of the page.

##

Rhea Serran, Public Information Officer
Media and Public Affairs
City of Sacramento
O: 916-808-5594
C: 916-897-7654
www.cityofsacramento.org

Kickoff Meeting Agenda

SACRAMENTO COUNTY
LOCAL HAZARD MITIGATION PLAN (LHMP) UPDATE
HMPC/STEERING COMMITTTEE MEETING #1
APRIL 5 & 6, 2016

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. National Flood Insurance Program's (NFIP) Community Rating System Overview
4. The Role of the Hazard Mitigation Planning Committee (HMPC)/Steering Committee
5. Planning for Public Input
6. Coordinating with other Agencies
7. Hazard Identification
8. Mitigation Strategy`
9. Data Needs
10. Schedule
11. Questions and Answers

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC/Steering Comm. ~~**Early Public Meeting**~~ **#1 (Elk Grove)**
April 5, 2016

Name/Title	Email Address	Phone	City/Organization/ Affiliation	
TROY BAIR DEPUTY CHIEF	troybair@csdfire.com	916-217-2585	COSUMNES FIRE	
ROBERT MEAD	ROB.MEAD@COMCAST.NET	916-686-2075		✓
DIGNA ACOSTA	acostad@saccounty.net	916 5390633	Sac Co. Ag Dept	
Sarah Staley/Engineer	sstaley@folsom.ca.us	9163513545	City of Folsom	C
RON Phillips, FIRE CHIEF	RPhillips@folsom.CA.US	916 716 7400	City of Folsom	C
KEIGHTON VOHE	keighton.vohe@FolsomFSC.org	916 221-1882	FOLSOM FIRESAFE Council	
KEVIN BECKER Principal Engineer	kbecker@citrusheights.net	916 727 4770	CITRUS HEIGHTS	C
Chris FERRARI	CFerrari@geiconsultants.com GEI Consultants	916 201-5719	GEI	✓
WALT HOPPE	WALTER.J.HOPPE@GMAIL.COM	916684-2741	SCF	✓
Emmerson Zapata	czapata@cityofsacramento.org	916-808-6636	self	✓
Debbie Turner	turnerd@losrios.edu	916-568-3189	LOS RIOS CCD	C

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC / Steering Comm. ~~**Early Public Meeting**~~ **#1 (Elk Grove)**
April 5, 2016

Name/Title	Email Address	Phone	City/Organization/ Affiliation	
Dawn Pimentel	pimentdd@saccounty.net	916 874 7104	County of Sac / EG resident	✓
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Bryan Nobleit	BNobleit@elkgrovepd.org	916-478-8004	" " "	
Vincent King	vking@southgateregionalpark.net	916-[illegible]-1171	SRPD	
Mark Rains Assoc. C.E.	rainsm@saccounty.net	916-874-8643	Sac Co DWR	C
Connie Nelson	cnelson@elkgrovecity.org	916-478-3633	~~City~~ Elk Grove	C
Bill Forrest	wforrest@ci.galt.ca.us	209-366-7289	City of Galt	C
Alice Bernardino	abernardino@ci.galt.ca.us	209 366 7295	City of Galt	C
James Hendricks	James-hendricks@heraldfiredistrict.com	(209) 748-2322	HFPD	C
Debbie Turner	debbieturner@gmail.com	916-205-9521	Elk Grove Citizen	

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC/Steering Committee Kickoff Meeting #1 (Elk Grove)
April 5, 2016

Name/Title	Email Address	Phone	City/Organization/ Affiliation
GEORGE BOOTH, SENIOR CE	boothg@saccounty.net	916/874-6484	SACRAMENTO COUNTY WATER AGENCY
Lance Armstrong	lance.egcitizen@gmail.com	916-685-3945	Elk Grove Citizen ✓

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC/Steering Committee Kickoff Meeting #1 (Natomas)
April 6, 2016

Name/Title	Email Address	Phone	City/Organization/ Affiliation
KELLY SHERFEY, Program Analyst	KSHERFEY@CITYOFSACRAMENTO.ORG	916-808-2539	CITY OF SACRAMENTO
FREDERICK GAYLE, Director		(916) 332-1376	CITY/COUNTY
Steve Nebozuk, Sr Civil Eng	nebozuks@sacsewer.com	916 876 6118	Sacramento Regional County Sanitation District
Greg CASENTINI, Fire Marshal	CASENTINI.GREGORY@METROFIRE.CA.GOV	916 616 2420	Metro Fire
MATT DARROW	DARROW@SACCOUNTY.NET	874-7052	SAC CO. DOT
Russ Eckman	eckman@water.ca.gov	375 6000	State DWR - MA09
Richard Coombs	rec1146@aol.com	798-6100	Campus Commons / Nepa the Insurance, Legal + Safety
GILBERT COSIO	gcosio@mbkengineers.com	(916) 456-4400	MBK ENGR - DELTA RD'S
HENRY MATSUNAGA	hmatsunaga@wbecorp.com	441-6050	WBE - RD341 RD800
Patrick Ervin	pwervin@wbecorp.com	441-6050	WBE - RD341 RD800
CONSTANCE GUTOWSKY	CPERKINSCPIXOR.com	381-6321	City resident ✓
Debbie Whaley	debbie.whaley@csus.edu	278.3932	CSUS
Paul Devereux	pdevereux@rd1000.org	922-1449	RD 1000

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC/Steering Committee Kickoff Meeting #1 (Natomas)
April 6, 2016

Name/Title	Email Address	Phone	City/Organization/ Affiliation
CHARLEA MOORE	CHARHORSERANCH@AOL.com	916-991-0385	RESIDENT RLE ✓
MEG ARNOLD	meg.arnold@valleyvision.org	530 867 1921	Valley Vision. ✓
Remi Mendoza	RMendoza@cityofsacramento.org	(916) 808-5003	City of Sac
Judy Robinson	Robinsonjh@SACcounty.NET	916-874-4551	Sac County
LISA DEKLINSKI	ldeklinski@cityofsacramento.org	808-1309	City of Sac
Allen Quynn	aquynn@cityofranchocordova.org	916-851-8718	Rancho Cordova
Rhea Serran	rserran@cityofsacramento.org		City of Sacramento
Karla Tejada	Karla.tejada@gswater.com	203 491 0755	Golden State Water Company ✓
GEORGE WHITNEY	gbwhitney@gmail.com	(916) 361-2416	COUNTY RESIDENT
MARIA LORENZO-LEE	MTISAL@SBCGLOBAL.NET	916-804-5358	Resident of Sac
Colin Bailey	colin@ejcw.org	916-432-3529	Environmental Justice Coalition for Water
Kim Cave	KCave@SacsHeriff.com	916 874-5980	SSD

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LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC/Steering Committee Kickoff Meeting #1 (Natomas)
April 6, 2016

Name/Title	Email Address	Phone	City/Organization/ Affiliation
ALAN VAIL	ARVAIL@SBCGLOBAL.NET		
GEORGE BOOTH	boothgc@saccounty.net	916/874-6494	SACRAMENTO County WATER

HMPC & Steering Committee Meeting #2 – Risk Assessment Meeting

Email Invite to Risk Assessment Meeting

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Friday, June 03, 2016 8:44 AM
Subject: 2016 LHMP Update - June Meeting Date(s)
Importance: High

Hello all.

In an earlier email, we asked that you save the dates of June 21st and 22nd for the next LHMP committee meetings. As a committee member you only need to attend one. These are duplicate meetings offering the same agenda, yet the input attendees offer will, of course, vary.

The times and venues are as follows;

Tuesday, June 21st: 1:00 pm – 4:00 pm
Laguna Creek High School - Career Room
9050 Vicino Dr., Elk Grove, CA 95758

Wednesday, June 22nd: 1:00 pm – 4:00 pm
Bannon Creek Elementary School - Multi-Purpose Room
2775 Millcreek Drive, Sacramento, CA 95833

Thank you and I look forward to seeing you there.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

Flyer for Risk Assessment Meeting

Local Hazard Mitigation Plan Update 2016

Sacramento County is in the process of updating the 2011 Local Hazard Mitigation Plan (LHMP). Partnering with the County in this effort are the incorporated communities of the City of Sacramento, Elk Grove, Galt, Isleton, Rancho Cordova and Citrus Heights along with many local Districts. A copy of the 2011 plan can be reviewed at:
http://www.waterresources.saccounty.net/pages/LocalHazardMitigationPlan2010.aspx

Meeting Schedule

Duplicate meetings will be held in the following locations for your convenience:

Tuesday, June 21st:	Wednesday, June 22nd:
1:00 pm – 4:00 pm	1:00 pm – 4:00 pm
Laguna Creek High School - Career Room	Bannon Creek Elementary School - Multi-Purpose Room
9050 Vicino Dr., Elk Grove, CA	2775 Millcreek Drive, Sacramento, CA

The Stafford Disaster Mitigation Act of 2000 requires that local governments have a Hazard Mitigation Plan in place to be eligible for pre– and post-disaster funding. The LHMP identifies potential natural disasters, such as flood and fire risks, and ways to protect people from those dangers through mitigation.
With your knowledge of local hazards, your input is critical to our success.
Please join us for this important meeting.

For further information, contact:
Mark Rains Phone: 916 - 874 - 8649 E-mail: rainsm@saccounty.net
or Celine Livengood: 916-874-3130 Email: livengoodc@saccounty.net

Sacramento County
Department of Water Resources
827 7th Street, Rm 430

Risk Assessment Meeting Agenda

SACRAMENTO COUNTY

AGENDA
Sacramento County
Local Hazard Mitigation Plan (LHMP) Update
Risk Assessment Meetings: June 21 & 22, 2016

1. Introductions
2. Status of the DMA Planning Process
3. Review of Risk Assessment
4. Review of Data Needs
5. Questions
6. Next Steps

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Risk Assessment Meeting #2 (Elk Grove)
June 21, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Rebecca Lane	rlane@cityofsacramento.org	(916) 808-1343	Citizen EG / cityof Sacramento
ROBERT MEDD	ROB.MEDD@COMCAST.NET	(916) 686-2670	
WALT HOPPE	WALTER.J.HOPPE@SBCGLOBAL.NET	916 684-2711	
Debbie Turner	turnerd@losrios.edu	916 568-3054	LOSRIOS Com College District
Judy Robinson	Robinsonju@saccounty.net	916.874.4551	Sacto County Sustainability
TODD TAYLOR	TAYLORTO@SACCOUNTY.NET	916-874-3125	SAC. CO. PLANNING
Sami Nall	Sami.nall@water.ca.gov		DWR
LEIGHTON JOHE	leighton368@gmail.com	916 221-1882	Folsom Fire Safe Council /
Steve Nebozuk	nebozuks@sacsewer.com	916 876 6118	Sac Regional County San District
Emily Pappalardo	emily@dceengineering.net	916-716-9120	BAWMP/RD 804/RD 556
Mark Rains Asst. C.E.	rainsm@saccounty.net	916-874-8649	Sac Co DWR
Greg CASENTINI	CASENTINI.gregory@metrofire.CA.gov	916 616 2420	SACRAMENTO METRO FIRE DISTRICT
Allen Quynn	aquynn@City of Rancho Cordova.org	916-851-8718	City of Rancho Cordova

Sac Area Sewer District

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Risk Assessment Meeting #2 (Elk Grove)
June 21, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Kirtland Stout	kirtland@csus.edu	916-278-7233	Sacramento State

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Risk Assessment Meeting #2 (Sacramento)
June 22, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Dan Henderson, Sales Manager	dhenderson@esri.com	858-342-2600	Esri, Resident - City of Isleton
Roni BALBINI DIRECTOR OF PUBLIC WORKS	RONIBALBINI@GMAIL.COM	916-777-7770	City of ISLETON
Shelley Jiang	sjiang@airquality.org	916-874-4885	Sac Metro Air Quality Mgmt District
Larry Greene	lgreene@airquality.org	916-874-4823	SAC metro AQMD
Amber Mace	ajmace@ucdavis.edu	(510)326-0685	UC Davis Capital Region Climate Readiness Collaborative
Remi Mendoza	RMendoza@cityofsacramento.org	(916) 808-5003	City of Sacramento
CONNIE PERKINS	CPERKINS@PIXOR.COM	916-381-6324	Resident - City of Isleton
Patrick Ervin District Engineer	pervin@wbecorp.com	916-441-6850	RD 341, 348, 800
Connie Nelson Project Manager	cnelson@elkgrovecity.org	916-478-3633	City of Elk Grove
Bill Forrest, Sr. Civil Engr	wforrest@ci.galt.ca.us	209-366-7289	City of Galt.
Meg Arnold	meg.arnold@valleyvision.org	916 325 1630	Valley Vision.
ALAN VAIL	ARVAIL@SDCGLOBAL.NET	916-716-5522	VCS CONSULTING
Paul Devereux	pdevereux@rd1000.org	916-922-1449	RD 1000

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Risk Assessment Meeting #2 (Sacramento)
June 22, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Kim Love - Sgt. SSD	KLOVE@SACSHERIFF.com	874-5980	Sac. co. SHERIFF
MATT DARROW	DARROWM@SACCOUNTY.NET	874-7052	SACDOT
Kathleen Ave	kathleen.ave@snwp.org	732-5302	CapRegion Climate Readiness/SNWP
Richard Coombs	rec1146@aol.com	7986100	Nopbattle / Campus Commons Legal, Insurance, Risk

HMPC & Steering Committee Meeting #2 – Risk Assessment Meeting DELTA

Email invite to Delta Risk Assessment Meting

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Thursday, June 16, 2016 8:51 AM
To: Ghelfi. Pete <ghelfip@SacCounty.NET>; rd1601@frontiernet.net; ssinnock@ksninc.com; cosio@mbkengineers.com; ginny@greeneandhemly.com; rabercrombie@tfewines.com; cosio@mbkengineers.com; pdevereux@rd1000.org; pcarey@water.ca.gov; pwervin@wbecorp.com; henry@wbecorp.com; ckchu52@comcast.net; Glabrie@dccengineering.net; msvls@cwo.com; daniel@kaydix.com; jwoodling@rwah2o.org; eckman@water.ca.gov; mlorenzo@water.ca.gov; chrisferrari@geiconsultants.com; Flynn. MaryJo <FlynnM@saccounty.net>; Ince. Roger <incer@SacOES.Org>; Cantelme. Steve <cantelmes@sacoes.org>; Jose.Lara@caloes.ca.gov; Megan.Walton@caloes.ca.gov; Victoria.LaMar-Haas@CalOES.ca.gov; jbehrmann@ci.galt.ca.us; wforrest@ci.galt.ca.us; abernardino@ci.galt.ca.us; swinkler@ci.galt.ca.us; djhengineering@hughes.com; sandra.rutledge@cityofisleton.com; romi.balbini@gmail.com; klove@sacsheriff.com; ewhite@elkgrovepd.org; bnoblett@elkgrovepd.org; James-hendricks@heroldfiredistrict.com; krishubbard@csdfire.com; casentini.gregory@metrofire.ca.gov; davidwelch@courtlandfire.com; delliot@golyon.com
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: Special Public Meeting for Emergency Action Plan and 2016 Local Hazard Mitigation Plan Update
Importance: High

Hello all.

Attached is a flyer for a special meeting in the Delta area. We hope to see many of you there to participate in the conversation with the community.

This meeting will be held **Tuesday, June 21st, 6:00pm to 7:30 at the Courtland Fire House on Hood Franklin Road**.
Please see the attached flyer.

Because this meeting will take place very soon, we need help in spreading the word. Attached is a flyer about the meeting.

If possible, please forward to people in the community or print and put it anywhere it will get noticed.

Thank you so much. Celine

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

Reminder Email for Delta Risk Assessment Meeting

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Monday, June 20, 2016 9:49 AM
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>; Rains. Mark <rainsm@SacCounty.NET>
Subject: Special Community Meeting - Emergency Action Plan & Local Hazard Mitigation Plan

Hello all.

Attached is a flyer for a special meeting in the Delta area to be held Tuesday, June 21st, 6:00pm to 7:30 at the Courtland Fire House on Hood Franklin Road. Please see the attached flyer. I apologize for the last minute notice, but it was only decided on a week ago.

The purpose of the meeting is to get the word out about the update of the Local Hazard Mitigation Plan. The identified natural hazards in this plan is the critical document for pre and post disaster funding from FEMA.

Additionally, we will discuss the Emergency Action Plan which focuses on the Delta area and what actions will take place during an emergency. This will be the reference document for emergency response teams during a disaster.

Please spread the word by forwarding this email to neighbors, friends and family that live in the Delta.

Thank you so much. Celine

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

Flyer for Delta Risk Assessment Meeting

Special Community Meeting; June 21 2016

Local Hazard Mitigation Plan and Emergency Action Plan

Sacramento County is in the process of updating the 2011 **Local Hazard Mitigation Plan (LHMP)** AND developing a new **Emergency Action Plan (EAP)** for flood emergencies in the Delta area. Partnering with the County on the Emergency Action Plan are the Delta Reclamation Districts and, for LHMP, the Districts along with the incorporated cities of Elk Grove, Isleton, Rancho Cordova, Citrus Heights and the City of Sacramento.

Tuesday, June 21 6:00-7:30pm

Courtland Fire House

1125 Hood Franklin Road

The Stafford Disaster Mitigation Act of 2000 requires that local governments have a Hazard Mitigation Plan in place to be eligible for pre– and post-disaster funding. The LHMP identifies potential natural disasters, such as flood and fire risks, and ways to protect people from those dangers through mitigation.

With your knowledge of local hazards, your input is critical to our success. Please join us for this important meeting.

For futher information, contact: Mark Rains Phone: 916 - 874 - 8649 E-mail: rainsm@saccounty.net
or Celine Livengood: 916-874-3130 Email: livengoodc@saccounty.net

Sacramento County
Department of Water Resources
827 7th Street, Rm 430

AGENDA
Sacramento County
HMPC/Steering Committee & Public Meeting
Local Hazard Mitigation Plan (LHMP)
&
Emergency Action Plan (EAP) Updates
June 21, 2016

1. Introductions

2. LHMP planning process and Risk Assessment Overview

3. Emergency Action Planning Project Overview

4. Questions & Discussion

5. Next Steps

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
Public-HMPC Risk Assessment Meeting #2 (Delta)
June 21, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
ROGER INGE	INGER@SACCOUNTY.NET	916 874 4670	SAC COUNTY
Mike Mirmazaheri	MMirmazaheri@geiconsultants.com	916-631-4523	GEI Consultants
Warren Tetrak	giranch@frontiernet.net	916-257-2734	Walnut Grove Fire District
Katherine Tetrak	" "	"	Walnut Grove Fire District
BILL VIRVITCH	virvitch of AOL com	925-639-2040	10701 River Rd Hood
CHRISTOPHER H. NEUDECK	CNEUDECK@KSNINC.COM	209.946.0268	KSN INC. / REC. DISTS.
Ross Dibble	redibble@gmail.com	916-627-1849	Homeowner - Sherman Island
Joyce Dibble	jedibble@gmail.com	"	"
Pam Hodgson	spammyrussell@gmail.com	916 862-2092	Homeowner / Courtland
TIM HODGSON	TIM@TIMHODGSON.US	916.599.1844	HOMEOWNER / COURTLAND
Tim Franusich	michelle_franusich@yahoo.com	916-684-2592	Homeowner/Franklin
Paul F. Franusich	Michelle_franusich@yahoo.com	916-684-2592	" " "
HOMER HEROD	HKhapp@AOL.COM	916-684-1010	HOME OWNER FRANKLIN

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
Public-HMPC Risk Assessment Meeting #2 (Delta)
June 21, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
WALT HOPPE	WALTERJHOPPE@GMAIL.COM	916-684-2711	HOMEOWNER
Bob Berger	bob33berger@gmail.com	775-4757	Hood Home owner
Peter Stone	peterwesleystone@gmail.com	916 744-1956	River Rd Resident across from Clarksburg near Freeport
EMILY PAPPALARDO	EMILY@DCLENGINEERING.NET	916-716-9128	DCL ENGINEERING
Hayze Loree Saberin	saberin@frontiernet.net	916 775-4151	Home owner
Celine Livengood	livengoodc@saccounty.net	916 874 3130	SAC CO DWR.
MARIA LORENZO-LEE	MTL2MAIL-WORK@YAHOO.COM #2	916-804-5358	RESIDENT OF SAC CO.
DAVID WELCH	DAVID.WELCH@CONTRACOSTA.COM	916 43 54814	FIRE CHIEF

HMPC & Steering Committee Meetings #3/4 – Goals and Mitigation Strategy Meetings

Email Invite to Goals and Mitigation Strategy Meetings

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Wednesday, June 29, 2016 2:13 PM
To: rd1601@frontiernet.net; cneudeck@ksninc.com; ssinnock@ksninc.com; cneudeck@ksninc.com; cosio@mbkengineers.com; ginny@greeneandhemly.com; rabercrombie@tfewines.com; cosio@mbkengineers.com; pdevereux@rd1000.org; pcarey@water.ca.gov; pwervin@wbecorp.com; Peterson. Todd <petersont@SacCounty.NET>; Booth. George <boothg@SacCounty.NET>; Rains. Mark <rainsm@SacCounty.NET>; Thomas. Don <thomasdon@SacCounty.NET>; Radmacher. Richard <RADMACHERR@saccounty.net>; Ghelfi. Pete <ghelfip@SacCounty.NET>; Darrow. Matthew <DarrowM@SacCounty.NET>; Tamayo. Dave <tamayod@SacCounty.NET>; Johnson. Michael <johnsonm@SacCounty.NET>; Rickelton. Glen <RickeltonG@saccounty.net>; Acosta. Diana <AcostaD@saccounty.net>; Robinson. Judy <robinsonju@SacCounty.NET>; Taylor. Todd <taylorto@saccounty.net>; Winter. Mike <WINTERM@saccounty.net>; alstonjoan@comcast.net; walterjhoppe@gmail.com; manager@woodsidehoa.com; henry@wbecorp.com; ckchu52@comcast.net; Glabrie@dccengineering.net; emily@dccengineering.net; Becker, Kevin (MSA) <kbecker@citrusheights.net>; bmurdoch@elkgrovecity.org; bfragiao@elkgrovecity.org; cnelson@elkgrovecity.org; jcline@elkgrovecity.org; rphillips@folsom.ca.us; leighton.johe@folsomfsc.org; sstaley@folsom.ca.us; communitysuggestion@fairoakspark.org; carriec51@earthlink.net; mnisenboym@fowd.com; Kristopher Borders (FOPD) <kborders@fairoakspark.org>; jbehrmann@ci.galt.ca.us; wforrest@ci.galt.ca.us; abernardino@ci.galt.ca.us; swinkler@ci.galt.ca.us; djhengineering@hughes.com; sandra.rutledge@cityofisleton.com; romi.balbini@gmail.com; javed.siddiqui@jtsengineering.com; aquynn@cityofranchocordova.org; cperkins@cityofsacramento.org; ksherfey@cityofsacramento.org; rmendoza@cityofsacramento.org; rserran@cityofsacramento.org; ldeklinski@cityofsacramento.org; jsirney1@pd.cityofsacramento.org; rec1146@aol.com; swinton@pd.cityofsacramento.org; Brian.Heiland@water.ca.gov; alan.haynes@noaa.gov; jeff@sactoflood.com; derek@larsenwurzel.com; Dhenderson@esri.com; tferguson@nwhm.com; Moore. Stephen (SDA) <moorest@sacsewer.com>; Nebozuk. Steven (SDA) <nebozuks@sacsewer.com>; hitomib@csus.edu; turnerd@losrios.edu; salfen@arcohe.net; Greg.Rash@twinriversusd.org; mikejordan@centerusd.k12.ca.us; ecarlson@egwd.org; karla.tejada@gswater.com; brandyn.hancocks@gswater.com; fgayle@sswd.org; laura@carmichaelwd.org; des@cpuc.ca.gov; joseph.tanner@amwater.com; debrasedwick@sbcglobal.net; nwadmin@natomaswater.com; sfraher@acrpd.com; mail@carmichaelwd.org; ssingh-martin@southgaterecandpark.net; klove@sacsheriff.com; ewhite@elkgrovepd.org; bnoblett@elkgrovepd.org; rooney@pd.cityofsacramento.org; James-hendricks@heroldfiredistrict.com; krishubbard@csdfire.com; casentini.gregory@metrofire.ca.gov; davidwelch@courtlandfire.com; meg.arnold@valleyvision.org; jim@gillumco.com; hehillmann@comcast.net; alexia.berlanda@dbiservices.com; gbwhitney@gmail.com; sdavis@golyon.com; delliot@golyon.com; 123her@citilink.net; arvail@sbcglobal.net; jkim@lgc.org; Kathleen.Ave@smud.org; amanda@ejcw.org; colin@ejcw.org; Moore, Charlea (MSA) <charhorseranch@aol.com>; kmeis@lgc.org; mace.ucdavis@gmail.com; curtis.alling@ascentenvironmental.com; Greene. Larry (Air Quality) <LGreene@airquality.org>; jwoods@lgc.org; ezapata@cityofsacrmento.org; cferrari@geiconsultants.com; Rob.Mead@comcast.net; Olson. Karen <OlsonK@SacCounty.net>; asadakhtar@csus.edu; wolmsted@comcast.net; rec1146@aol.com; ivan.gennis@gmail.com; generalwelfare@surewest.com; lance.egcitizen@gmail.com; pimentald@sccounty.net; rlane@cityofsacramento.org; linda@chaplaw.us; giranch@frontiernet.net; virvitch@aol.com; redibble@gmail.com; jedibble@gmail.com; spammyrussell@gmail.com; tim@timhodgson.us; michelle_franusich@yahoo.com; Hkhapp@aol.com; WaterJHoppe@gmail.com; Bob33Berger@gmail.com; Peterwestleystone@gmail.com; Emily@dccengineering.net; saberin@frontiernet.net; Flynn. MaryJo <FlynnM@saccounty.net>; Ince.

>; Ince. Roger <incer@SacOES.Org>; Cantelme. Steve <cantelmes@sacoes.org>; Jose.Lara@caloes.ca.gov; Megan.Walton@caloes.ca.gov; Victoria.LaMar-Haas@CalOES.ca.gov; YRodrigu@placer.ca.gov; michelle.mead@noaa.gov; eckman@water.ca.gov; mlorenzo@water.ca.gov; chrisferrari@geiconsultants.com; msvls@cwo.com; daniel@kaydix.com; jwoodling@rwah2o.org; rd1601@frontiernet.net; cneudeck@ksninc.com; ssinnock@ksninc.com; cneudeck@ksninc.com; cosio@mbkengineers.com; ginny@greeneandhemly.com; rabercrombie@tfewines.com; cosio@mbkengineers.com; pdevereux@rd1000.org; pcarey@water.ca.gov; pwervin@wbecorp.com; henry@wbecorp.com; ckchu52@comcast.net; Glabrie@dccengineering.net; emily@dccengineering.net; msvls@cwo.com; daniel@kaydix.com; jwoodling@rwah2o.org; Peterson. Todd <petersont@SacCounty.NET>; Booth. George <boothg@SacCounty.NET>; Rains. Mark <rainsm@SacCounty.NET>; Livengood. Celine <LivengoodC@saccounty.net>; Thomas. Don <thomasdon@SacCounty.NET>; Radmacher. Richard <RADMACHERR@saccounty.net>; Darrow. Matthew <DarrowM@SacCounty.NET>; Tamayo. Dave <tamayod@SacCounty.NET>; Johnson. Michael <johnsonm@SacCounty.NET>; Rickelton. Glen <RickeltonG@saccounty.net>; Acosta. Diana <AcostaD@saccounty.net>; Robinson. Judy <robinsonju@SacCounty.NET>; Taylor. Todd <taylorto@saccounty.net>; Winter. Mike <WINTERM@saccounty.net>; alstonjoan@comcast.net; walterjhoppe@gmail.com; manager@woodsidehoa.com
Cc: Rains. Mark <rainsm@SacCounty.NET>; Booth. George <boothg@SacCounty.NET>; Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: LHMP Update - Committee) Meetings #3 and #4

Hello to you all.

The upcoming July meetings are #3 and #4 which are the two most important meetings for this LHMP Update. Goals and objectives will be updated and mitigation projects identified and prioritized.
The time commitment in July is necessary to complete the LHMP requirements. The meetings will take place over two days, with the same information offered in the morning and the afternoon for convenience in attending your choice of location.

For committee members, attendance is required at one 3-hour meeting block on June 12th for the Goals Meeting and one 3-hour meeting block on June 13th for the Mitigation Alternatives/Projects Meeting. Individuals from the general public are welcome and encouraged to participate also. Meeting times and locations are as follows;

Tuesday July 12th – Meeting #3	**Wednesday July 13th – Meeting #4:**
8:30 — 11:30 **Bannon Creek Elementary School - Multi-Purpose Room** **2775 Millcreek Drive, Sacramento, CA** ***Or*** **1:00 pm – 4:00 pm** **Laguna Creek High School - Career Room** **9050 Vicino Dr., Elk Grove, CA**	**8:30 — 11:30** **Bannon Creek Elementary School - Multi-Purpose Room** **2775 Millcreek Drive, Sacramento, CA** ***Or*** **1:00 pm – 4:00 pm** **Laguna Creek High School - Career Room** **9050 Vicino Dr., Elk Grove, CA**

Key County and City departmental Staff, District staff, as well as community groups and members of the public with recommendations for mitigation projects to address identified natural hazards should attend these meetings. Your input is critical to success of this important document. Please forward this email or distribute the attached flyer to anyone who may be interested in contributing to the Plan.

If you haven't attended previous meetings, please RSVP so we have enough seating for all attendees. We look forward to seeing you then and hearing your thoughts.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net

Reminder Email for Goals and Mitigation Strategy Meetings

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Wednesday, June 29, 2016 2:37 PM
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>; Booth. George <boothg@SacCounty.NET>; Rains. Mark <rainsm@SacCounty.NET>
Subject: Local Hazard Mitigation Plan Update - July Meetings

Hello to you all.

Thank you for attending the recent meeting we had in your community to discuss the hazard mitigation planning. It was great to see the turnout and hear your thoughts on the natural hazards facing your community.

We hope to receive more information from you on local natural hazards and your thoughts on how to mitigate those dangers. Attached is a worksheet for your use in considering hazards and offering input on any that apply. Input on natural hazards will be included in the Plan update.

Additionally, a flyer for the upcoming July meetings is attached for your use in getting others to participate.

The LHMP July meetings, #3 and #4 of the LHMP process, are the two most important meetings for this update. Goals and objectives will be updated and mitigation projects identified and prioritized., Individuals from the general public are welcome and encouraged to participate also. Meeting times and locations are as follows;

Tuesday July 12th – Meeting #3	**Wednesday July 13th – Meeting #4:**
8:30 — 11:30 **Bannon Creek Elementary School - Multi-Purpose Room** **2775 Millcreek Drive, Sacramento, CA** ***Or*** **1:00 pm – 4:00 pm** **Laguna Creek High School - Career Room** **9050 Vicino Dr., Elk Grove, CA**	**8:30 — 11:30** **Bannon Creek Elementary School - Multi-Purpose Room** **2775 Millcreek Drive, Sacramento, CA** ***Or*** **1:00 pm – 4:00 pm** **Laguna Creek High School - Career Room** **9050 Vicino Dr., Elk Grove, CA**

These meetings will take place over two days, with the same information offered in the morning and the afternoon for convenience in attending your choice of location or time. If you don't want to attend, yet would like to contribute information, you may send me the Hazard Worksheet or an email with your input on local natural hazards.

This fall, you will be notified when the draft Plan is available for review and a meeting will be scheduled in your community for commenting on the Plan.

Thank you for your time and help in this effort.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

Email to Jurisdictions, Public and other Stakeholders to Participate

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Thursday, July 07, 2016 10:44 AM
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>; Booth. George <boothg@SacCounty.NET>; Rains. Mark <rainsm@SacCounty.NET>
Subject: Sacramento County - Local Hazard Mitigation Plan Update

Hello and good day to you.

You are receiving this email because you participated in the 2011 update of Sacramento County's (multi-jurisdictional) Local Hazard Mitigation Plan (Plan). Under the Stafford Disaster Mitigation Act of 2000, jurisdictions are required to have a hazard mitigation plan in place to be eligible for Federal assistance with pre- and post- disaster funding. This Plan forms the long-term strategy to reduce disaster losses throughout Sacramento County.

Also required under the Disaster Mitigation Act is that the Plan be updated every five years. Therefore, we are in the process of updating the 2016 LHMP and we want you to have the opportunity to participate.

Communities participating in the update are represented by various city and county departments, federal, state and local agency stakeholders and the public. Several meetings will be taking place next week for the purpose of gathering input and direction for the update. As residents are most aware of local conditions, your input is important to us. We hope you will attend one or more of the meetings.

Please refer to the attached LHMP Overview Flyer for a detailed description on the purpose and process of this update and the Committee Meetings Flyer for meeting schedule and location.

The current plan can be viewed at www.stormready.org.

For questions about the Plan or the upcoming meetings, please contact me or Mark Rains (916)-874-8649, rainsm@saccounty.net.

Thank you.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

Flyer for Goals and Mitigation Strategy Meetings

Local Hazard Mitigation Plan Update 2016

Please plan on attending the Hazard Mitigation Planning Committee meetings #3 and #4 when we will update objectives and prioritize projects. For committee members attendance is required at one 3-hour meeting on June 12th for discussion on Goals and Objectives and one 3-hour meeting on June 13th for discussion on Mitigation Alternatives and Priorities. The general public is welcome and encouraged to attend.

Meeting Schedule

Duplicate meetings will be held each day for your convenience:

Tuesday July 12th – *Meeting #3*

8:30 – 11:30
Bannon Creek Elementary School - Multi-Purpose Room
2775 Millcreek Drive, Sacramento, CA

Or

1:00 pm – 4:00 pm
Laguna Creek High School - Career Room
9050 Vicino Dr., Elk Grove, CA

Wednesday July 13th – *Meeting #4:*

8:30 – 11:30
Bannon Creek Elementary School - Multi-Purpose Room
2775 Millcreek Drive, Sacramento, CA

Or

1:00 pm – 4:00 pm
Laguna Creek High School - Career Room
9050 Vicino Dr., Elk Grove, CA

For further information, contact:
Mark Rains Phone: 916 - 874 - 8649 E-mail: rainsm@saccounty.net
or Celine Livengood: 916-874-3130 Email: livengoodc@saccounty.net

Sacramento County
Department of Water Resources
827 7th Street, Rm 430

Agenda for Goals and Mitigation Strategy Meetings

SACRAMENTO COUNTY

AGENDA

Sacramento County
Local Hazard Mitigation Plan (LHMP) Update
Mitigation Strategy Meetings
July 12 & 13, 2016

HMPC Meeting #3:

1. Introductions
2. Watershed Management Plan (WMP) Status
3. Status of the DMA Planning Process
4. Risk Assessment Update
5. Develop Updated Plan Goals and Objectives
6. Identify and Review Mitigation Alternatives/Projects

HMPC Meeting #4:

1. Introductions
2. Watershed Management Plan (WMP) Status
3. Identify and discuss Mitigation Alternatives/Projects
4. Review Mitigation Selection Criteria
5. Prioritize Mitigation Projects
6. Review of Schedule/Data Needs

Please visit the below website for a current version of the WMP:

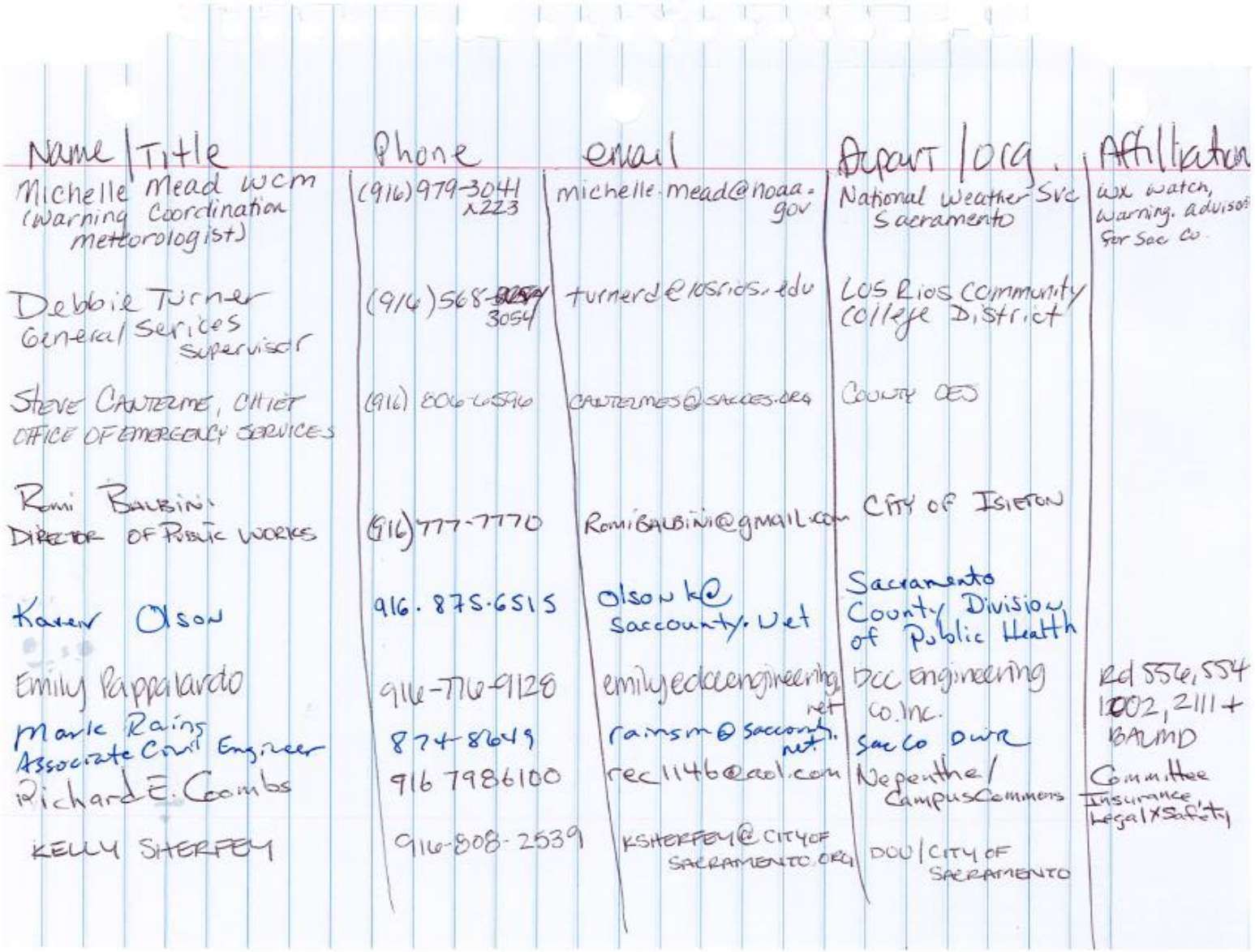
http://www.waterresources.saccounty.net/Local%20Hazard%20Mitigation%20Plan/Sacramento%20County%20Appendix%20G%20Watershed%20Management%20Plan.pdf#search=wmp

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Mitigation Strategy Meeting #3 (Elk Grove)
July 12, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
ROBERT NEAD	ROB.NEAD@COMCAST.NET	(916) 686-2075	
RON PHILLIPS	RPhillips@folsom.ca.us	(916) 984-2295	FOLSOM
MIKE TEAGUE	Teague.michael@metrofire.ca.gov	916-580-5560	Metro Fire
DIANA ACOSTA	acostad@saccounty.net	916 875-6047	Sac Co. Ag
LEE HOPPE	WALTERJHOPPE@GMAIL.COM	916 684-2711	
S. NEBOZUK	nebozuks@sacsewer.com	916 876 6118	Sacramento Regional County Sanitation District
JEANETTE HADDLESTON	haddlestonj@saccounty.net	874-4711	DWR & Sac Area Sewa Dist
CONNIE NELSON	cnelson@elkgrovecity.org	916-478-3638	City of ELK Grove
CELINE LIVERNGOOD	liverngoodc@saccounty	916 874 3130	SCDWR
GEORGE BOOTH	boothg "	874 6484	SCWA
TIM HODGSON	TIM@TIMHODGSON.US	599-1844	COURTLAND
Dan Henderson	dhenderson@esri.com	858-342-2600	City of Sac / Esri
Allen Quynn	aquynn@cityofranchocordova.com	916-851-8718	City of Rancho Cordova

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Mitigation Strategy Meeting #3 (Elk Grove)
July 12, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Remi Mendoza	RMendoza@cityofsacramento.org	808-5003	City of Sacramento
ALAN VAIL	AVEVAIL@SBCGLOBAL.NET	716-5522	VCS
Beth Brose	beth.brose@twinriversusd.org	370-0352	TRUSD
Judy Robinson	Robinsonju@saccounty.net	874-4551	County of Sac - Sustainability
Patrick Ervin Engineer	pwervin@wbecorp.com	916-441-6850	RD 341 / BOD



Name / Title	Phone	email	Depart / Org.	Affiliation
Michelle Mead WCM (Warning Coordination meteorologist)	(916) 979-3041 x223	michelle.mead@noaa.gov	National Weather Svc Sacramento	wx watch, warning, advisor for Sac Co
Debbie Turner General Services Supervisor	(916) 568-~~3054~~ 3054	turnerd@losrios.edu	Los Rios Community College District	
Steve Cauterme, Chief Office of Emergency Services	(916) 606-6596	CAUTERMES@SACCES.ORG	County OES	
Romi Balbini Director of Public Works	(916) 777-7770	RomiBalbini@gmail.com	City of Isleton	
Karen Olson	916.875.6515	olsonkc@saccounty.net	Sacramento County Division of Public Health	
Emily Pappalardo	916-716-9128	emily@dccengineering.net	DCC Engineering Co. Inc.	Rd 556, 554
Marie Rains Associate Civil Engineer	874-8649	rainsm@saccounty.net	Sac Co DWR	1002, 2111 + BAUMD
Richard E. Coombs	916 7986100	rec1146@aol.com	Nepenthe / CampusCommons	Committee Insurance Legal / Safety
KELLY SHERFEY	916-808-2539	KSHERFEY@CITYOFSACRAMENTO.ORG	DOU / City of Sacramento	

NAME	TITLE	Phone	Email	Depart. / Org. / Affiliation
Paul Devereux	GM	916-922-1449	pdevereux@rd1000.org	RD 1000
Shelley Jiang		916-874-4885	sjiang@airquality.org	SMAQMD

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Mitigation Strategy Meeting ~~#3~~ (Sacramento) #4
July ~~12~~ 13, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Richard Coombs	rec1146@aol.com	916-798-6100	ILS Committee Nepenthe/Campus Commons
June Cowles, Senior Planner	jcowles@cityofranchocordova.org		City of Rancho Cordova
Dinna Acosta, Deputy Ag Commissioner	acostad@saccounty.net	916 875-6047	Sac. Co. - Ag Dept.
Patrick Ervin, Engineer	pervin@wbecorp.com	916-441-6850	RD 341/800
Celine Livengood	livengoodc@gmail	874 3130	SCDWR-drainage
Romi Balbini Director of Public Works	RomiBalbini@gmail.com	916-777-7770	City of Isleton
Karen Olson	olsonk@saccounty.net	916.875.6515	County, Sacramento Public Health Div.
Emily Pappalardo	emily@dccengineering.net	916-776-9128	DCC Engineering RD 556, 554 ~~B~~ 1111 #1002 + BALM
Jason Sirney	jmsirney@sfd.cityofsacramento.org	916 996 2231	City of Sac
Etienne Ozorak	ozorake@saccounty.net	916-875-4115	Sac County D. Waste Mgmt
Kyle Hines	hinesk@saccounty.net	916-874-6760	Sac County D.O.T.
Kelly Sherfey	ksherfey@cityofsacramento.org	916-808-2539	City of Sac
Chris Ferrari	cferrari@GEIconsultants	916-200-5119	Consultant

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Mitigation Strategy Meeting ~~#5~~ (Sacramento) #4
July ~~12~~, 2016 13th

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Mike Tinnaraheri	mmtinnaraheri@geiconsultants.com	916-631-4523	Consultant
Debbie Turner	turnerd@losrios.edu	916-568-3054	LOSRios Com. College DIST.
Paul Devereux	pdevereux@rd1000.org	916-922-1449	RD 1000
Meg Arnold	meg.arnold@valleyvision.org	916 3251630	Valley Vision
Shelley Jiang	sjiang@airquality.org	916-874-4775	SMAQMD
TIM HODGSON	TIM@TIMHODGSON.US	916 5991844	COURTLAND TOWN ASSOCIATION

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Mitigation Strategy Meeting #4 (Elk Grove)
July 13, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
ROBERT MEHD	ROB.MEHD@COMCAST.NET	916 686-2075	
BETH BROSE	beth.brose@twinriversusd.org	916 370-0352	TRUSD
Mark Rains	rainsm@saccounty.net	874-8849	Sac Co DWR
Connie Nelson	cnelson@elkgrovecity.org	916 478-3638	Elk Grove
WALT HOPPE	WALTERJHOPPE@GMAIL	916 684-2711	
Bill Forrest	wforrest@ci.galt.ca.us	209-366-7260	Galt
Steve Nebozuk	nebozuk@sacsewer.com	916 876 6118	Sac Regional County San District Sac Area Sewer District
Michael Teague	teague.michael@metrofire.ca.gov	916-616-2417	Metro Fire
Remi Mendoza	RMendoza@cityofsacramento.org	916-808-7003	City of Sac
GEORGE BOOTH	boothg@saccounty.net	916/874 6484	County of Sac. & SCWA
Allen Quynn	aquynn@cityofrancho cordova.org	916-851-8717	Rancho Cordova

HMPC & Steering Committee Meetings– LHMP Process Overview/Mitigation Strategy/Annex Development Meetings DELTA Reclamation Districts

Email Invite to Delta Area Meeting

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Thursday, August 18, 2016 10:11 AM
To: daniel@Kaydix.com; Cosio@mbkengineers.com; msvls@cwo.com; Cosio@mbkengineers.com
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>; Booth. George <boothg@SacCounty.NET>
Subject: Offer to Prepare Annex for your District - LHMP

Hello to you all.

This is a follow up to the phone messages and conversations from this morning regarding the importance of your annex to the LHMP.

To make the process of starting an annex for your District easy for you, our consultant can prepare the paperwork, all in one quick sitting, if you will meet with her. She will be available to do this on September 9th and will come to the Delta area, likely to be held at the Courtland Firehouse. Otherwise, she can meet you in the City of Sacramento that day.

Having your District represented in the LHMP has great importance in Federal assistance, for disaster relief and mitigation grants. When flood events cause major damage, those entities that participate in the Plan are entitled to Federal disaster relief at a reduced cost, from 25% to 6% match…a match that may equate to millions of dollars.

Please let me know if you can take an hour to have the annex prepared for your District.
Thank you for your time.
Celine Livengood

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

Delta Area Meeting Agenda Items

Delta RD HMPC Meeting September 9, 2016

Overview of Participation for Delta Reclamation Districts and Working Section

Participants:

Daniel Wilson

- RD 2111 Dead Horse Island

Gilbert Cosio

- RD 3 Grand Island
- RD 551 Pearson District
- RD 2110 McCormick Williamson Track
- RD 755 Randall Island
- RD 813 Ehreardt Club

Russel Van Loben Sels

- RD 744 No Name

Clarence Chu

- RD 369 Libby McNeil

Chris Neudeck

- RD 1601 Twitchell Island
- RD 563 Tyler Island

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Meeting (Delta)
September 9, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Jeanine Foster	jeanine.foster@fostermorrison.com	303 717-7191	Foster Morrison
Brenna Howell	brenna@brennahowell.com	916 202-2635	KSN Inc · RD1601 RD563 RD 2111
Chris Ferrari	cferrari@GEIConsultants.com	916-100-5174	GEI
Jeffrey Twitchell	jtwitchell@GEIConsultants.com	916-631-4555 990-2569	GET
Celine Livengood	livengoodc@saccounty.net	(916)874 3130.	Sac. County.
Gilbert Cosio	cosio@mbkengineers.com	916.456.4400	MBK ENG. RD 3 RD555 RD755 RD2110 RD3349 RD813
Ariana Herrera	Ariana@Kaydix.com	(916) 776-1701	KD 2111
CLARENCE CHU	ckchu52@Comcast.net	916 776 1684	RD 369
Russ VanLoben Sels	MSVLS@cwo.com	916-439-3200	RD 744
CHILES WILSON JR	CHILESWILSONJR@GMAIL.COM	(916) 417-4982	RD2111
BILL DARSIE	wcharsie@ksninc.com	209 946 0268	KSN ENGINEERS RD 1601 " 563 " 2111

HMPC & Steering Committee Meeting #5 – Final Meetings

Email Invite to Final Meetings

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Friday, October 21, 2016 4:35 PM
To: Peterson. Todd <petersont@SacCounty.NET>; Booth. George <boothg@SacCounty.NET>; Rains. Mark <rainsm@SacCounty.NET>; Livengood. Celine <LivengoodC@saccounty.net>; Thomas. Don <thomasdon@SacCounty.NET>; Radmacher. Richard <RADMACHERR@saccounty.net>; Darrow. Matthew <DarrowM@SacCounty.NET>; Tamayo. Dave <tamayod@SacCounty.NET>; Johnson. Michael <johnsonm@SacCounty.NET>; Rickelton. Glen <RickeltonG@saccounty.net>; Acosta. Diana <AcostaD@saccounty.net>; Robinson. Judy <robinsonju@SacCounty.NET>; Wright. Archie <WrightAr@SacCounty.NET>; Taylor. Todd <taylorto@saccounty.net>; Winter. Mike <WINTERM@saccounty.net>; alstonjoan@comcast.net; walterjhoppe@gmail.com; manager@woodsidehoa.com; Ghelfi. Pete <ghelfip@SacCounty.NET>; rd1601@frontiernet.net; cneudeck@ksninc.com; ssinnock@ksninc.com; cneudeck@ksninc.com; cosio@mbkengineers.com; ginny@greeneandhemly.com; rabercrombie@tfewines.com; cosio@mbkengineers.com; pdevereux@rd1000.org; pcarey@water.ca.gov; pwervin@wbecorp.com; henry@wbecorp.com; ckchu52@comcast.net; Glabrie@dccengineering.net; emily@dccengineering.net; msvls@cwo.com; daniel@kaydix.com; jwoodling@rwah2o.org; eckman@water.ca.gov; mlorenzo@water.ca.gov; cferrari@geiconsultants.com; michelle.mead@noaa.gov; Flynn. MaryJo <FlynnM@saccounty.net>; Ince. Roger <incer@SacOES.Org>; Cantelme. Steve <cantelmes@sacoes.org>; Jose.Lara@caloes.ca.gov; Megan.Walton@caloes.ca.gov; Victoria.LaMar-Haas@CalOES.ca.gov; YRodrigu@placer.ca.gov; Becker, Kevin (MSA) <kbecker@citrusheights.net>; bmurdoch@elkgrovecity.org; bfragiao@elkgrovecity.org; cnelson@elkgrovecity.org; jcline@elkgrovecity.org; rphillips@folsom.ca.us; leighton.johe@folsomfsc.org; sstaley@folsom.ca.us; communitysuggestion@fairoakspark.org; carriec51@earthlink.net; mnisenboym@fowd.com; Kristopher Borders (FOPD) <kborders@fairoakspark.org>; jbehrmann@ci.galt.ca.us; wforrest@ci.galt.ca.us; abernardino@ci.galt.ca.us; swinkler@ci.galt.ca.us; djhengineering@hughes.com; sandra.rutledge@cityofisleton.com; romi.balbini@gmail.com; javed.siddiqui@jtsengineering.com; aquynn@cityofranchocordova.org; cperkins@cityofsacramento.org; ksherfey@cityofsacramento.org; rmendoza@cityofsacramento.org; rserran@cityofsacramento.org; ldeklinski@cityofsacramento.org; jsirney1@pd.cityofsacramento.org; rec1146@aol.com; swinton@pd.cityofsacramento.org; Brian.Heiland@water.ca.gov; alan.haynes@noaa.gov; jeff@sactoflood.com; derek@larsenwurzel.com; Dhenderson@esri.com; tferguson@nwhm.com; Moore. Stephen (SDA) <moorest@sacsewer.com>; Nebozuk. Steven (SDA) <nebozuks@sacsewer.com>; hitomib@csus.edu; turnerd@losrios.edu; salfen@arcohe.net; Greg.Rash@twinriversusd.org; Beth.Brose@twinriversusd.org; mikejordan@centerusd.k12.ca.us; ecarlson@egwd.org; karla.tejada@gswater.com; brandyn.hancocks@gswater.com; fgayle@sswd.org; laura@carmichaelwd.org; des@cpuc.ca.gov; joseph.tanner@amwater.com; debrasedwick@sbcglobal.net; nwadmin@natomaswater.com; sfraher@acrpd.com; mail@carmichaelwd.org; ssingh-martin@southgaterecandpark.net; klove@sacsheriff.com; ewhite@elkgrovepd.org; bnoblett@elkgrovepd.org; rooney@pd.cityofsacramento.org; James-hendricks@heraldfiredistrict.com; krishubbard@csdfire.com; casentini.gregory@metrofire.ca.gov; davidwelch@courtlandfire.com; meg.arnold@valleyvision.org; jim@gillumco.com; hehillmann@comcast.net; alexia.berlanda@dbiservices.com; gbwhitney@gmail.com; sdavis@golyon.com; delliot@golyon.com; 123her@citilink.net; arvail@sbcglobal.net; jkim@lgc.org; Kathleen.Ave@smud.org; amanda@ejcw.org; colin@ejcw.org; Moore, Charlea (MSA) <charhorseranch@aol.com>; kmeis@lgc.org; mace.ucdavis@gmail.com; curtis.alling@ascentenvironmental.com; Greene. Larry (Air Quality) <LGreene@airquality.org>; jwoods@lgc.org; katie@vgconsulting.org; ezapata@cityofsacrmento.org; cferrari@geiconsultants.com; Rob.Mead@comcast.net; Olson. Karen <OlsonK@SacCounty.net>; asadakhtar@csus.edu; wolmsted@comcast.net; rec1146@aol.com; ivan.gennis@gmail.com; generalwelfare@surewest.com;

lance.egcitizen@gmail.com; pimentald@saccounty.net; rlane@cityofsacramento.org; linda@chaplaw.us; giranch@frontiernet.net; virvitch@aol.com; redibble@gmail.com; jedibble@gmail.com; spammyrussell@gmail.com; tim@timhodgson.us; michelle_franusich@yahoo.com; Hkhapp@aol.com; WalterJHoppe@gmail.com; Bob33Berger@gmail.com; Peterwesleystone@gmail.com; Emily@dccengineering.net; saberin@frontiernet.net; kirtland@csus.edu; saminall@water.ca.gov; rob.mead@comcast.net; rlane@cityofsacramento.org; lgreene@airquality.net; ajmace@ucdavis.edu; sjiang@airquality.org; rec1146@aol.com; jcowles@cityofranchocordova.org; Ozorak. Etienne <ozorake@saccounty.net>; Hines. Kyle <HINESK@SacCounty.NET>; mmirmazaheri@geiconsultants.com; huddlestonj@sacounty.net; beth.brose@twinriversusd.org; teague.michael@metrofire.ca.gov; dnugen@folsom.ca.us; Wright. Archie <WrightAr@SacCounty.NET>
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: 2016 LHMP Update - Final Meeting(s)

Hello to you all.

The upcoming meetings in November are the last to complete the LHMP 5-year update! Once again, there will be two meetings on subsequent days, with the same information offered each day. This is for your convenience in attending your choice of location or day.

Attendance from committee members is required at one of the meetings. Individuals from the general public are welcome and encouraged to participate also. If you know of people in the general public that would like to attend a meeting, there will be two evening meetings, of which you are not required to attend.

Please forward this email to anyone who may be interested in contributing to the Plan.

Your attendance at one of the final committee meetings is critical for ensuring FEMA participation requirements are met.

The meetings are scheduled as follows;

Hazard Mitigation Planning/Steering Committee Meetings–

Committee Members - November 16th 9:00-11:00 AM at South Natomas Community Center, Conference Room
2921 Truxel Rd, Sacramento, CA 95833

Committee Members - November 17th 9:00-11:00 AM at Hood/Courtland Fire House (Station 2)
1125 Hood Franklin RD, Hood, CA 95639

Public Meetings -

General Public - November 15th 6:00-7:30 PM at South Natomas Community Center, Conference Room
2921 Truxel Rd, Sacramento, CA 95833

General Public - November 16th 6:00-7:30 PM at Laguna Creek High School, Career Room
9050 Vicino Dr., Elk Grove, CA 95758

While you are welcome to come and support the public meetings, please plan on attending one of the final Planning/Steering Committee meetings to provide input on the Draft LHMP and to address public comments. After the review and comment period, the LHMP will be submitted to Cal OES/FEMA for approval and subsequently will be adopted by the governing boards for each participating jurisdiction.

Please let me know if you have questions. In addition to your attendance at one of the final planning/steering committee meetings, you can also provide written comments on the public review draft by:

- Email comments to Jeanine.foster@fostermorrison.com or LivengoodC@saccounty.net
- Bring comments to one of the meetings

For all participating jurisdictions, Jeanine will be in touch with you this week to provide a final punch list of any outstanding items for your Annexes.

Thank you for all your time and commitment to this important document.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

Notice of Review Draft

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Tuesday, October 18, 2016 4:03 PM
To: Peterson. Todd <petersont@SacCounty.NET>; Booth. George <boothg@SacCounty.NET>; Rains. Mark <rainsm@SacCounty.NET>; Livengood. Celine <LivengoodC@saccounty.net>; Thomas. Don <thomasdon@SacCounty.NET>; Radmacher. Richard <RADMACHERR@saccounty.net>; Darrow. Matthew <DarrowM@SacCounty.NET>; Tamayo. Dave <tamayod@SacCounty.NET>; Johnson. Michael <johnsonm@SacCounty.NET>; Rickelton. Glen <RickeltonG@saccounty.net>; Acosta. Diana <AcostaD@saccounty.net>; Robinson. Judy <robinsonju@SacCounty.NET>; Wright. Archie <WrightAr@SacCounty.NET>; Taylor. Todd <taylorto@saccounty.net>; Winter. Mike <WINTERM@saccounty.net>; alstonjoan@comcast.net; walterjhoppe@gmail.com; manager@woodsidehoa.com; Ghelfi. Pete <ghelfip@SacCounty.NET>; rd1601@frontiernet.net; cneudeck@ksninc.com; ssinnock@ksninc.com; cneudeck@ksninc.com; cosio@mbkengineers.com; ginny@greeneandhemly.com; rabercrombie@tfewines.com; cosio@mbkengineers.com; pdevereux@rd1000.org; pcarey@water.ca.gov; pwervin@wbecorp.com; henry@wbecorp.com; ckchu52@comcast.net; Glabrie@dccengineering.net; emily@dccengineering.net; msvls@cwo.com; daniel@kaydix.com; jwoodling@rwah2o.org; eckman@water.ca.gov; mlorenzo@water.ca.gov; cferrari@geiconsultants.com; michelle.mead@noaa.gov; Flynn. MaryJo <FlynnM@saccounty.net>; Ince. Roger <incer@SacOES.Org>; Cantelme. Steve <cantelmes@sacoes.org>; Jose.Lara@caloes.ca.gov; Megan.Walton@caloes.ca.gov; Victoria.LaMar-Haas@CalOES.ca.gov; YRodrigu@placer.ca.gov; Becker, Kevin (MSA) <kbecker@citrusheights.net>; bmurdoch@elkgrovecity.org; bfragiao@elkgrovecity.org; cnelson@elkgrovecity.org; jcline@elkgrovecity.org; rphillips@folsom.ca.us; leighton.johe@folsomfsc.org; sstaley@folsom.ca.us; communitysuggestion@fairoakspark.org; carriec51@earthlink.net; mnisenboym@fowd.com; Kristopher Borders (FOPD) <kborders@fairoakspark.org>; jbehrmann@ci.galt.ca.us; wforrest@ci.galt.ca.us; abernardino@ci.galt.ca.us; swinkler@ci.galt.ca.us; djhengineering@hughes.com; sandra.rutledge@cityofisleton.com; romi.balbini@gmail.com; javed.siddiqui@jtsengineering.com; aquynn@cityofranchocordova.org; cperkins@cityofsacramento.org; ksherfey@cityofsacramento.org; rmendoza@cityofsacramento.org; rserran@cityofsacramento.org; ldeklinski@cityofsacramento.org; jsirney1@pd.cityofsacramento.org; rec1146@aol.com; swinton@pd.cityofsacramento.org; Brian.Heiland@water.ca.gov; alan.haynes@noaa.gov; jeff@sactoflood.com; derek@larsenwurzel.com; Dhenderson@esri.com; tferguson@nwhm.com; Moore. Stephen (SDA) <moorest@sacsewer.com>; Nebozuk. Steven (SDA) <nebozuks@sacsewer.com>; hitomib@csus.edu; turnerd@losrios.edu; salfen@arcohe.net; Greg.Rash@twinriversusd.org; Beth.Brose@twinriversusd.org; mikejordan@centerusd.k12.ca.us; ecarlson@egwd.org; karla.tejada@gswater.com; brandyn.hancocks@gswater.com; fgayle@sswd.org; laura@carmichaelwd.org; des@cpuc.ca.gov; joseph.tanner@amwater.com; debrasedwick@sbcglobal.net; nwadmin@natomaswater.com; sfraher@acrpd.com; mail@carmichaelwd.org; ssingh-martin@southgaterecandpark.net; klove@sacsheriff.com; ewhite@elkgrovepd.org; bnoblett@elkgrovepd.org; rooney@pd.cityofsacramento.org; James-hendricks@heraldfiredistrict.com; krishubbard@csdfire.com; casentini.gregory@metrofire.ca.gov; davidwelch@courtlandfire.com; meg.arnold@valleyvision.org; jim@gillumco.com; hehillmann@comcast.net; alexia.berlanda@dbiservices.com; gbwhitney@gmail.com; sdavis@golyon.com; delliot@golyon.com; 123her@citilink.net; arvail@sbcglobal.net; jkim@lgc.org; Kathleen.Ave@smud.org; amanda@ejcw.org; colin@ejcw.org; Moore, Charlea (MSA) <charhorseranch@aol.com>; kmeis@lgc.org; mace.ucdavis@gmail.com; curtis.alling@ascentenvironmental.com; Greene. Larry (Air Quality) <LGreene@airquality.org>; jwoods@lgc.org; katie@vgconsulting.org; ezapata@cityofsacrmento.org; cferrari@geiconsultants.com; Rob.Mead@comcast.net; Olson. Karen <OlsonK@SacCounty.net>; asadakhtar@csus.edu; wolmsted@comcast.net; rec1146@aol.com; ivan.gennis@gmail.com; generalwelfare@surewest.com;

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Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>; Robinson. Matthew <Robinsonma@saccounty.net>
Subject: Sacramento County Hazard Mitigation Planning/Steering Committee:

Hello to you all.

A draft of the Local Hazard Mitigation Plan LHMP Update has just been released for public and stakeholder review and comment. The Draft document includes annexes for the participating Cities and Districts The draft is now available online at: Department of Water Resources website.

A hardcopy of the draft LHMP update will be available for public review by October 20th at the reference desks of the following Sacramento County libraries:

More information on the library locations and hours are located at:

Fair Oaks Branch, 11601 Fair Oaks Blvd, Fair Oaks, CA 95628

Main Branch, 828 I St, Sacramento, CA 95814

Your final input is needed on this document. .

- Email comments to Jeanine.foster@fostermorrison.com or LivengoodC@saccounty.net
- Bring comments to the meeting you attend in November (schedule will be sent by next week).

For all participating jurisdictions, Jeanine will be in touch with you this week to provide a final punch list of any outstanding items.

I appreciate everyone's participation and efforts on this LHMP Update Project.

Thank you very much again.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
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Office: (916) 874-3130 | Fax: (916) 874-3789

Final Meeting Agenda

SACRAMENTO COUNTY

AGENDA
Sacramento County
Local Hazard Mitigation Plan (LHMP) Update
Final HMPC Meetings: November 16 & 17, 2016

1. Introductions
2. Status of the LHMP Update Process
3. Addressing Public Comments
4. Summary of Changes in Sacramento County Planning Area: Vulnerabilities and Mitigation Priorities
5. Final HMPC/Steering Committee Input: Data/Projects
6. Next Steps

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Mitigation Strategy Meeting #5 (Sacramento) (pg 1)
November 16, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
ROGER INCE			SAC COES
KELLY SHERFEY			CITY OF SACRAMENTO
KEVIN BECKER			CITY of CITRUS HEIGHTS
CHRIS FALCBECK			CITY OF CITRUS HEIGHTS
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MATT DARROW	DARROWM@SACCOUNTY.NET	(916)874-7	SACDOT
Juanita Cano		(916)428-7071	Southgate Rec & Park
JASON SIRNEY			CITY OF SAC
KELLY KIRK	KKIRK@SACSHERIFF.COM	916-874-5980	SAC CO SHERIFF
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Romi BALBINI	RB@CITYOFISLETON.COM	916-777-7770	CITY OF ISLETON
Steve Nebozuk	nebozuk@sacsewer.com	916 876 6118	Sac Reg County San Dist Sac Area Sewer Dist

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT HMPC (CONT. pg 2)
Final Public Meetings (~~Elk Grove~~) NATOMAS, SACRAMENTO
November 16, 2016
Meeting #5

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
George Booth	boothg@saccounty.net	874 6484	Sacramento County
Jeanine Foster	jeanine.foster@fostermorrison.com	303 717-7171	foster Morrison
~~SGT KELLY KIRK~~	~~KKIRK@SACSHERIFF.COM~~	~~874-5980~~	~~Sac Co. SHERIFF~~
Connie Gutowsky	CPERKINS@PIXOK.COM	381-6321	RESIDENT
Paul Devereaux	pdevereaux@rd1000.org	922-1449	RD 1000
June Cowles	jcowles@cityofranchocordova.org		Rancho Cordova
Allan Qunyn "TISA"	aqunyn@cityofrancho cordova.org		Rancho Cordova
MARIA LORENZO-LEE	MTISAL@SBCGLOBAL.NET	(916) 804-5358	RESIDENT

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
HMPC Mitigation Strategy Meeting #5 (Courtland)
November 17, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Patrick Ervin / Engineer	pwervin@wbecorp.com	916-441-6850	RD 341 / 800
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Greg Rash	greg.rash@twinriversusd.org	916 566-1646	Twin Rivers USD
TODD TAYLOR	TAYLORTO@SACCOUNTY.NET	916 874-7125	SAC CO. PLANNING & ENV. REVIEW
Jeanine Foster	Jeanine foster@fostermorrison.com	303 717 7191	Foster Morrison
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Connie Nelson	cnelson@elkgrovecity.org	916-475-3633	City of Elk Grove

Sacramento County Hazard Identification and Profiles – 2016

Hazards Comparison List

2011 Sacramento County Plan*	2013 State of California Plan Applicable Hazards	Proposed 2016 Hazards
Ag Hazards: Insect Pests	Agriculture Pests and Diseases	Ag Hazards: Insect Pests
Bird Strike	Airline Crashes	Bird Strike
-------	Climate Change & Related Hazards	Climate Change
Dam Failure	Dam Failure	Dam Failure
Drought	Droughts and Water Shortage	Drought and Water Shortage
Earthquake	**Earthquake**	Earthquake
Earthquake: Liquefaction		Earthquake: Liquefaction
	Epidemic/Pandemic/Vector Borne Disease Hazards	
Flood: 100/200/500–year	**Flood**	Flood: 100/200/500–year
Flood: Localized/Stormwater		Flood: Localized/Stormwater
Landslide	Landslide	Landslide and Debris Flows
Levee Failure	Levee Failure	Levee Failure
	Marine Invasive Species	
River/Stream/Creek Bank Erosion	Coastal Flooding, erosion, sea level rise	River/Stream/Creek Bank Erosion
Severe Weather: Extreme Heat	Extreme Heat	Severe Weather: Extreme Heat
Severe Weather: Fog		Severe Weather: Fog
Severe Weather: Freeze	Freeze	Severe Weather: Freeze
Severe Weather: Heavy Rains and Storms	Severe Weather and Storms	Severe Weather: Heavy Rains and Storms
Severe Weather: Tornadoes		Severe Weather: Tornadoes
Subsidence		Subsidence
Volcano	Volcano	Volcano
Wildfire	**Wildfire**	Wildfire

Sacramento County Hazard Identification Table (Jurisdiction)

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance
Ag Hazards: Insect Pests				
Bird Strike				
Climate Change				
Dam Failure				
Drought and Water Shortage				
Earthquake				
Earthquake: Liquefaction				
Flood: 100/200/500–year				
Flood: Localized/Stormwater				
Landslide and Debris Flows				
Levee Failure				
River/Stream/Creek Bank Erosion				
Severe Weather: Extreme Heat				
Severe Weather: Fog				
Severe Weather: Freeze				
Severe Weather: Heavy Rains and Storms				
Severe Weather: Tornadoes				
Subsidence				
Volcano				
Wildfire				

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Mitigation Strategy

Sacramento County 2011 Goals

- Goal 1: Minimize the loss of life, injury, and property damage from natural hazards (reduce the risk and vulnerability of the community to hazards through mitigation efforts)
- Goal 2: Enhance public awareness of the effects of natural hazards and public understanding of disaster preparedness
- Goal 3: Improve the capabilities of the community to mitigate or reduce losses from natural hazards
- Goal 4: Position Jurisdictions for Federal and State Grant Funding

Sacramento County 2011 Actions

Table 1 Sacramento County 2011 Actions Table

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Multi-Hazard Mitigation Actions					
Enhance Public Awareness of the Effects of Natural Hazards and Public Understanding of Disaster Preparedness	Sacramento County				
CRS Public Information Pilot Program	Sacramento County, City of Sacramento				
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Sacramento County City of Citrus Heights City of Elk Grove City of Folsom City of Galt City of Rancho Cordova City of Sacramento				
Flood Insurance Promotion	Sacramento County				
Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas	Sacramento County				
Finalize and Implement the Actions of the South Sacrament Habitat Conservation Plan	Sacramento County City of Elk Grove City of Galt City of Rancho Cordova Sacramento Regional County Sanitation District Sacramento County Water Agency, Southeastern Connector				
SAFELY OUT™ Evacuation Preparedness	Sacramento County Citizen Voice				
Public Education Program	City of Elk Grove				
Alerts and Warning System	City of Elk Grove				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Emergency Operation Center (EOC)	City of Elk Grove				
Critical Facilities Database Development and Data Maintenance Processes	City of Elk Grove				
Increase Redundancy/ Functionality of Water Wells and Sewer Lift Stations	City of Galt				
Increase Data Capacity of Emergency Frequencies	City of Galt				
Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas	City of Sacramento				
Data Center Disaster Recovery Improvement	Los Rios Community College District				
Community Emergency Response Training (CERT)	Los Rios Community College District				
Update the critical facilities identified during this DMA planning effort with the City's GIS technical group to support emergency management efforts.	City of Sacramento				
Bird Strike Mitigation Actions					
Wildlife Hazard Management Plan	Sacramento County Airport System				
Dam Failure Mitigation Actions					
Mather Dam Improvements	Sacramento County				
Alder Creek Miners Dam	Sacramento County				
Improved Flood Inundation and Evacuation Plan for Probable maximum flow from New Spillway at Folsom Dam	Sacramento County				
Folsom Dam Joint Federal Project	SAFCA				
Folsom Dam Raise	SAFCA				
Drought Mitigation Actions					
Drought Contingency Plan	Southgate Park & Recreation District				
Earthquake Mitigation Actions					
Hughes Stadium Renovation at Sacramento City College	Los Rios Community College District				
Flood Mitigation Actions					
Improve County ALERT (Automated Local Evaluation in Real Time) system of stream and rain gages	Sacramento County				
Elevation Projects to Mitigate Flood Risk	Sacramento County				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Arcade Creek Corridor Plan	Sacramento County				
Elevate up to Three Homes on Long Island (Grand Island Road, Sacramento River)	Sacramento County				
Mitigation Projects for Repetitive Loss Structures/Areas	Sacramento County				
Improve Strawberry Creek Basins at East Stockton Blvd	Sacramento County				
Triangle Detention Basin	Sacramento County				
Unionhouse Detention Basin Upstream of East Stockton Blvd Partnering with Park District and SAFCA	Sacramento County				
Unionhouse Creek Joint Use Detention Basins – Park Active or Passive Joint Use	Sacramento County				
South Sacramento Stream Group Detention Basins	Sacramento County				
Elder and Gerber Creek	Sacramento County				
Florin Creek Basins –Florin Vineyard Drainage Master Plan	Sacramento County				
Joint Use Detention-Park Basins on Laguna Creek	Sacramento County				
Pasa Robles Drive - Concrete Channel Lining Rehabilitation	Sacramento County				
Chicken Ranch Slough - Concrete Channel Lining Rehabilitation	Sacramento County				
Morrison Creek - Concrete Channel Lining Rehabilitation	Sacramento County				
Mayhew Slough - Concrete Channel Lining Rehabilitation	Sacramento County				
Strong Ranch Slough - Concrete Channel Lining Rehabilitation	Sacramento County				
Keep Watershed Management Plan Current CRS Activity 450 (county and cities)	Sacramento County				
Woodside Condominiums Repetitive Flood Loss Property	Sacramento County				
Conversion to NAVD88 vertical datum (from NGVD29)	Sacramento County				
Mitigation projects to reduce flood risk to critical facilities.	Sacramento County				
Hydrologic and Hydraulic Modeling in Compliance with 2012 Central Valley Flood Protection Plan	Sacramento County				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Delta Area Fire Station Needs to be Elevated or Flood Proofed to Protect Against Levee Breach Flooding to Assure Function in that Disaster Event.	Sacramento County				
Update and Adopt Floodplain Management Ordinance in Light of Levee De-accreditation	Sacramento County				
Mitigate Peak Flow on Dry Creek and Tributaries (including Sacramento County and City of Roseville)	Sacramento County				
Repetitive Loss Church Building on Dry Creek	Sacramento County				
Determine Cause and Mitigate Mercury and Methyl Mercury Coming from Tributaries of American River	Sacramento County				
Pump Stations	Sacramento County				
Public Outreach Mailers	Sacramento County				
Drainage improvements to reduce flooding on key evacuation routes	Sacramento County				
South Branch Arcade Creek – Gum Ranch Basin (with Fair Oaks Park District)	Sacramento County				
Dry Creek Flood Hazard Mitigation Acquisitions with County Park Dept	Sacramento County				
Arcade Creek at Evergreen Estates Floodwall improvements	Sacramento County				
Linda Creek Peak Flow Mitigation	Sacramento County				
Improve flood protection and/or Evacuation Planning for Mobile Home/RV Park at Manzanita/Auburn. Alternatively, the park Should Establish Flood Warning and Evacuation Procedures.	Sacramento County				
Capital Improvement Projects – Pipelines (2012-13)	Sacramento County				
Capital Improvement Projects – Pipelines (2014-15)	Sacramento County				
New City Sump 90 Operation Plan	Sacramento County				
Land Acquisition	Southgate Park & Recreation District				
Conservation Easements	Southgate Park & Recreation District				
Multi-jurisdictional Cooperation within Watersheds	Southgate Park & Recreation District				
South Sacramento Streams Group	SAFCA				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
American River Common Features	SAFCA				
CVFPP - Flood Emergency Plan	City of Sacramento				
Adopt Additional Floodplain Development Standards	City of Sacramento				
Update the General Plan to include the requirements of the CVFPP	City of Sacramento				
Historic Magpie Creek Study	City of Sacramento				
South Sacramento Streams Project: Union Pacific Railroad Flood Wall	City of Sacramento				
Natomas Levee Improvement Project (NLIP)	City of Sacramento				
Retrofit of Repetitive Loss Properties	City of Sacramento				
Preferred Risk Policy (PRP) Outreach Campaign	City of Sacramento				
Drainage Projects for Repetitive Loss Properties	City of Sacramento				
Unionhouse Creek Existing Conditions LOMR and Channel Improvements	City of Sacramento				
Emergency Notification and Evacuation Planning	City of Sacramento				
Drainage Projects from the City's Priority Drainage Project List	City of Sacramento				
Riconada Flood Wall	City of Citrus Heights				
Storm Debris Removal	City of Elk Grove				
Drainage and Flood Control Programs	City of Elk Grove				
LID Rain Garden Plaza	City of Elk Grove				
School Street Alley Drainage Improvements	City of Elk Grove				
Elk Grove Creek Outfalls	City of Elk Grove				
Elk Grove Creek Restoration	City of Elk Grove				
Waterman Road Culvert Repair and Replacement	City of Elk Grove				
Waterman Road Culvert Replacement	City of Elk Grove				
Elk Grove Creek Flood Protection and Clean Water	City of Elk Grove				
Elk Grove Watershed Recommended Improvements	City of Elk Grove				
Multi-Functional Drainage Corridor for Shed C	City of Elk Grove				
9816 Sheldon Road – Enlarge Culverts	City of Elk Grove				
Sheldon Road Drainage Project	City of Elk Grove				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Sleepy Hollow Detention Basin Retrofit	City of Elk Grove				
Sleepy Hollow Lane Drainage Improvements	City of Elk Grove				
East Elk Grove Area/ Rural Region Improvements	City of Elk Grove				
Sheldon Road Ditch Improvements and Multi-Use Trails	City of Elk Grove				
Laguna Creek Watershed Improvements (New Pipeline and Enlarge Existing Pipelines)	City of Elk Grove				
Deer Creek Watershed Improvements (New Detention Basins)	City of Elk Grove				
SCADA System for the Stormwater Pump Stations	City of Elk Grove				
Dry Well Installation at Kent Street and St. Anthony Court	City of Elk Grove				
Elk Crest Drive Pipes	City of Elk Grove				
Strawberry Creek Detention Basin Retrofit	City of Elk Grove				
Laguna Creek and Whitehouse Creek Multi-Functional Corridor Enhancement	City of Elk Grove				
Whitehouse Creek Watershed Improvements	City of Elk Grove				
Grant Line Channel Improvements (Pump Station and Enlarge Pipes)	City of Elk Grove				
Alder Creek Watershed Council	City of Folsom				
Redevelopment Area Drainage Improvements	City of Folsom				
Drainage System Maintenance Tax Assessment	City of Folsom				
Floodplain Mapping	City of Folsom				
Drain Inlet Retrofit Capital Improvement Plan (CIP)	City of Galt				
Creek/Streams Vegetation Management Plan	City of Galt				
Sunrise Boulevard Widening Kiefer to Jackson	City of Rancho Cordova				
Flood Response Equipment	Cosumnes Community Services District Fire Department				
Flood Response Training	Cosumnes Community Services District Fire Department				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Coordinate with SAFCA, CA-DWR, USACE, and Sacramento County on Proposed Flood Control projects on Magpie Creek	City of Sacramento				
Storm Water Management Practices - Implement Storm Water Management Practices as identified in Stormwater Quality Design Manual	Southgate Park & Recreation District				
Main Drainage Canal Bank Stabilization and Sediment Removal	Reclamation District #1000				
Security of District Facilities	Reclamation District #1000				
South River Pump Station Flood Protection Project	Sacramento Regional County Sanitation District				
SRCSD Critical Facilities Flood Study (Planning)	Sacramento Regional County Sanitation District				
Levee Failure Mitigation Actions					
Hydromodification and Stormwater Quality countywide	Sacramento County				
Ring Levees to Protect Delta Historic Villages	Sacramento County				
Levee Breach Scenario, Inundation, Evacuation, and Recovery Planning for Rural Areas South of Freeport	Sacramento County				
Improved Flood Inundation and Evacuation Plan for Structural Flood Control System Failure Scenarios in Urban Areas	Sacramento County				
Human Vertical Evacuation Structures in Areas of Widespread Flood Hazard	Sacramento County				
Livestock Vertical Evacuation Mounds in Areas of Widespread Flood Hazard	Sacramento County				
Implement the Recommended Actions of the Sherman Island Five Year Plan	Reclamation District #341				
Highway 16 Levee Rehabilitation Project	Reclamation District #800				
Bank and Levee erosion	Reclamation District #1000				
Severe Weather: Heavy Rains and Storms Mitigation Actions					
Public Education/Outreach Extreme Weather	City of Folsom				
Heating and Cooling Centers for Extreme Weather	City of Folsom				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
District Wide Roofing Renovations	Los Rios Community College District				
Tree Management	Southgate Park & Recreation District				
Wildfire Mitigation Actions					
Fuels Reduction in the American River Parkway	City of Sacramento/Sacramento Metropolitan Fire District				
Coordinate with SAFCA on completion of South Sacramento Streams Group (includes Florin and Morrison Creeks) Projects in 2005. Provide greater than 100-year protection by improving conveyance and raising levees.	City of Sacramento				
Fuel Reduction and Modification	City of Folsom				
Wildfire Prevention Outreach	City of Folsom				
Wildfire Hazard Identification	City of Folsom				
Arson Prevention & Control Outreach	City of Folsom				
Ignition Resistant Building Construction Upgrades	City of Folsom				
Reduction of Fire Hazard SRCSD Bufferlands	Sacramento Regional County Sanitation District				

Sacramento County 2016 Hazards

- Ag Hazards
- Bird Strike
- Dam Failure
- Drought and Water Shortage
- Climate Change
- Earthquake
- Earthquake: Liquefaction
- Flood: 100/200/500–year
- Flood: Localized/Stormwater
- Landslide
- Levee Failure
- River/Stream/Creek Bank Erosion
- Severe Weather: Extreme Temperatures - Extreme Heat
- Severe Weather: Extreme Temperatures - Extreme Cold/Freeze
- Severe Weather: Fog
- Severe Weather: Heavy Rains and Storms (includes thunderstorms with hail/lightning/wind)
- Severe Weather: Winds and Tornadoes
- Subsidence
- Volcano
- Wildfire

Sacramento County Historic Hazard Worksheet (Past Occurrences)

Name of Jurisdiction: _____

Please fill out one sheet for each significant hazard event with as much detail as possible. Attach supporting documentation, photocopies of newspaper articles, or other original sources.

Type of event	
Nature and magnitude of event	
Location	
Date of event	
Injuries	
Deaths	
Property damage	
Infrastructure damage	
Crop damage	
Business/economic impacts	
Road/school/other closures	
Other damage	
Insured losses	
Federal/state disaster relief funding	
Opinion on likelihood of occurring again	
Source of information	
Comments	

	Please return worksheets by mail, email, or fax to: Jeanine Foster, Foster Morrison 5628 West Long Place Littleton, CO 80123 fax: (720) 893-0863 email: jeanine.foster@fostermorrison.com
Prepared by:	
Phone:	
Email:	
Date:	

SACRAMENTO COUNTY

AGENDA
Sacramento County
Local Hazard Mitigation Plan (LHMP) Update
Risk Assessment Meetings: June 21 & 22, 2016

1. Introductions
2. Status of the DMA Planning Process
3. Review of Risk Assessment
4. Data Needs
5. Questions
6. Next Steps

Table 1 Sacramento County Planning Area Hazard Identification Table

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards	Limited	Likely	Critical	Low	Low
Bird Strike	Limited	Highly Likely	Critical	Medium	Low
Climate Change	Significant	Likely	Limited	Medium	–
Dam Failure	Significant	Unlikely	Catastrophic	Medium	High
Drought and Water Shortage	Extensive	Highly Likely	Limited	Medium	High
Earthquake	Limited	Occasional	Critical	Medium	None
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium	None
Flood: 100/200/500-year	Significant	Occasional	Catastrophic	High	High
Flood: Localized Stormwater Flooding	Limited	Highly Likely	Limited	Medium	High
Landslides	Limited	Unlikely	Negligible	Low	Medium
Levee Failure	Significant	Occasional	Catastrophic	High	High
River/Stream/Creek Bank Erosion	Limited	Highly Likely	Limited	Medium	High
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Likely	Limited	Low	High
Severe Weather: Extreme Temperatures - Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Fog	Extensive	Highly Likely	Limited	Low	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning)	Extensive	Highly Likely	Critical	Medium	High
Severe Weather: Wind and Tornadoes	Limited	Likely	Limited	Low	Medium
Subsidence	Significant	Highly Likely	Limited	Low	Medium
Volcano	Limited	Unlikely	Limited	Low	None
Wildfire	Limited	Likely	Limited	Medium	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **Highly Likely**: Near 100% chance of occurrence in next year, or happens every year.
- **Likely**: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
- **Occasional**: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
- **Unlikely**: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Calculating Vulnerability

Vulnerability is measured in general, qualitative terms, and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential:

- **Extremely Low**: The occurrence and potential cost of damage to life and property is very minimal to non-existent.
- **Low**: Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**: Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**: Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have already occurred in the past.
- **Extremely High**: Very widespread and catastrophic impact.

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for the plan. These factors include the following:

- **Past Occurrences**: Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences**: Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures**: This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of a community to a given hazard event.

Risk Assessment Summary: Sacramento County Planning Area

Agricultural Hazard

- Most agricultural disasters in Sacramento County associated with severe weather events, including heavy rains, floods, heat, and drought; insects and noxious weeds also a concern.
- According to the 2014 crop report, despite the severe drought conditions of 2014, Sacramento County's 2014 crop production value of $495,379,000 is the highest ever recorded for the county and represents a 7. 7% increase over the 2013 crop production value.
- 28 USDA disaster declaration from 1982-2015, most associated with severe weather events
- WHAT ARE THE BIGGEST AG ISSUES?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Bird Strike

- The County of Sacramento operates five airports, which have a collective economic impact in excess of $3 billion annually (2008 dollars)
- The FAA data shows 2,812 bird strike incidents for Sacramento County since 1990
- ANY INPUT ON NOTABLE BIRD STRIKE INCIDENTS?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Non-Priority Hazard?

Climate Change

- The 2013 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. Climate Change has the potential to alter the nature and frequency of most hazards.
- ANY HMPC INPUT ON CLIMATE CHANGE ISSUES IN SACRAMENTO?
- Likelihood of Future Occurrence: Likely
- Vulnerability: Medium
- Non-Priority Hazard?

Dam failure

- There are 27 dams in Sacramento County constructed for flood control, storage, electrical generation, and recreational purposes. Of the 27 dams, 16 are rated as High Hazard, 5 as Significant Hazard, 5 as Low Hazard, and 1 was not rated.
- 8 high hazard dams located in neighboring counties also have the potential to impact the Sacramento County Planning Area

- A search of the National Performance of Dams database data shows two dam failure incidents for Sacramento County since 1994, both related to the Folsom Dam. However, these incidents were limited in scope and since the incidents occurred, improvements to the Folsom Dam system have been made.
- Likelihood of Future Occurrence: Jurisdictional Dams: Unlikely/Smaller, non-jurisdictional Dams: Occasional
- Vulnerability: Extremely High
- Priority Hazard

Drought and Water Shortage

- Historical drought data for the Sacramento County Planning Area and region indicate there have been 5 significant droughts in the last 84 years.
- Since 2012, snowpack levels in California have dropped dramatically, with an increase in 2015.
- 1 federal disaster declarations in 1977; 1 state disaster declaration in 2008; 1 drought State of Emergency in 2014
- HMPC – CAN YOU PROVIDE DAMAGES OR RESTRICTIONS THAT HAVE OCCURRED IN THE COUNTY RECENTLY DUE TO THE CURRENT DROUGHT. WHAT HAS BEEN IMPACTED THE MOST? WHAT IS THE PRIMARY SOURCE OF WATER AND HOW HAS WATER SUPPLY BEEN AFFECTED IN THE COUNTY?
- Likelihood of Future Occurrence: Likely
- Vulnerability: High to Extremely High?
- Priority Hazard

Earthquake

- Geological literature indicates that no major active faults transect the County; however, there are several subsurface faults in the Delta.
- There have been two disaster declarations in Sacramento County: 1989 Loma Prieta; 2014 Napa
- There have been several felt occurrences in the County from area earthquakes, with limited damages to the County: USGS reports 13 earthquakes of 5.0 magnitude or greater within 90 miles of Sacramento County since 1975.
- WERE THERE ISSUES IN THE COUNTY FROM THE MORE RECENT EARTHQUAKES?
- Likelihood of Future Occurrence: Unlikely – large, damaging earthquake; Occasional – minor earthquake
- Vulnerability: Medium – High?
- Priority Hazard

Earthquake: Liquifaction

- Sacramento County has two areas that have been suggested as posing potential liquefaction problems due to loose sandy soils and silt and presence of faults- the downtown area and the Delta.
- Although no historic examples of seismically induced levee failure are known in the Delta, the modern levee network has not been subjected to strong shaking.
- HAVE THERE BEEN ANY ISSUES IN THE COUNTY ASSOCIATED WITH LIQUEFACTION?
- Likelihood of Future Occurrence: Occasional
- Vulnerability: Medium – High?

- Priority Hazard

Flood Hazards

100/200/500 year

- Historically, portions of Sacramento County have always been at risk to flooding because of its annual percentage of rainfall and the number of watercourses and miles of levees that traverse the County.
- Multiple state and federal disaster declarations related to heavy rains and flooding.
- Likelihood of Future Occurrence: 100-Occasional; 200-Unlikely; 500-Unlikely
- Vulnerability: High to Extremely High
- Priority Hazard

Localized/Stormwater flooding

- Significant localized flood history in the County – occurs annually
- Each jurisdiction is updating this information.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium?
- Priority Hazard

Landslides and Debris Flows

- The NCDC contains no records of landslides in the County. There have been no disaster declarations associated with landslides in Sacramento County.
- The topography of the majority of Sacramento County is relatively flat and not subject to landslide. In Sacramento County, only a narrow strip along the eastern boundary, from the Placer County line to the Cosumnes River, is considered to have landslide potential. However, future slides on these slopes are expected to be minor in nature and do not pose a large scale threat to life or property. The American River Bluffs downstream from Folsom and in Fair Oaks and Carmichael are considered stable and are generally not subject to fracture or landslides. TRUE? OTHER AREAS? PAST OCCURRENCES?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Low
- Non-Priority Hazard

Levee Failure

- Over 500 miles of levees throughout the County. CORRECT?
- There have been two federal disaster declarations in Sacramento County related to levee failure: 1980 Delta Levee Break and 1972 Andrus Island Levee Break.
- Although numerous documented levee breaks in the Delta area since 1900, most were prior to 1990 and do not reflect future failure potential due to extensive levee improvements in the area.
- All levees in the Sacramento Area have been decertified (although not reflected in current DFIRMs), but many are undergoing significant improvements to certify levees to the 200 year+ level of protection
- Likelihood of Future Occurrence: Occasional?
- Vulnerability: Extremely High
- Priority Hazard

Severe weather

Extreme Temperatures: Cold and Freeze

- Annual occurrences of winter weather
- The NCDC data recorded 22 cold and freeze incidents for Sacramento County since 1993.
- No state or FEMA disaster declarations related to cold or freeze.
- ANY NOTABLE EXTREME COLD/FREEZE EVENTS SINCE 2011 PLAN?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Non-Priority Hazard

Extreme heat

- Annual occurrences – it gets hot every summer
- The NCDC data shows 32 extreme heat incidents for Sacramento County since 1993.
- ANY NOTABLE EXTREME HEAT EVENTS SINCE 2011? HOW MANY TIMES WERE COOLING CENTERS OPENED?
- Climate change might affect this hazard in the future
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Low – Medium?
- Priority Hazard? (This was a low priority hazard last time)

Fog and Freezing Fog

- Annual occurrences of fog events
- The NCDC data shows 6 fog incidents for Sacramento County since 1993
- ANY NOTABLE FOG EVENTS SINCE 2011?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Low
- Non-Priority Hazard

Heavy rains and storms (Thunderstorms, Hail, Lightning)

- Significant County history: annual occurrences
- Multiple state and federal disaster declarations associated with Heavy Rains and Storms
- The NCDC data shows 33 extreme heavy rains and storm events for Sacramento County since 1950.
- Severe storms/heavy rains are the primary cause of most major flooding
- ANY NOTABLE HEAVY RAINS/STORM EVENTS SINCE 2011?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Wind and Tornadoes

- Annual occurrences of wind events

- The NCDC data shows 52 high wind events for Sacramento County since 1993
- The NCDC data shows 18 tornado events (6 funnel clouds, 8 F0s, 3 F1s, 1 F2) for Sacramento County since 1993
- ANY NOTABLE HIGH WINDS OR TORNADO EVENTS SINCE 2011?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Low
- Non-Priority Hazard

River/Stream/Creek Bank Erosion

- Due to the high number of linear feet of levees and creek banks, erosion and deposition are occurring continually at varying rates over the planning area.
- USACE/DWR maintain an inventory program to identify and repair erosion sites. As areas are fixed, new areas are identified.
- ARE THERE ANY KEY AREAS THAT SHOULD BE A NOTED CONCERN?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Subsidence

- Subsidence in the Delta has been a historical problem, occurring on an annual basis. Areas with peat thickness over 10 feet have a great potential for continued subsidence.
- ANY NOTABLE AREAS OF CONCERN BOTH IN OUR OUTSIDE OF THE DELTA AREA?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Low
- Non-Priority Hazard

Volcano

- Of the approximately 20 volcanoes in the California, only a few are active and pose a threat. Of these, Long Valley Caldera and Lassen Peak are the closest to Sacramento County.
- According to the State Multi-Hazard Mitigation Plan, Sacramento County is not considered to be vulnerable to eruption and/or ash from these volcanoes.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Extremely Low
- Non-Priority Hazard

Wildfire

- Wildfires occur on an annual basis in the Sacramento County Planning Area
- Any ignition has the potential to become an out of control wildfire.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Outstanding Items and Next Steps

Participating Jurisdictions

- Return first draft of Annexes ASAP
- Return Mitigation Action Strategy Status Updates

Mitigation Strategy Meetings

- July 12 &13 (plan on attending both days)

Draft LHMP Update out for HMPC Review

- August 2016

Mitigation Action Worksheet

Jurisdiction:	
Mitigation Action/Project Title:	
Hazards Addressed:	
Issue/Background:	
Project Description:	
Other Alternatives:	
Existing Planning Mechanism(s) through which Action Will Be Implemented:	
Responsible Office/Partners:	
Cost Estimate:	
Benefits (Losses Avoided):	
Potential Funding:	
Timeline:	
Project Priority:	

Worksheet completed by:	
Name and Title:	
Phone:	

Sacramento County
2016 Local Hazard Mitigation Plan Update
Sacramento County: Vulnerability Worksheets

Name of Jurisdiction: _____

Hazard Risk, and Vulnerability Questions

Localized/Stormwater Flooding

The following is from the 2011 LHMP.

Table 1 identifies the number of parcels and roads by watersheds affected by localized flooding throughout the unincorporated County. Parcels were identified by the County based on those parcels historically affected by localized flooding issues. Affected roads are estimated based on those roads fully within 50 feet of a parcel with historical flooding problems. Maps of these localized flooding areas are still under development by the County. (HAVE THEY BEEN DEVELOPED YET?) The Watershed Master Plan included as an appendix to this LHMP also addresses these flood prone areas falling outside of the established 100- and 500-year floodplains.

Table 1 Unincorporated Sacramento County Localized Flooding Areas

Watershed	# of Parcels Affected	# of Road Segments Affected
Buffalo Creek	63	686
Morrison Creek	1,102	366
Chicken Ranch Slough	421	221
Cosumnes River	335	211
Laguna Creek	1042	202
North Delta	769	199
Linda Creek	379	199
Florin Creek	715	191
Arcade Creek	347	182
Fair Oaks Stream Group	197	172
Dry Creek	308	166
Strong Ranch Slough	196	153
Sierra Creek	93	149
Carmichael Creek	176	128
Robla Creek	320	126
Antelope Creek	187	107

Watershed	# of Parcels Affected	# of Road Segments Affected
Minnesota Creek	212	105
Deadmans Gulch	223	102
Alder Creek	19	88
North Fork Badger Creek	232	86
NEMDC Trib 3	137	78
East Natomas	158	69
Badger Creek	194	62
Elder Creek	149	58
Arcade Creek South Branch	83	58
Magpie Creek	56	58
Diablo Creek	11	49
Sierra Branch	70	48
NEMDC Trib 2	118	47
Strawberry Creek	168	46
East Antelope	111	46
Unionhouse Creek	47	46
Skunk Creek	81	45
Laguna Creek (South)	52	45
Beach-Stone Lake	123	44
Hen Creek	94	44
Gerber Creek	75	42
Cripple Creek	38	39
Hagginbottom	38	38
Verde Cruz Creek	19	38
Dry Creek (South)	66	37
Hagginwood Creek	49	37
Courtland	157	31
Griffith Creek	125	29
Mayhew Slough	18	25
Date Creek	48	23
Deer Creek	61	21
Boyd Creek	40	20
Willow Creek (South)	64	19
NEMDC Trib 1	41	17
San Juan Creek	24	16
Hadselville Creek	43	15

Watershed	# of Parcels Affected	# of Road Segments Affected
Frye Creek	22	12
Manlove	13	12
Negro Slough	11	12
Rolling Draw Creek	10	11
Willow Creek	15	8
Coyle Creek	9	7
Natomas Basin	0	5
Crevis Creek	4	4
Coyote Creek	26	3
Arkansas Creek	4	3
Carson Creek	13	2
Bear Slough	3	2
Brooktree Creek	3	2
Browns Creek	6	1
Cordova/Coloma Stream Group	1	1
Elk Grove Creek	0	1
Little Deer Creek	0	1
Grizzly Slough	0	0
Mariposa Creek	0	0
Slate Creek	0	0
Sunrise Creek	0	0
Whitehouse Creek	0	0
Willow Creek (Middle)	0	0
Total	**10,034**	**5,216**

Source: Sacramento County

Earthquake Vulnerability

1. Number of unreinforced masonry buildings. If available, please provide an inventory of URM buildings specific to your jurisdiction. Include any tables and/or maps. Is this a layer available in GIS?

Special Populations

1. Describe any hazard-related concerns or issues regarding the vulnerability of special needs populations, such as the elderly, disabled, low-income, or migrant farm workers.

Development since 2011 Plan

USE THE BELOW SECTION TO IDENTIFY DEVELOPMENT SINCE THE LAST PLAN.

As shown in Table 2, Sacramento County has seen a gain of 3.4% of population between 2010 and January 1, 2015.

Table 2 Sacramento County Population Changes Since 2011

Year	Population	Change	% Change
2010[1]	554,554	–	–
2015[2]	573,513	18,959	3.4%

Source: [1]US Census Bureau, [2]California Department of Finance

BASED ON INFORMATION PROVIDED BY YOUR BUILDING DEPARTMENT, PERMITS ISSUED, POPULATE THE FOLLOWING TABLES DESCRIBING DEVELOPMENT SINCE THE 2011 PLAN IN TOTAL AND BY KNOWN HAZARD AREAS. USE THE "OTHER" COLUMN TO DESCRIBE OTHER HAZARD AREAS TRACKED BY YOUR JURISDICTION. MODIFY TEXT ACCORDINGLY.

The Sacramento County Building Department and Planning Department tracked total building permits issued since 2011 for the County. These are tracked by total development, property use type, and hazard risk area. These are shown in Table 3 and Table 4. All development in the identified hazard areas, including the 1% annual chance floodplains, areas protected by levees, and high wildfire risk areas, were completed in accordance with all current and applicable development codes and standards and should be adequately protected. Thus, with the exception of more people living in the area potentially exposed to natural hazards, this growth should not cause a significant change in vulnerability of the County to identified priority hazards.

Table 3 Sacramento County Total Development Since 2011

Property Use	2011	2012	2013	2014	2015
Residential					
Commercial					
Industrial					
Other					
Total					

Source: Insert

Table 4 Sacramento County Development in Hazard Areas since 2011

Property Use	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Residential				

Property Use	1% Annual Chance Flood	Area Protected by Levee	Wildfire Risk Area[1]	Other
Commercial				
Industrial				
Other				
Total				

Source: INSERT

Incorporation of Hazard Mitigation Plan into Other Plans

Since the creation of the 2011 Sacramento County Local Hazard Mitigation Plan, other plans have been created. This includes General Plans, CWPPs, EOPs, other fire plans, or any other planning process. Was the 2011 LHMP incorporated into or implemented through any of these other plans?

Jurisdiction	Planning Mechanism 2010 LHMP Was Incorporated/Implemented In. Details?

Past Occurrences since 2011 LHMP

Populate the table with any significant past occurrences by hazard since the 2011 Plan. Give some description of the event, along with damages, injuries, and deaths if known.

Hazard	Description of Event (date and text about what happened)	Damages	Injuries	Deaths
Agricultural Hazards				
Bird Strike				
Climate Change				

Hazard	Description of Event (date and text about what happened)	Damages	Injuries	Deaths
Dam Failure				
Drought and Water Shortage				
Earthquake				
Earthquake: Liquefaction				
Flood: 100/200/500-year				
Flood: Localized Stormwater Flooding				
Landslides				
Levee Failure				
River, Stream, Creek Bank Erosion				
Severe Weather: Extreme Temperatures – Cold/Freeze				
Severe Weather: Extreme Temperatures - Heat				
Severe Weather: Fog				

Hazard	Description of Event (date and text about what happened)	Damages	Injuries	Deaths
Severe Weather: Heavy Rains and Storms (Thunderstorms, Hail, Lightning)				
Severe Weather: Wind and Tornadoes				
Subsidence				
Volcano				
Wildfire				

Mitigation Action Worksheet

Jurisdiction:	
Mitigation Action/Project Title:	
Hazards Addressed:	
Issue/Background:	
Project Description:	
Other Alternatives:	
Existing Planning Mechanism(s) through which Action Will Be Implemented:	
Responsible Office/Partners:	
Cost Estimate:	
Benefits (Losses Avoided):	
Potential Funding:	
Timeline:	
Project Priority:	

Worksheet completed by:	
Name and Title:	
Phone:	

HMPC Handouts HMPC #3/#4

Please see Appendix C for these handouts.

SACRAMENTO COUNTY

2016 LHMP Update
Final HMPC Meetings: November 16 & 17, 2016

2011 Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or annexation).

Updates to this plan will:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to infrastructure inventories; and
- Incorporate new action recommendations or changes in action prioritization.

Summary of Significant Changes to Current Conditions, Planning Area Vulnerability, and Hazard Mitigation Priorities

This section provides a summary by hazard of significant changes in current conditions, planning area vulnerability, and any resulting modifications to the community's mitigation program priorities since the 2011 LHMP:

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Agricultural Hazards			X

- Recent drought conditions stressed crops making them more susceptible to insect infestation
- Reduced water supply resulted in land being left out of production reducing overall crop yields
- Noxious weeds are more drought tolerant – better able to compete for water over local crops
- Drought increased the tree mortality in the County further impacting the wildfire hazard.
-
-

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Bird Strike		X	

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Climate Change			

-
-

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Dam Failure	X		

- Folsom Dam Improvement projects are near completion that will allow releases at a lower flood stage so the Dam can hold more water for enhanced flood control. This decreases the overall vulnerability in the Folsom Dam inundation areas.
- Jurisdictional dams generally have no change in vulnerability as they are highly regulated. However, with more people moving into dam inundation areas, the vulnerability increases due to an increase in potentially affected population, but not due to an increased risk of dam failure.
- Non-jurisdictional dams pose the biggest risk and, over time with little regular maintenance and often located in remote areas with little security, result in an increase in vulnerability to Sacramento.
-
-
-

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Drought and Water Shortage			X

- Since the 2011 planning process, current drought conditions, including water supply issues, have had a significant impact on the Sacramento County planning area and California. As a result the drought hazard has become a significant priority for mitigation planning.
- As previously mentioned, the drought has contributed to an increase in vulnerability of the County due to increase tree mortality issues and general increase in wildfire conditions.
- Water Supply?
- Over the last few years, the drought has had a significant economic impact on recreation in the County, with rivers running substantially lower, less people have been vacationing and undertaking water dependent recreational activities, such as boating.
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2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Earthquakes		X	

- The primary factor that might change the earthquake vulnerability, is additional development and more people moving to the area.
- Lake County had a 5.2 earthquake on a previously unknown fault. There is the potential for effects from earthquakes and volcanic activity in the adjacent and nearby counties.
-

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Earthquake Liquefaction			

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Floods:100-/200-/500-year		X	

- With the issuing of new FEMA flood maps (2015 DFRIMs), flood depths have been established in some areas and the regulatory Special Flood Hazard Area has changed. With these changes, flood mitigation projects, including flood insurance promotion and continued participation in the NFIP's CRS program, is a priority.
- Although the FEMA mapped floodplains have changed based on new data, the risk and vulnerability of 100/200/500-year flood remains somewhat constant. Ongoing implementation of regional flood control projects and effective land use planning and requirements for development in identified floodplains have minimized additional exposure to this hazard in the County.
- All new development in the floodplain has been completed in accordance with current and applicable codes and standards, thus these new development areas should be protected from future flooding.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Floods: Localized Flooding		X	

- Increased development in unmapped flood hazard areas could result in a net increase in vulnerability should these areas experience increased stormwater/localized flooding. However, development requirements that require mitigation of stormwater runoff effectively mitigates this hazard.
- Climate change issues may result in more localized flooding as the climate warms and the wetter storms create more runoff.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Landslide and Debris Flows			X

- Over the last couple of years, with the severe drought, much of the vegetation along slopes areas is failing to thrive, thus there is a lack of vegetation to hold soil contributing to the landslide/mudslide potential.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Levee Failure			

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
River/Stream/Creek Bank Erosion			X

- Drought conditions have increase the occurrence of stream bank erosion, with soils drying out and becoming more friable, they tend to slough off the banks causing increased areas of erosion.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Extreme Temperatures - Heat			X

- Climate change issues create the potential for additional heat related impacts in the future.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Extreme Temperatures- Cold and Freeze			

- Over the last five years of mild winters, there has been a notable decrease in vulnerability of Sacramento County to freeze and severe winter storms.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Fog		X	

- This low priority hazard has not changed over the last five years.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Severe Weather: Heavy Rains and Storms	X		

- Over the last five years of mild winters, there has been a notable decrease in vulnerability of Sacramento County to heavy rains and storms. However, climate change bring renewed concern moving forward for heavy rains, storms and associated issues to the County.
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2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Winds and Tornadoes			

-

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Subsidence			

- Drought conditions have contributed to increased subsidence statewide. In Sacramento County, this is likely more of a Delta issue where subsidence concerns have actually decreased with the implementation of better farming practices over the years.
-

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Volcano		X	

- This low priority hazard has not changed over the last five years.

2016 LHMP Update Hazards	Decrease in Vulnerability	No Change in Vulnerability	Increase in Vulnerability
Wildfire			X

- Compounded by current drought conditions, the wildfire hazard has substantially increased and is no longer just a seasonal issue. The wildfire season, including the potential for a catastrophic wildfire, is now a year around concern.
- The vulnerability of Sacramento County to increased occurrence of a devastating wildfire has increased as exacerbated by the recent drought, increases in tree mortality, and overall increase in wildfire conditions.
- The increased development in WUI areas within the County also contributes to an increase in vulnerability.
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Multi-hazard Considerations

- With new areas of development identified within the County and within the incorporated communities, requirements for new development will consider various hazard constraints and mitigation measures to govern ultimate development and buildout of these areas. Changes in development that have occurred in hazard prone areas and have increased or decreased the vulnerability of the Planning Area,

development planned or under the consideration of the participating jurisdictions, and other conditions that may affect the risks and vulnerabilities of the Planning Area such as climate change variables are documented and considered in this Plan Update.

A.2 Sacramento County Step 2: Involve the Public

Multiple efforts were made to engage the public during the creation of this plan, including direct outreach efforts such as phone calls, emails, direct mailings, and face-to-face meetings, in addition to the broader outreach efforts such as e-newsletters, website postings, newspaper advertisements and articles, and leveraging other community events to communicate and invite participation in the LHMP Update project. A key element of public participation is including members of the public and other public-type stakeholders (at 50% participation) on the Hazard Mitigation Planning Committee as part of the Steering Committee to the HMPC.

a) List of Steering Committee Members

Community/Representative	Department/Organization	Citizen	Stakeholder	# Meetings
Sacramento County				
George Booth	Department of Water Resources		X	4
City of Citrus Heights				
Kevin Becker	Department of Public Works/Principal Engineer		X	2
City of Elk Grove				
Connie Nelson			X	5
City of Folsom				
Allan Laca	Department of Public Works/Sr. Civil Engineer		X	4
City of Galt				
Bill Forrest	Department of Public Works/Sr. Civil Engineer		X	4
Town of Isleton				
Romi Balbini	Director of Public Works		X	4
City of Rancho Cordova				
Allen Quynn	Department of Public Works/Assoc. Civil Engineer		X	5
City of Sacramento				
Kelly Sherfey	Department of Utilities, Floodplain Management/Engineering		X	5
Permanent Public Stakeholders				
Robert Mead	Resident	X		5
Chris Ferrari	Resident/GEI	X		4
Walt Hope	Resident	X		4
Meg Arnold	Valley Vision	X	X	3
Alan Vail	Resident/VCS Consulting	X		3

Community/Representative	Department/Organization	Citizen	Stakeholder	# Meetings
Tim Hodgson	Resident	X		3
Maria Lorenzo-Lee	Resident	X	X	3
Richard Coombs	Campus Commons/Nepenthe Insurance, Legal & Safety	X	X	4
Dan Henderson	ESRI	X	X	2
Mike Miramazehere	GEI Consultants	X	X	2
Connie Gutowsky	Resident	X		2
Other Public Stakeholders:				
Sami Nall	Cal DWR	X	X	1
Kirkland Stout	Sacramento State	X		1
Amber Mace	UC Davis	X	X	1
Kathleen Ave	Cap Region Climate Readiness/SMUD	X	X	1
Bill Virvitch	Resident	X		1
Ross Dibble	Resident	X		1
Joyce Dibble	Resident	X		1
Pam Hodgson	Resident	X		1
Tim Franesich	Resident	X		1
Paul Franusicl	Resident	X		1
Homer Herod	Resident	X		1
Bob Berger	Resident	X		1
Peter Stone	Resident	X		1
Heinz Lorza Saberig	Resident	X		1
Emmerson Zapata	Resident	X		1
Lance Armstrong	Resident	X		1
Charlie Moore	Resident	X		1
Karla Tejada	Golden State Western Company	X	X	1
George Whitney	Resident	X		1
Colin Bailey	Env. Justice Coalition for Water	X	X	1
Frederick Gayle	Resident	X		1
Russ Ekman	State DWR MA09	X	X	1

b) and c) Public Meetings

Meeting Type	Meeting Topic	Meeting Date	Meeting Locations
Early Public Meetings	1) Intro to DMA, CRS and mitigation planning 2) 2016 LHMP Update Process	4/5 & 6, 2016	South Natomas Community Center, Sacramento and Laguna Town Hall, Elk Grove
Delta HMPC/Community Meeting	1) Introduction to DMA and the planning process 2) Risk assessment overview and work session 3) Emergency Action Planning Status	6/21, 2016	Courtland Fire House, Hood/Courtland
Final Public Meetings	1)Presentation of Draft LHMP and solicitation of public and stakeholder comments	10/ 15 & 16, 2016	Courtland Fire House, Hood/Courtland and Laguna Creek High School, Elk Grove

Press Release for Early Public Meeting

Robert B. Leonard
Chief Deputy County Executive

Department of Water Resources
Michael L. Peterson, Director

Navdeep S. Gill
Interim County Executive

County of Sacramento

Sacramento County Local Hazard Mitigation Plan Update: Kickoff meeting

HELP YOUR COMMUNITY TO BE HAZARD-READY

Sacramento, CA: Sacramento County is partnering with the City of Sacramento, other local incorporated cities and special districts to update their joint Local Hazard Mitigation Plan (LHMP). Flood and fire are just two of the hazards to our local communities. A LHMP forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Communities with a FEMA- approved LHMP are eligible for pre- and post-disaster FEMA grant funding and for lower costs of flood insurance to residents through in the National Flood Insurance Program's (NFIP) Community Rating System (CRS).

The people most aware of potential hazards are the people that live and work in the affected communities- *like you.* We are seeking members of the public to participate on our LHMP update planning committee. Your commitment would involve the following:

- Attending 5 afternoon meetings over the next 6 months
- Reviewing and providing comments on the plan drafts via email

Initial Planning Committee and public information meetings will be held in the following locations; please select the date and location that works best for you.

April 5, 2016
Planning Committee 2pm-5pm
Public Information Meeting 6pm-7:30pm
Laguna Town Hall
3020 Renwick Ave,
Elk Grove, CA 95758

April 6, 2016
Planning Committee 2pm-5pm
Public Information Meeting 6pm-7:30pm
South Natomas Community Center, Room
2921 Truxel Rd,
Sacramento, CA 95833

If you are interested in volunteering as a Planning Committee member, please send your RSVP to Celine Livengood at 916-874-3130 or email at livengood@saccounty.net. You may also contact Celine if you have any questions.
For more information and to review the current Hazard Mitigation Plan document, please go to StormReady.org and follow the link to Local Hazard Mitigation Plan 2016.

LHMP Kickoff Meeting Public Notifications and Invites

From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:16 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Delta - CMAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CMAC - Delta Citizen Municipal Advisory Council (1125 recipients)

You are receiving this email because you are signed up to receive updates on issues that may affect your community.

Sacramento County is partnering with the City of Sacramento, and other incorporated cities and special districts to update the **Local Hazard Mitigation Plan (LHMP)**. The update relies on information from people most aware of potential hazards within Sacramento County, people that live and work in the affe communities, like you.

Please visit the following website to view the "Apr 2016" flyer for information regarding the **initial pul information meetings** being held on both **April 5 and April 6, 2016 from 6:00 – 7:30 pm**.

http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Comm 2016-Plan-Update.aspx

If you have any questions regarding the update, please contact Celine Livengood at 916-874-3130 or by email at livengood@saccounty.net.

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:17 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Arden Arcade Community Planning Advisory Council Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - Arden Arcade Community Planning Advisory Council (1977 recipients)

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:18 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Carmichael/Old Foothill Farms - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - Carmichael/Old Foothill Farms Community Planning Advisory Council (1882 recipients)

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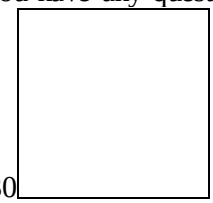
If you have any questions regarding the update, please contact Celine Livengood at 916-874-



3130 or by email at livengood@saccounty.net.

From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:18 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
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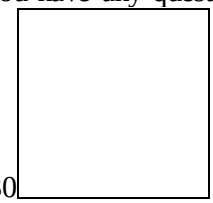

3130 or by email at livengood@saccounty.net.

From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:19 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Cosumnes - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - Cosumnes Community Planning Advisory Council (1372 recipients)

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:19 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Fair Oaks - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - Fair Oaks Community Planning Advisory Council (1634 recipients)

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:20 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Natomas - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - Natomas Community Planning Advisory Council (1646 recipients)

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:20 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: North Highlands/Foothill Farms - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - North Highlands/Foothill Farms Community Planning Advisory Council (1438 recipients)

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Sent: Thursday, March 24, 2016 4:20 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: North Highlands/Foothill Farms - CPAC Update

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:22 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Rio Linda / Elverta - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - Rio Linda / Elverta Community Planning Advisory Council (1375 recipients)

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:23 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Southeast Area - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - Southeast Area Community Planning Advisory Council (1281 recipients)

You are receiving this email because you are signed up to receive updates on issues that may affect you community.

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:23 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: South Sacramento - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - South Sacramento Community Planning Advisory Council (1874 recipients)

You are receiving this email because you are signed up to receive updates on issues that may affect you community.

Sacramento County is partnering with the City of Sacramento, and other incorporated cities and special districts to update the **Local Hazard Mitigation Plan (LHMP)**. The update relies on information from people most aware of potential hazards within Sacramento County, people that live and work in the affe communities, like you.

Please visit the following website to view the "Apr 2016" flyer for information regarding the **initial pul information meetings** being held on both **April 5 and April 6, 2016 from 6:00 – 7:30 pm**.

http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Comm 2016-Plan-Update.aspx

If you have any questions regarding the update, please contact Celine Livengood at 916-874-3130 or by email at livengood@saccounty.net.

Sign up to receive the latest news from Sacramento County.

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:24 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Vineyard - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - Vineyard Community Planning Advisory Council (1380 recipients)

You are receiving this email because you are signed up to receive updates on issues that may affect you community.

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http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Comm 2016-Plan-Update.aspx

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From: Sacramento County, CA [mailto:casacram@service.govdelivery.com]
Sent: Thursday, March 24, 2016 4:23 PM
To: Andis. Chris; Terry. Vickie; Bongiorno. Brenda; Cooksey. Gloria; Fong. Mimi; Gillen. Tonja; Klink. Donna
Subject: Courtesy Copy: Southeast Area - CPAC Update

This is a courtesy copy of an email bulletin sent by Tonja Gillen.

This bulletin was sent to the following groups of people:

Subscribers of CPAC - Southeast Area Community Planning Advisory Council (1281 recipients)

You are receiving this email because you are signed up to receive updates on issues that may affect you community.

Sacramento County is partnering with the City of Sacramento, and other incorporated cities and special districts to update the **Local Hazard Mitigation Plan (LHMP)**. The update relies on information from people most aware of potential hazards within Sacramento County, people that live and work in the affe communities, like you.

Please visit the following website to view the "Apr 2016" flyer for information regarding the **initial pul information meetings** being held on both **April 5 and April 6, 2016 from 6:00 – 7:30 pm**.

http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Comm 2016-Plan-Update.aspx

If you have any questions regarding the update, please contact Celine Livengood at 916-874-3130 or by email at livengood@saccounty.net.

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Paid Advertisement for Early Public Meeting in the Sacramento Bee

From: Rhea Serran
To: Connie Perkins; Kelly Sherfey
Subject: Fwd: Follow-up from Bee Media-Final Proof
Date: Thursday, March 31, 2016 4:39:11 PM
Attachments: SP59669 (1).PDF
ATT00001.htm

FYI

Rhea Serran, Public Information Officer
Media and Public Affairs
City of Sacramento
O: 916-808-5594
C: 916-897-7654
www.cityofsacramento.org

Begin forwarded message:

From: "Orosco, Phyllis" <porosco@sacbee.com>
To: "Kristy Lai" <KLai@cityofsacramento.org>, "Rhea Serran" <RSerran@cityofsacramento.org>
Subject: Follow-up from Bee Media-Final Proof

Here you go. This will run tomorrow.

Regards,

--
Phyllis Orosco
Sales Executive, Multimedia Advertising Division
O: 916.321.1488 *F:* 916.326-5595 *C:* 209.639.4404
The Sacramento Bee | 2100 Q Street | Sacramento , CA 95816

From: Rhea Serran
To: Council-All; Executive-Team; CManager - All
Cc: Bobby Mann; Benjamin A. Sosenko; Carlos Eliason; Marycon Raza; Chris Hobson; Morse, Doug; Erin Treadwell; Gina Knepp; Harvey, Christopher; Swafford, Jena; Brown, Justin; Kelli Trapani; Natasha Greer; Wendy Klock-Johnson; Linda Tucker; Susan Goodison; Dan Sherry; Michael Malone; Jim Peifer; Bill Busath; Drew Farmer; Joe Robinson; Kelly Sheffey; Connie Perkins
Subject: Media Release: Sacramento County Local Hazard Mitigation Plan Update: Kickoff meeting
Date: Thursday, March 31, 2016 10:18:40 AM

Good morning,

The following announcement will be sent to the media today. The City, in partnership with Sacramento County and surrounding cities, is updating the countywide Local Hazard Mitigation Plan.

--

Sacramento County Local Hazard Mitigation Plan Update: Kickoff meeting

FEMA defines Hazard Mitigation as any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards. While natural hazards cannot be prevented, a Hazard Mitigation Plan forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction.

Sacramento County is partnering with the Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and several special districts to update their countywide 2010 Local Hazard Mitigation Plan (LHMP).

Communities with a FEMA- approved LHMP are eligible for FEMA pre- and post-disaster grant funding and for lower costs of flood insurance to residents through the National Flood Insurance Program's (NFIP) Community Rating System (CRS).

The 2016 LHMP Update is a multi-jurisdictional effort being developed by a planning committee comprised of representatives from various County and City departments; neighboring jurisdictions, key federal state and local agency stakeholders, and the public.

To be part of our planning committee your commitment would involve the following:

- Attending 5 afternoon meetings over the next 6 months
- Reviewing and providing comments on the plan drafts via email

Kickoff meetings will be held in the following locations; please select the date and location that works best for you.

April 5, 2016
Planning Committee 2pm-5pm
Laguna Town Hall
3020 Renwick Ave,
Elk Grove, CA 95758

April 6, 2016
Planning Committee 2pm-5pm
South Natomas Community Center, Room
2921 Truxel Rd,
Sacramento, CA 95833

Planning Committee Meeting will be followed by an informational evening meeting for the general public from 6:00 to 7:30. You are welcome to attend the evening meetings as well, but your attendance is not required.

Please RSVP and plan on attending this important planning process. For additional information, contact Celine Livengood at 916-874-3130 or email at livengood@saccounty.net.

For more information and a copy of the Hazard mitigation Plan, please go to Saccounty.net and type Local Hazard Mitigation Plan in the search window at the top of the page.

##

Rhea Serran, Public Information Officer
Media and Public Affairs
City of Sacramento
O: 916-808-5594
C: 916-897-7654
www.cityofsacramento.org

CEOs, activists urge N. Carolina to repeal new transgender law

The Associated Press

RALEIGH, N.C.

North Carolina's governor met Thursday with gay-rights advocates bearing a letter signed by more than 100 corporate executives urging him to repeal the nation's first state law limiting the bathroom options for transgender people.

The law also excludes lesbian, gay, bisexual and transgender people from anti-discrimination protections, and it blocks municipalities from adopting their own anti-discrimination and living wage rules.

The governor "appreciated the opportunity to sit down and deal with these complex issues through conversation and dialogue as opposed to political threats and economic retaliation," his spokesman, Josh Ellis, said in a statement.

The advocates declined to describe Gov. Pat McCrory's response.

Some companies are already reconsidering doing business in the country's ninth-largest state.

New Jersey-based Braeburn Pharmaceuticals said it is "re-evaluating our options based on the recent, unjust legislation" whether to build a $20 million manufacturing and research facility in Durham County. The 50 new jobs paying an average of nearly $76,000 a year were announced two weeks ago.

Lionsgate, the California-based entertainment company, had been lining up hotel and equipment rentals and hiring more than 100 workers in North Carolina but decided to shoot its pilot episode for a comedy series in Canada instead, said Jennifer Irvine, a Charlotte production coordinator.

Charlotte convention officials and the organizers of one of the world's largest furniture markets say some customers have pulled out, also citing the new law.

Changing business plans is much more difficult for companies with existing investments in buildings, equipment and people, but the outsized lobbying power of major corporations could reshape how prospective talent and investors perceive North Carolina as a place they want to be, business observers said.

City of
SACRAMENTO
Get Involved!
HELP YOUR COMMUNITY BE HAZARD-READY

Sacramento, CA: The regional Local Hazard Mitigation Plan will be updated by a coordinated effort between the County of Sacramento, the City of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and many special districts within the County. Flood, drought, fire, earthquakes, and severe weather are just a few of the hazards to Sacramento communities. While natural hazards such as these cannot be prevented, a Hazard Mitigation Plan forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Additionally, only communities with a FEMA-approved Hazard Mitigation Plan are eligible to apply for both pre- and post-disaster grant funding.

Another benefit of this plan update is to enhance the floodplain management programs of Sacramento communities which can help reduce the costs of flood insurance to residents of the City of Sacramento and Sacramento County through participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS).

The people most aware of potential hazards are the people that live and work in the affected communities. In addition to plan participation by local, state and federal agencies, the community is seeking enthusiastic, community-minded residents to be part of our Local Hazard Mitigation Plan Update. We encourage attendance and participation from the general public in both our planning and public meetings.

The initial planning and public meetings will be held at the following locations. Please select the date and location that works best for you.

April 5, 2016
Planning Committee 2pm-3pm
Public Meeting 6pm-7:30pm
Laguna Town Hall
3020 Renwick Ave,
Elk Grove, CA 95758

April 6, 2016
Planning Committee 2pm-3pm
Public Meeting 6pm-7:30pm
South Natomas Community Center, Conference Room
2921 Truxel Rd,
Sacramento, CA 95833

You also have the opportunity to volunteer as a planning committee member for our Plan update. As a committee member, your commitment would involve the following:

- Attending 5 afternoon meetings over the next 6 months
- Reviewing and providing comments on the plan drafts via email

If you are interested in volunteering as a Planning Committee member, please send your RSVP to Celine Livengood at 916-874-3130 or email at livengoodc@saccounty.net

For more information and to review the current Hazard Mitigation Plan document, please go to StormReady.org and follow the link to Local Hazard Mitigation Plan, 2016.

Agenda for Early Public Meeting

SACRAMENTO COUNTY
LOCAL HAZARD MITIGATION PLAN (LHMP) UPDATE
PUBLIC MEETING #1
APRIL 5 & 6, 2016

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. National Flood Insurance Program's (NFIP) Community Rating System Overview
4. Hazard Identification and Profiles
5. Mitigation Strategy
6. Opportunities for Public Participation and Input
7. Questions and Answers

Early Public Meeting Sign in Sheets

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
Public ~~**HMPC/Steering Committee**~~ **Kickoff Meeting #1 (Elk Grove)**
April 5, 2016

Name/Title	Email Address	Phone	City/Organization/ Affiliation
GEORGE BOOTH, SENIOR CE	boothg@saccounty.net	916/874-6494	SACRAMENTO COUNTY WATER AGENCY
Lance Armstrong	lance.egcitizen@gmail.com	916-685-3945	Elk Grove Citizen √

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
Early Public Meeting #1 (Natomas)
April 6, 2016

Name/Title	Email Address	Phone	City/Organization/ Affiliation
NO OUTSIDE Attendees – All public attended planning Team Meetings			

Final Public Meeting Press Release

Comment on Your Community's Local Hazard Mitigation Plan!

HELP YOUR COMMUNITY BE HAZARD-READY

Sacramento County is partnering with the City of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and several special districts to update their multi-jurisdictional Local Hazard Mitigation Plan (Plan). Flood, drought, fire, earthquakes, and severe weather are just a few of the hazards to Sacramento communities. While natural hazards such as these cannot be prevented, a Hazard Mitigation Plan forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Additionally, only communities with a FEMA- approved Hazard Mitigation Plan are eligible to apply for both pre- and post-disaster grant funding.

Another benefit of this plan update is to enhance the floodplain management programs of Sacramento communities. This can help reduce the costs of flood insurance to residents through a jurisdiction's participation in the National Flood Insurance Program's (NFIP) Community Rating System (CRS).

The process began in April 2016 with an initial public meeting and the establishment of a planning committee comprised of participating jurisdictions; local, state, and federal agencies; and other key stakeholders and members of the public. The plan is scheduled to be finalized and submitted to Governor's Office of Emergency Services and Federal Emergency Management Agency in November 2016.

Public Review Draft

The Public Review Draft of the LHMP Update is available (in printed copy) at the following Sacramento area libraries: Central Branch and Fair Oaks Branch. The address of the libraries and library hours are located at: www.saclibrary.org. The Public Review Draft is also available online (pdf format), go to StormReady.org and follow the link to Local Hazard Mitigation Plan, 2016.

Open Public and Planning Team Meetings

Final meetings to review and provide comments on the Public Review Draft LHMP Update are scheduled as follows:

Public Meetings:

November 15, 2016, 6:00-7:30 pm
South Natomas Community Center
Conference Room
2921 Truxel Road
Sacramento, CA 95833

November 16, 2016, 6:00-7:30 pm
Laguna Creek High School, Career Room
9050 Vicino Drive
Elk Grove, CA 95758

Planning Team Meetings:

November 16, 2016, 9:00-11:00 am
South Natomas Community Center
Conference Room
2921 Truxel Road
Sacramento, CA 95833

November 17, 2016, 9:00-11:00 am
Hood/Courtland Fire House (Station 2)
1125 Hood Franklin RD
Hood, CA 95639

We encourage attendance and participation from the general public in either our planning or public meetings. Please select the date and location that works best for you.

Comments on the Public Review Draft due by November 18, 2016

There are several options for providing comments on the LHMP Public Review Draft:

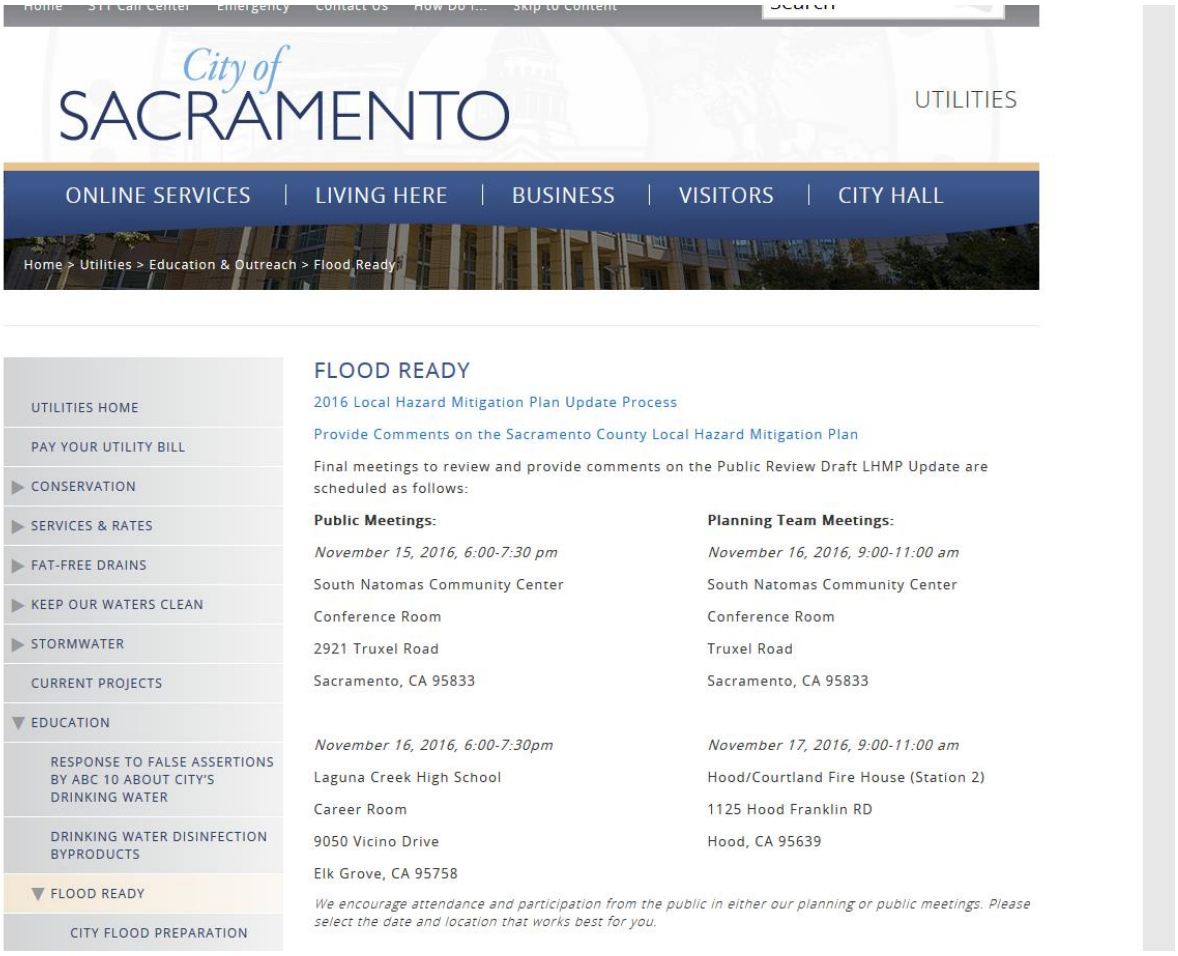
- Email comments to Jeanine.foster@fostermorrison.com or LivengoodC@saccounty.net
- Drop off written comments or send by mail to: Sacramento County Department of Water Resources, Attn: Celine Livengood, 827 Seventh Street, Room 301, Sacramento, CA 95814
- Bring comments to one of the meetings

For More Information

Contact Celine Livengood at 916-874-3130 or email at livengood@saccounty.net.

Final Public Meeting Social Media Outreach

City of Sacramento Website Announcement for Final Meeting



City of SACRAMENTO

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Home > Utilities > Education & Outreach > Flood Ready

- UTILITIES HOME
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- CONSERVATION
- SERVICES & RATES
- FAT-FREE DRAINS
- KEEP OUR WATERS CLEAN
- STORMWATER
- CURRENT PROJECTS
- EDUCATION
  - RESPONSE TO FALSE ASSERTIONS BY ABC 10 ABOUT CITY'S DRINKING WATER
  - DRINKING WATER DISINFECTION BYPRODUCTS
  - FLOOD READY
    - CITY FLOOD PREPARATION

FLOOD READY

2016 Local Hazard Mitigation Plan Update Process

Provide Comments on the Sacramento County Local Hazard Mitigation Plan

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Hood/Courtland Fire House (Station 2)
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Hood, CA 95639

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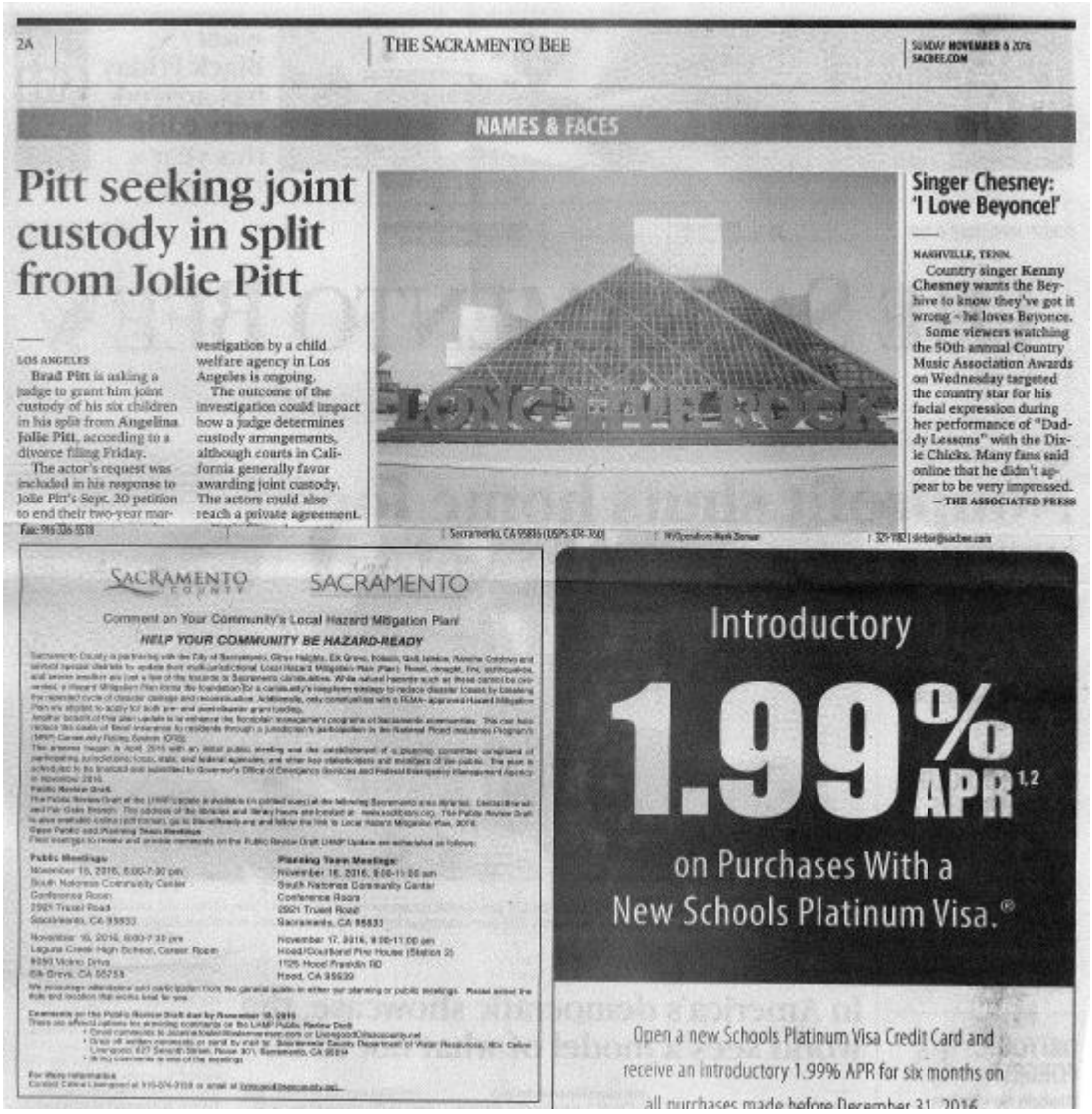
Paid Advertisements for Final Public Meetings: Sac Bee and Elk Grove Citizen



2A | THE SACRAMENTO BEE | SUNDAY NOVEMBER 6 2016 SACBEE.COM

NAMES & FACES

Pitt seeking joint custody in split from Jolie Pitt

LOS ANGELES

Brad Pitt is asking a judge to grant him joint custody of his six children in his split from Angelina Jolie Pitt, according to a divorce filing Friday.

The actor's request was included in his response to Jolie Pitt's Sept. 20 petition to end their two-year mar-

vestigation by a child welfare agency in Los Angeles is ongoing.

The outcome of the investigation could impact how a judge determines custody arrangements, although courts in California generally favor awarding joint custody. The actors could also reach a private agreement.

Singer Chesney: 'I Love Beyonce!'

NASHVILLE, TENN.

Country singer Kenny Chesney wants the Beyhive to know they've got it wrong – he loves Beyonce.

Some viewers watching the 50th annual Country Music Association Awards on Wednesday targeted the country star for his facial expression during her performance of "Daddy Lessons" with the Dixie Chicks. Many fans said online that he didn't appear to be very impressed.

– THE ASSOCIATED PRESS

SACRAMENTO COUNTY SACRAMENTO

Comment on Your Community's Local Hazard Mitigation Plan!

HELP YOUR COMMUNITY BE HAZARD-READY

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In the Superior Court of the State of California

IN AND FOR THE

COUNTY OF Sacramento

Certificate of Publication of

PUBLIC NOTICE

State of California
SS.
County of SACRAMENTO

I, DAVID R. HERBURGER, certify on penalty of perjury:

PUBLIC NOTICE

Comment on Your Community's Local Hazard Mitigation Plan!
HELP YOUR COMMUNITY BE HAZARD-READY

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Conference Room
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November 16, 2016, 6:00-7:30 pm
Laguna Creek High School, Career Room
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Elk Grove, CA 95758

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Sacramento, CA 95833

November 17, 2016, 9:00-11:00 am
Hood/Courtland Fire House (Station 2)
1125 Hood Franklin RD
Hood, CA 95639

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- Drop off written comments or send by mail to: Sacramento County Department of Water Resources, Attn: Celine Livengood, 827 Seventh Street, Room 301, Sacramento, CA 95814
- Bring comments to one of the meetings

For More Information
Contact Celine Livengood at 916-874-3130 or email at livengood@saccounty.net.
November 9, 2016

EGW

4887

That affiant is and at all times hereinafter mentioned was a citizen of the United States, over the age of eighteen years and was at and during all said times the printer and publisher of THE ELK GROVE CITIZEN, a newspaper published in Elk Grove, County of Sacramento, State of California; that said newspaper is and was at all times herein mentioned, a newspaper of general circulation as that term is defined by Sections 6000 and 6001 of the Government Code of the State of California, and as provided by said sections is and was at all times herein mentioned published for the dissemination of local and telegraphic news and intelligence of a general character, having a bona fide subscription list of paying subscribers, and is not and was not during all said times devoted to the interests or published for the entertainment or instruction of a particular class, profession, trade, calling, race or denomination, or for the entertainment and instruction of any number of such classes, professions, trades, callings, races or denominations; that at all said times said newspaper has been established, printed and published in said Sacramento County and State, at regular intervals for more than one year preceding the first publication of the NOTICE herein mentioned; that said NOTICE was set in type not smaller than nonpareil and was preceded with words printed in black face type not smaller than nonpareil describing and expressing in general terms the purport and character of the notice intended to be given; that the NOTICE in the above entitled matter, of which the annexed is a true printed copy, was published in said newspaper on the following dates, to wit:

NOVEMBER 9, 2016

that the date of the first publication of said

PUBLIC NOTICE

in said newspaper is NOVEMBER 9, 2016

DAVID R. HERBURGER

THE ELK GROVE CITIZEN

Dated: NOVEMBER 9, 2016

Final Public Meeting Agenda

SACRAMENTO COUNTY

AGENDA
Sacramento County
Local Hazard Mitigation Plan (LHMP) Update
Final Public Meetings: November 15 & 16, 2016

1. Introductions
2. Overview/Status of the LHMP Update Process
3. Overview of the Sacramento County Risk Assessment/Mitigation Strategy
4. Public Comments/Input
5. Next Steps

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
Final Public Meetings (Sacramento)
November 15, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Jeanine Foster	jeanine.foster@fostermorrison.com	303 717-7171	Foster Morrison
GEORGE BOOTH			SACRAMENTO County
KELLY SHERFEY	KSHERFEY@CITYOFSACRAMENTO.ORG	916-808-2539	CITY OF SACRAMENTO

SIGN-IN SHEET
Sacramento County
LOCAL HAZARD MITIGATION PLAN UPDATE PROJECT
Final Public Meetings (Elk Grove)
November 16, 2016

Name/Title	Email Address	Phone	Jurisdiction/Organization/ Affiliation
Joyce Dibble	jedibble@gmail.com	916-627-1849	homeowner
Ross Dibble	redibble@gmail.com	"	"
Jeanine foster	jeanine.foster@fostermorrison.com	303 717-7171	foster Morrison
Celine Livengood	livengoodc@saccounty.net	(916)874 3130	sac co dwr

(d) Other Public Outreach Efforts

Due to the multijurisdictional nature of this plan update, all public outreach activities described in this section were conduction in coordination with and on behalf of all participating jurisdictions, including the Sacramento County and the City of Sacramento, the two current CRS communities and other incorporated Sacramento communities considering participation in the CRS program.

Effort	Description
Public Outreach Flyer	An initial public outreach flyer was developed for use at all public events and meetings. A second public outreach flyer was developed for public outreach on the draft plan and prior to final HMPC and public meetings. These flyers are referenced below in these other public outreach activities.
Article in Newspaper	An article was published in the Elk Grove Citizen after the Kickoff meetings to make citizens in the County aware of the hazard mitigation update process and invite participation and attendance at upcoming HMPC and Public Meetings
Survey	A public survey was posted on the County's website at the beginning of the planning process inviting the public to comment on how prepared both the County and individuals are for a possible natural disaster, including flood events
Sacramento County LHMP Update Website	Information on the Plan update process and location of documents, and final HMPC and public meeting locations were posted on the County website. Links to the County website were placed on websites from the other incorporated communities. This website also included a link to the Survey.
Delta Area Community & HMPC Meeting	This meeting was held in the Delta area at the Courtland Fire House to provide a local forum for both the participating Delta RDs and the community members to participate in the LHMP Update process.
SAFCA Assessment Meetings – Joe Mims Jr. Comm. Center, May 11, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, representatives of the American River Flood Control District, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – George Sim Comm. Center, May 11, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – Johnson Comm. Center, May 12, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, representatives of the American River Flood Control District, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – South Natomas Comm. Center, May 12, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, RD 1000, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – Heron School, May 17, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, RD 1000, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.

Effort	Description
SAFCA Assessment Meetings – Clunie Comm. Center, May 17, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, American River Flood Control District, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – Elks Lodge #6, May 18, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meetings – Samuel Pannell Comm. Center, May 18, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meeting – Sierra 2 Center, May 19, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
SAFCA Assessment Meeting – Sierra Oaks Elementary School, May 19, 2016	Targeted community meeting to discuss flood control assessment and discuss flood risk to the community. This meeting was attended by City of Sacramento Staff, SAFCA staff, American River Flood Control District, and the Public. Information (Public Outreach Flyer) on the LHMP Update process and how to get involved was distributed at these meetings.
Bay Stone Lake Community Meeting	This meeting was held in the Bay Stone Lake Community area on August 30th, 2016 to discuss mitigation options for area residents in flood prone areas. The meeting started with a discussion of the LHMP Update and mitigation options such as home elevation.
Sacramento County Storm Water Quality Division Exhibit at State of California, Green Fair Event	Sacramento Water Quality Division had an exhibit at the State of California, Department of Technology, Green Fair Event in Rancho Cordova. This meeting targeted state employees. The exhibit included information on the LHMP Update process and how to get involved. The public information flyer was included as a handout.
Public Outreach at Sacramento County Public Library, Sacramento County Main Library location	The County placed the draft plan in the reference section at the Sacramento County Public Library, Main Library location. Invitations were placed on Facebook, the County website, and as part of the advertisement for public meetings to let the public know that the documents were there for review and input.
Public Outreach at Sacramento County Public Library, Sacramento County Elk Grove Library location	The County placed the draft plan in the reference section at the Sacramento County Public Library, Elk Grove Library location. Invitations were placed on Facebook, the County website, and as part of the advertisement for public meetings to let the public know that the documents were there for review and input.
Supervisor Kennedy's Public Meeting Fern Bacon Middle School, October 27, 2016	A brief overview of the LHMP plan update was given by the Sacramento County Department of Water Resources at this Supervisor's public meeting and the LHMP public information flyer was provided to meeting attendees. This flyer provided information on where and how the Public Review Draft could be reviewed, information on upcoming public meetings on the draft plan, and how to provide comments. County DWR also provided 500 Storm Ready Kits to attendees.
Directed email Outreach to Sacramento Residents	November 2, directed email to Sacramento residents previously showing interest in the LHMP Update process. This email requested a review and comment on the LHMP Public Review Draft and participation in the Hazard Survey.

Public Outreach Flyer

SACRAMENTO COUNTY

Help Reduce Disaster Losses in Your Community by Participating in the Sacramento County Local Hazard Mitigation Plan Update

Sacramento County is developing a Local Hazard Mitigation Plan (LHMP) Update to their 2011 plan. The purpose of this LHMP Update is to assess risk to natural hazards, implement actions to reduce future losses, and maintain eligibility for federal mitigation funds in accordance with the Disaster Mitigation Act of 2000. Partners in this planning effort include the incorporated communities of the City of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, Isleton, and Rancho Cordova and many special districts throughout the County.

What is Hazard Mitigation?

Hazard mitigation means any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.

Why is Natural Hazard Mitigation Important?

Most people who live or work in Sacramento County have been affected by natural hazards in one way or another. Sacramento County and its residents are vulnerable to a variety of hazards including floods, levee failure, drought, wildfire, and other severe weather events.

The rising costs associated with disaster response and recovery have focused the attention of federal, state, and local governments on addressing natural hazards before they occur. Obviously, torrential rains and floods cannot always be prevented from occurring. Planning for natural hazards and implementing mitigation measures, however, can reduce the impact of such events when they do occur. Emergency response and recovery costs; property damage; personal injury and loss of life; and the overall economic and social impact on the community can all be reduced, and in some instances eliminated through natural hazard mitigation.

Hazard Mitigation Plan and Plan Update Process

After securing Federal Emergency Management Agency (FEMA) mitigation grant funding, Sacramento County is using the funds to support an update of the 2011 LHMP. This LHMP Update is being developed by a Hazard Mitigation Planning Committee comprised of representatives from various County and City departments; neighboring jurisdictions, key federal, state, and local agency stakeholders and the public.

The plan will address an updated list of hazards, will assess the likely impacts of these hazards to the people and assets of the Sacramento County planning area, and will also establish updated goals and prioritize projects to reduce the impacts of future disasters on people and property as well as to critical facilities and infrastructure.

Another benefit of mitigation planning is that it can also help lessen the cost of flood insurance to the residents of Sacramento County and the City of Sacramento through FEMA's National Flood Insurance Program's (NFIP) Community Rating System.

National Flood Insurance Program's Community Rating System

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions in meeting the goals of the CRS Program. The reduction in flood insurance premium rates is provided according to a community's CRS classification. Sacramento County is currently a CRS Class 3, which provides a 35 percent discount on flood insurance for those located within the special flood hazard area (SFHA) and a 10 percent discount for those located in non-SFHA areas. The City of Sacramento is a CRS Class 5 providing a 25 percent discount on residents located in the SFHA and also a 10 percent discount for non –SFHA areas. Participation by these communities in CRS results in over $2.5 million in annual savings to area residents on the cost of their flood insurance premiums.

Opportunities for Input

Members of the community have a very important role in this process. A draft of the LHMP Update will be available mid October 2016 for review and comment by the public and all interested stakeholders on the County website and in select public libraries. Public meetings on the Draft Plan and final planning team meetings will also occur in early November 2016. All interested stakeholders and members of the public are welcome to attend.

For more information on this project and how you can get involved, go to **StormReady.org** and follow the link to Local Hazard Mitigation Plan, 2016 or contact the following individuals:

Celine Livengood/Mark Rains	**Jeanine Foster**
Sacramento County Department of Water Resources	Foster Morrison Consulting Ltd.
Phone: (916) 874-3130	Phone: (303) 717-7171
livengoodc@saccounty.net; rainsm@saccounty.net	jeanine.foster@fostermorrison.com

And, please take the Survey to let us know your concerns on natural hazards and disasters in Sacramento County: http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Committee-2016-Plan-Update.aspx.

Elk Grove Citizen ONLINE

Today's Weather
Elk Grove, CA

Elk Grove, CA
9:53:00 AM
Clear
69°F
75°F
55°F
9mph
mph
29.86
in.
in.
10mi
NW
Current
forecast...

NEWS

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City joins hazard mitigation plan update

Photo by Lance Armstrong - Jeanine Foster discusses the importance of updating the Local Hazard Mitigation Plan.

By Lance Armstrong - Citizen Staff Writer

Published: Friday, April 8, 2016 10:13 AM PDT

Elk Grove on April 5 joined other Sacramento County cities and special districts in the preliminary steps to update the Local Hazard Mitigation Plan.

The Federal Emergency Management Agency (FEMA) describes hazard mitigation as "any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards."

The local plan, which forms the foundation for a long-term strategy to reduce disaster losses, is required by FEMA under the Disaster Mitigation Act of 2000.

The act requires state and local governments to have a hazard mitigation plan in place.

One of the primary reasons for that requirement is for those cities and districts to maintain their eligibility for FEMA grants and mitigation funding.

Also included among the partners in this planning effort are the incorporated communities of the city of Sacramento, Galt, Isleton, Rancho Cordova, Citrus Heights, Folsom, and many special districts throughout the county.

The current multi-jurisdictional plan was created in 2005 and was last updated in 2010 and 2011. Another requirement of the Disaster Mitigation Act is that the plan be updated every five years.

An essential part of that process is the hosting of Hazard Mitigation Planning Committee and public meetings for the purpose of gathering input and direction for the update.

The committee consists of representatives from various city and county departments, neighboring jurisdictions, federal, state and local agency stakeholders and the public.

Weather patterns relating to such things as floods, and droughts are among the things that influence update changes.

Additionally, many people in the county are vulnerable to the threat of levee failure.

Current efforts consist of impact assessments of an updated list of hazards such as insects and pests pertaining to agriculture, dam failures and earthquakes.

Mitigation planning can also benefit residents in certain parts of the county by lowering the cost of flood insurance through FEMA's National Flood Insurance Program's Community Rating System.

Due to the costs associated with natural disasters, local, state and federal governments have placed much emphasis on addressing preventive measures against these disasters.

Although prevention against such occurrences as torrential rains and floods are not always successful, strategic planning can reduce their impacts, and as a result decrease economic and social effects that they have on communities.

Jeanine Foster, who led the first of the committee and public meetings at Laguna Town Hall on April 5, said that although the update process is early, the public has already showed its interest in providing their input to this project.

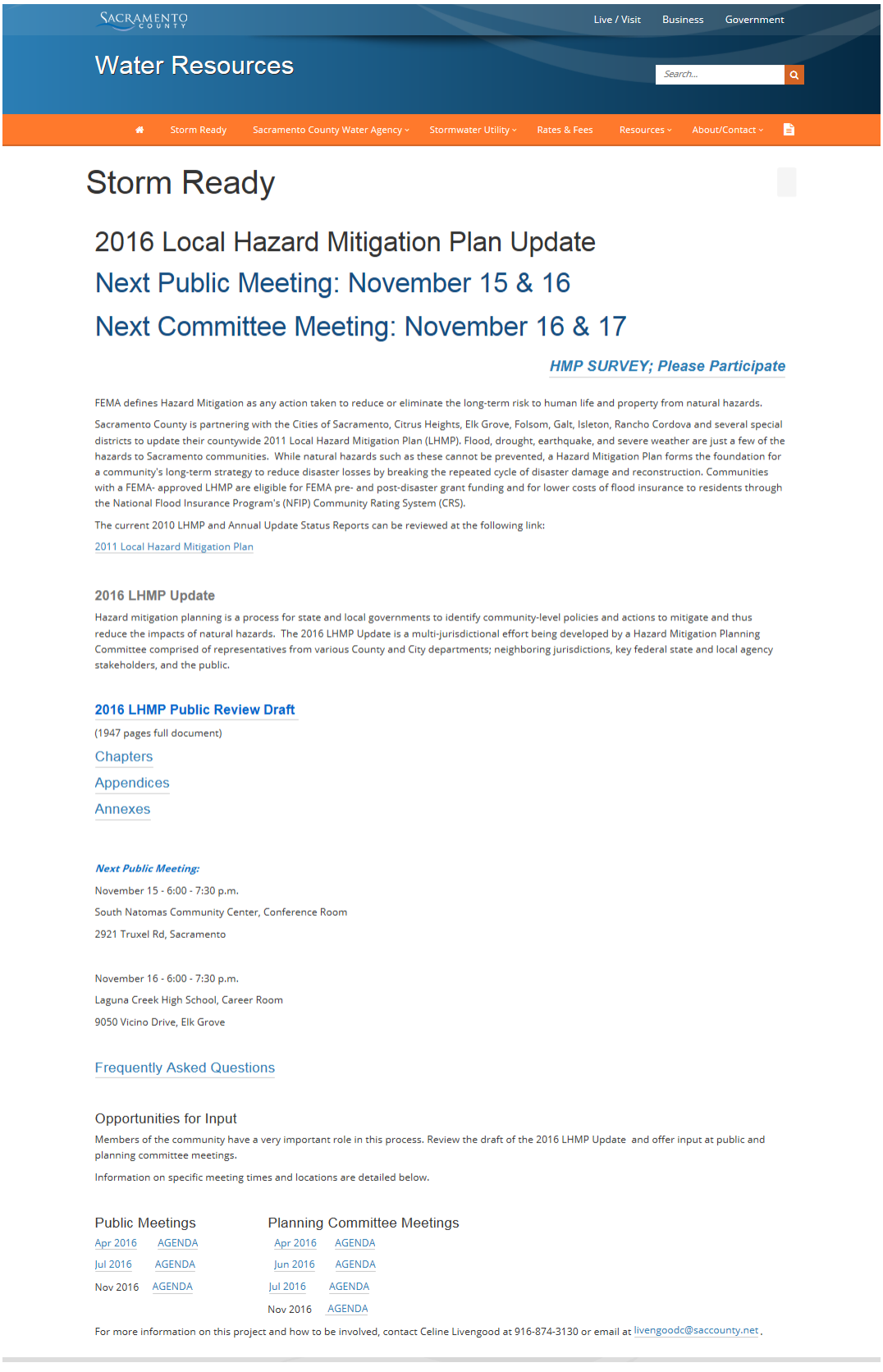
"The public is interested, they're concerned about where they live and the effects of these hazards and they're interested in this process," she said. "The indication is they would like to be part of this plan development process. So, the county and the cities and the districts are really opening this planning process up to input from the public so they can help guide some of the resulting mitigation measures for the plan."

The update process will take about six to 12 months to complete, and the document will eventually be reviewed for approval by the Federal Emergency Management Agency.

Survey


2016 Local Hazard Mitig
jeanine
www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Committee-2016-Plan-Update.aspx
Storm Ready
2016 Local Hazard Mitigation Plan Update
Next Public Meeting: November 15 & 16
Next Committee Meeting: November 16 & 17
HMP SURVEY; Please Participate
FEMA defines Hazard Mitigation as any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.
Sacramento County is partnering with the Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and several special districts to update their countywide 2011 Local Hazard Mitigation Plan (LHMP). Flood

Sacramento County LHMP Update Website



SACRAMENTO COUNTY

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Storm Ready

2016 Local Hazard Mitigation Plan Update

Next Public Meeting: November 15 & 16

Next Committee Meeting: November 16 & 17

HMP SURVEY; Please Participate

FEMA defines Hazard Mitigation as any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.

Sacramento County is partnering with the Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova and several special districts to update their countywide 2011 Local Hazard Mitigation Plan (LHMP). Flood, drought, earthquake, and severe weather are just a few of the hazards to Sacramento communities. While natural hazards such as these cannot be prevented, a Hazard Mitigation Plan forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Communities with a FEMA- approved LHMP are eligible for FEMA pre- and post-disaster grant funding and for lower costs of flood insurance to residents through the National Flood Insurance Program's (NFIP) Community Rating System (CRS).

The current 2010 LHMP and Annual Update Status Reports can be reviewed at the following link:

2011 Local Hazard Mitigation Plan

2016 LHMP Update

Hazard mitigation planning is a process for state and local governments to identify community-level policies and actions to mitigate and thus reduce the impacts of natural hazards. The 2016 LHMP Update is a multi-jurisdictional effort being developed by a Hazard Mitigation Planning Committee comprised of representatives from various County and City departments; neighboring jurisdictions, key federal state and local agency stakeholders, and the public.

2016 LHMP Public Review Draft

(1947 pages full document)

Chapters

Appendices

Annexes

Next Public Meeting:

November 15 - 6:00 - 7:30 p.m.

South Natomas Community Center, Conference Room

2921 Truxel Rd, Sacramento

November 16 - 6:00 - 7:30 p.m.

Laguna Creek High School, Career Room

9050 Vicino Drive, Elk Grove

Frequently Asked Questions

Opportunities for Input

Members of the community have a very important role in this process. Review the draft of the 2016 LHMP Update and offer input at public and planning committee meetings.

Information on specific meeting times and locations are detailed below.

Public Meetings		Planning Committee Meetings	
Apr 2016	AGENDA	Apr 2016	AGENDA
Jul 2016	AGENDA	Jun 2016	AGENDA
Nov 2016	AGENDA	Jul 2016	AGENDA
		Nov 2016	AGENDA

For more information on this project and how to be involved, contact Celine Livengood at 916-874-3130 or email at livengoodc@saccounty.net.

Delta Area Community & HMPC Meeting

Below are the addresses it went to.

'rd1601@frontiernet.net'; 'ssinnock@ksninc.com'; 'cosio@mbkengineers.com'; 'ginny@greeneandhemly.com'; 'rabercrombie@tfewines.com'; 'cosio@mbkengineers.com'; 'pdevereux@rd1000.org'; 'pcarey@water.ca.gov'; 'pwervin@wbecorp.com'; 'henry@wbecorp.com'; 'ckchu52@comcast.net'; 'Glabrie@dccengineering.net'; Booth. George <boothg@SacCounty.NET>; Rains. Mark <rainsm@SacCounty.NET>; Janine Foster (jeanine.foster@fostermorrison.com); 'Courtland Fire' <davidwelch@courtlandfire.com>

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Monday, June 13, 2016 12:36 PM
Subject: EAP & LHMP - Public Meeting

Hello to you all.

With the LHMP Update and the Emergency Action Plan for the south County area going forward concurrently, we want to be certain the Delta community is aware of each process and as involved as they would like to be. Therefore we are planning to host a public meeting in the Delta area the night of Tuesday, June 21st after the LHMP committee meeting. This extra meeting with the public will be held from 6:00pm to 7:30 at the Courtland Fire House on Hood Franklin Road.

Because this meeting will take place very soon and each of you best know the residents and places to put flyers…I'm asking for help in getting the word out about this meeting. I'll have a flyer prepared soon and send it as attachment that you can forward to people or print and pin up in stores, libraries, the marinas or anywhere where it will get noticed.

We'll also try to get a notice in a local paper.

Thank you. Celine

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

All,

I just wanted to clarify the Local Hazard Mitigation Plan meetings for next week and attendance by Reclamation Districts.

We have scheduled two planning team meetings for June 21 and June 22 as follows:

Tuesday, June 21st: 1:00 pm – 4:00 pm
Laguna Creek High School - Career Room
9050 Vicino Dr., Elk Grove, CA 95758

Wednesday, June 22nd: 1:00 pm – 4:00 pm
Bannon Creek Elementary School - Multi-Purpose Room
2775 Millcreek Drive, Sacramento, CA 95833

We have added a third meeting that is a combined planning team/public meeting:

Tuesday, June 21st, 6:00pm to 7:30
Courtland Fire House on Hood Franklin Road

As an RD participating in the LHMP Update, you only need to attend one of these three meetings to get coverage for the LHMP. These meetings will all cover similar information. We are offering multiple meeting times and locations to accommodate everyone's varying schedules.

And, since the meeting Tuesday evening at the Courtland Fire House is also a public meeting for Delta area residents, please encourage anyone from the area to attend.

Please let me know if you have questions.

Thanks very much and hope to see everyone at one of these meetings.

Jeanine

Jeanine Foster, J.D.
Principal/Senior Project Manager
Foster Morrison Consulting, LLC
(303) 717-7171
jeanine.foster@fostermorrison.com

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Thursday, June 16, 2016 8:51 AM
To: Ghelfi. Pete <ghelfip@SacCounty.NET>; rd1601@frontiernet.net; ssinnock@ksninc.com; cosio@mbkengineers.com; ginny@greeneandhemly.com; rabercrombie@tfewines.com; cosio@mbkengineers.com; pdevereux@rd1000.org; pcarey@water.ca.gov; pwervin@wbecorp.com; henry@wbecorp.com; ckchu52@comcast.net; Glabrie@dccengineering.net; msvls@cwo.com; daniel@kaydix.com; jwoodling@rwah2o.org; eckman@water.ca.gov; mlorenzo@water.ca.gov; chrisferrari@geiconsultants.com; Flynn. MaryJo <FlynnM@saccounty.net>; Ince. Roger <incer@SacOES.Org>; Cantelme. Steve <cantelmes@sacoes.org>; Jose.Lara@caloes.ca.gov; Megan.Walton@caloes.ca.gov; Victoria.LaMar-Haas@CalOES.ca.gov; jbehrmann@ci.galt.ca.us; wforrest@ci.galt.ca.us; abernardino@ci.galt.ca.us; swinkler@ci.galt.ca.us; djhengineering@hughes.com; sandra.rutledge@cityofisleton.com; romi.balbini@gmail.com; klove@sacsheriff.com; ewhite@elkgrovepd.org; bnoblett@elkgrovepd.org; James-hendricks@heroldfiredistrict.com; krishubbard@csdfire.com; casentini.gregory@metrofire.ca.gov; davidwelch@courtlandfire.com; delliot@golyon.com
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: Special Public Meeting for Emergency Action Plan and 2016 Local Hazard Mitigation Plan Update
Importance: High

Hello all.

Attached is a flyer for a special meeting in the Delta area. This meeting is not a requirement for the LHMP, yet we
hope to see many of you there to participate in the conversation with the community.

This meeting will be held **Tuesday, June 21st, 6:00pm to 7:30 at the Courtland Fire House on Hood Franklin Road**.
Please see the attached flyer.

Because this meeting will take place very soon, we need help in spreading the word. Attached is a flyer about the meeting.

If possible, please forward to people in the community or print and put it anywhere it will get noticed.

Thank you so much. Celine

Celine Livengood
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SACRAMENTO COUNTY

Flyer for SAFCA Meetings – 5/11/2016 to 5/19/2016

City of SACRAMENTO

Help Reduce Disaster Losses in Your Community by Participating in the Sacramento County Local Hazard Mitigation Plan Update

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Hazard mitigation means any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.

Why is Natural Hazard Mitigation Important?

Most people who live or work in Sacramento County have been affected by natural hazards in one way or another. Sacramento County and its residents are vulnerable to a variety of hazards including floods, levee failure, drought, wildfire, and other severe weather events.

The rising costs associated with disaster response and recovery have focused the attention of federal, state, and local governments on addressing natural hazards before they occur. Obviously, torrential rains and floods cannot always be prevented from occurring. Planning for natural hazards and implementing mitigation measures, however, can reduce the impact of such events when they do occur. Emergency response and recovery costs; property damage; personal injury and loss of life; and the overall economic and social impact on the community can all be reduced, and in some instances eliminated through natural hazard mitigation.

Hazard Mitigation Plan and Plan Update Process

After securing Federal Emergency Management Agency (FEMA) mitigation grant funding, Sacramento County is using the funds to support an update of the 2011 LHMP. This LHMP Update is being developed by a Hazard Mitigation Planning Committee comprised of representatives from various County and City departments; neighboring jurisdictions, key federal, state, and local agency stakeholders and the public.

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Another benefit of mitigation planning is that it can also help lessen the cost of flood insurance to the residents of Sacramento County and the City of Sacramento through FEMA's National Flood Insurance Program's (NFIP) Community Rating System.

National Flood Insurance Program's Community Rating System

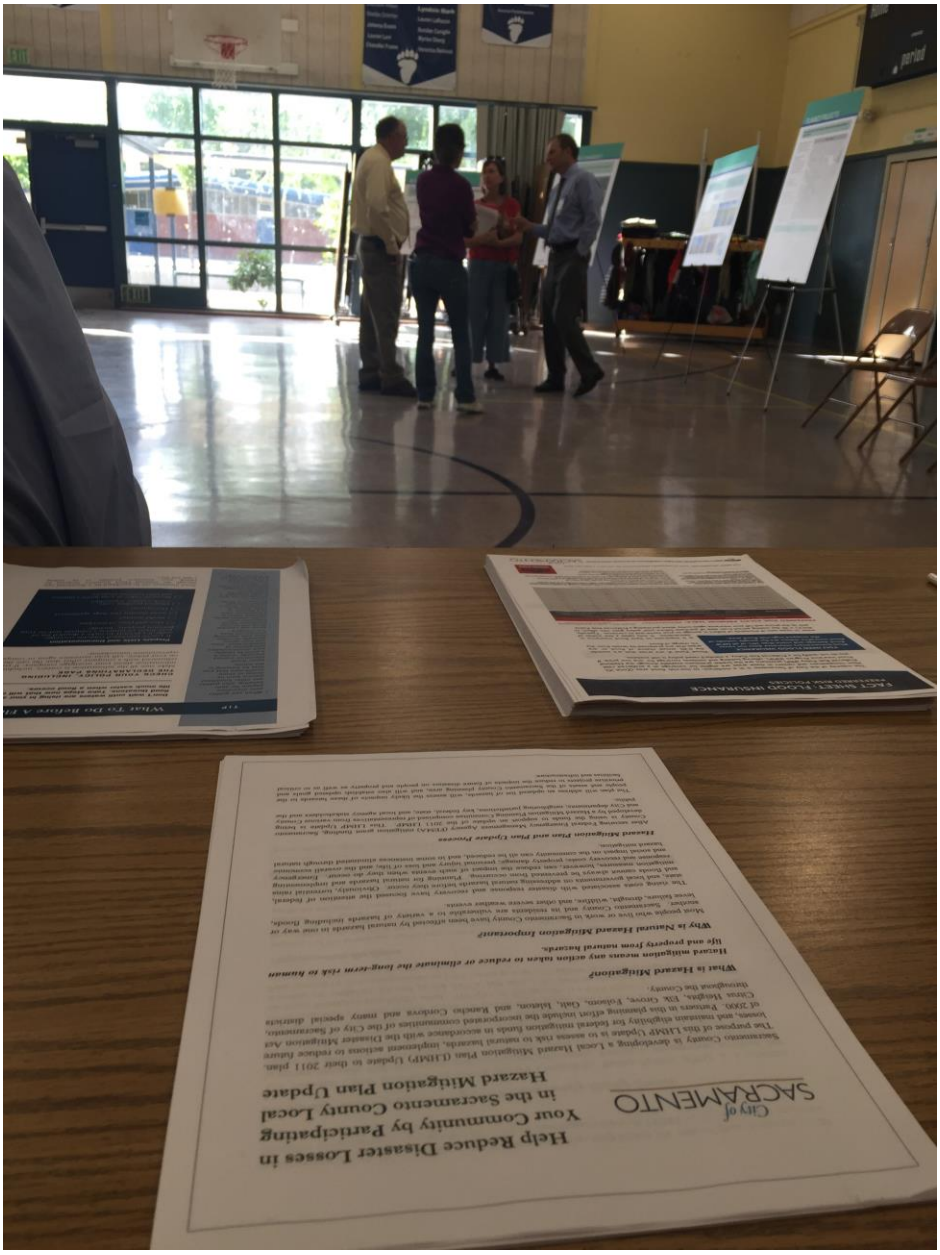
The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions in meeting the goals of the CRS Program. The reduction in flood insurance premium rates is provided according to a community's CRS classification. Sacramento County is currently a CRS Class 3, which provides a 35 percent discount on flood insurance for those located within the special flood hazard area (SFHA) and a 10 percent discount for those located in non-SFHA areas. The City of Sacramento is a CRS Class 5 providing a 25 percent discount on residents located in the SFHA and also a 10 percent discount for non –SFHA areas. Participation by these communities in CRS results in over $2.5 million in annual savings to area residents on the cost of their flood insurance premiums.

Opportunities for Input

Members of the community have a very important role in this process. A draft of the LHMP Update will be available early fall 2016 for review and comment by the public and all interested stakeholders on the County and City websites and other identified locations. Planning team and public stakeholder meetings will also occur throughout the plan development process. All interested stakeholders and members of the public are welcome to attend.

For more information on this project and how you can get involved, go to **StormReady.org** and follow the link to Local Hazard Mitigation Plan, 2016, or contact the following individuals:

Celine Livengood/Mark Rains	**Jeanine Foster**
Sacramento County Department of Water Resources	Foster Morrison Consulting Ltd.
Phone: (916) 874-3130	Phone: (303) 717-7171
livengoodc@saccounty.net; rainsm@saccounty.net	jeanine.foster@fostermorrison.com


Help Reduce Disaster Losses in
Your Community by Participating
in the Sacramento County Local
Hazard Mitigation Plan Update
City of SACRAMENTO
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Hazard mitigation means any action taken to reduce or eliminate the long-term risk to human
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severe storms, drought, wildfire, and other severe weather events.
Hazard Mitigation Plan and Plan Update Process
FACT SHEET: FLOOD INSURANCE

SAFCA Assessment Meetings – Joe Mims Jr. Comm. Center, May 11, 2016

Meeting Record

Project: SAFCA Assessment Meetings – Joe Mims Jr. Comm. Center	**Date**: May 11, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Kelly Sherfey	Program Analyst	916-808-2539
American River Flood Control District Representative		916-929-4006
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
- Several flood insurance questions – some required follow up historical flood zone data and elevation certificate		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

SAFCA Assessment Meetings – George Sim Comm. Center, May 11, 2016

Meeting Record

Project: SAFCA Assessment Meetings – George Sim Comm. Center	**Date**: May 11, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Connie Perkins	Senior Engineer	916-808-1914
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

SAFCA Assessment Meetings – Johnson Comm. Center, May 12, 2016

Meeting Record

Project: SAFCA Assessment Meetings – Johnston Comm. Center	**Date**: May 12, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Connie Perkins	Senior Engineer	916-808-1914
American River Flood Control District Representative		916-929-4006
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

SAFCA Assessment Meetings – South Natomas Comm. Center, May 12, 2016

Meeting Record

Project: SAFCA Assessment Meetings – South Natomas Comm. Center	**Date**: May 12, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Kelly Sherfey	Program Analyst	916-808-2539
RD 1000		916-922-1449
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
- Several flood insurance questions – some required follow up historical flood zone data		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

SAFCA Assessment Meetings – Heron School, May 17, 2016

Meeting Record

Project: SAFCA Assessment Meetings – Heron School	**Date**: May 17, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Kelly Sherfey	Program Analyst	916-808-2539
RD 1000		916-922-1449
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
- Several flood insurance questions – some required follow up historical flood zone data		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

SAFCA Assessment Meetings – Clunie Comm. Center, May 17, 2016

Meeting Record

Project: SAFCA Assessment Meetings – Clunie Community Center	**Date**: May 17, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Connie Perkins	Senior Engineer	916-808-1914
American River Flood Control District Representative		916-929-4006
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

SAFCA Assessment Meetings – Elks Lodge #6, May 18, 2016

Meeting Record

Project: SAFCA Assessment Meetings – Elks Lodge #6	**Date**: May 18, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Connie Perkins	Senior Engineer	916-808-1914
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

SAFCA Assessment Meetings – Samuel Pannell Comm. Center, May 18, 2016

Meeting Record

Project: SAFCA Assessment Meetings – Sammuel Pannell Comc. Center	**Date**: May 18, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Kelly Sherfey	Program Analyst	916-808-2539
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

SAFCA Assessment Meeting – Sierra 2 Center, May 19, 2016

Meeting Record

Project: SAFCA Assessment Meetings – Sierra 2 Center	**Date**: May 19, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Connie Perkins	Senior Engineer	916-808-1914
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

SAFCA Assessment Meeting – Sierra Oaks Elementary School, May 19, 2016

Meeting Record

Project: SAFCA Assessment Meetings – Sierra Oaks Elementary School	**Date**: May 19, 2016
Meeting Purpose: Community meeting to discuss flood control assessment and discuss flood risk to the community	

Attendees		
Name	**Title**	**Contact Phone**
Kelly Sherfey	Program Analyst	916-808-2539
American River Flood Control District Representative		916-929-4006
SAFCA Staff		916-874-7606
Members of the Public		

Items Discussed
- Sacramento Area Flood Control Association (SAFCA) Flood Control Assessment
- Flood Insurance
- Flood Risks

Follow-up		
By	**Name**	**Organization**
	Kelly Sherfey, Program Analyst	City of Sacramento

Bay Stone Lake Community Meeting

AGENDA
Sacramento County DWR – Floodplain Management
Beach Stone Lake Community Meeting
August 30, 2016

Introductions (and LHMP): Celine (DWR Engineer Tech, *livengoodc@saccounty.net*)

Background: George Booth (DWR Senior Engineer, *boothg@saccounty.net*)

Insurance (NFIP): Edie Lohmann (FEMA – National Flood Insurance Program Specialist)

Mitigation Strategies: Mark Rains (DWR Associate Engineer- *rainsm@saccounty.net*)

Collaborative Discussion:

Notes:

Sign-In Sheet -Beach Stone Lake Meeting (Aug 30, 2016) - Attendess		
Name	**Contact Info**	**Affiliation**
Maryn Whitney	mwhitney@sonic.net	
DIANNA HANSEN	DEYESPLACE45@GMAIL.COM	LAND OWNER
Alex Giorgi	ALGELKGROVE@outlook.com	
Neal L. Harrell	PASTORNEAL@YAHOO.COM	Community Chaplain
Brian Stephanie Knepper	Steph.Knepper@gmail.com	Landowner
Marcia K. Ragsdale	Lil Rags2riches@aol.com	landowner
Nancy & Paul Baldwin	Nancybaldw@gmail.com	landowner
RICK + CHRIS HUFFMAN	HUFFMANRC@ME.COM	HOME OWNER
Tom & Wendy Hardin	WENDYHARDIN@YAHOO.COM	Home Owner
Bill & Joanne LANE	wmlane4hire@gmail.com	Home Owner
Les Hoppe	WALTERJHoppe@Q.MAR.COM	" "

Hello to you all.

You are receiving this email because you were interested in receiving additional communication from our agency in regards to the topics discussed at the August 30th community meeting.

Specifically, information on potential mitigation options and grant opportunities, notification when the draft Local Hazard Mitigation Plan update (LHMP)is released for review and to receive the meeting minutes from the August 30th meeting.

Attached to this email are the meeting minutes from the August 30th meeting.

The LHMP update is anticipated to be ready for release in two weeks. You will receive another email at that time with a link to the document. There will be a two week comment period for the draft document.

In addition, our agency is requesting input on local natural hazards you are aware of through an online public survey at the following website;

http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Committee-2016-Plan-Update.aspx.

Thank you so much for your time and interest, and feel free to contact me with any questions.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net

SACRAMENTO COUNTY

Meeting Minutes
Beach Stone Lake (BSL) Community Meeting
August 30, 2016 6:00 – 7:30pm

The following notes are topics discussed in summary along with questions (Q) from the audience and the answers (A) to each. Questions and general statements (S) from the audience are in *Italics*. The dialogue contained in these notes is not a verbatim account but instead a compilation of general discussion points.

Introductions and other County Information

Celine Livengood explained that the purpose of the meeting; to offer residents information on changes to flood insurance premiums and options to help protect their homes from flooding. She also explained what the Local Hazard Mitigation Plan (LHMP) Update is (a document listing known natural hazards in Sacramento County and mitigation options for each hazard), the benefits the LHMP provides to the County and its residents and that the Draft LHMP will be available in mid-September. She told attendees she would be taking notes during the meeting and if they provide their email address, she will send the meeting minutes and a notice when the Draft LHMP is posted for review and comment. She introduced the speakers, George Booth (County), Edie Lohman (Federal Emergency Management Agency -FEMA), Irene Sabourin (Insurance broker) and Mark Rains (County).

Background

George Booth gave a brief history of BSL floodplain and the current FEMA Flood Insurance Rate Map (FIRM).Mr. Booth also talked about the McCormick-Williamson Weir Project and its likely effect on the current BFE. He said that a study was under way with preliminary modeling that shows the weir would effectively lower BFEs in the BSL area. However, there are mapping concerns associated with the Sacramento River de-accredited levees.

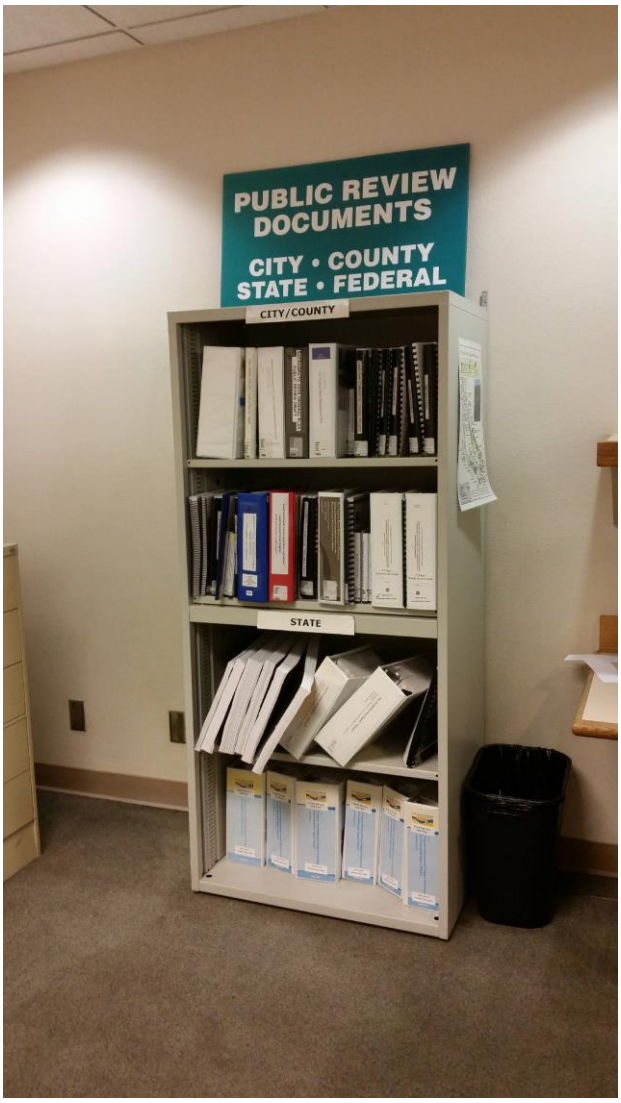
Q – [Considering the vertical datum change, on the 2012 Flood Insurance Rate Map,] Did the Elevation Certificate (EC) change by 2.4 feet? Does that mean the elevation of my home on the EC is 2.4' higher?

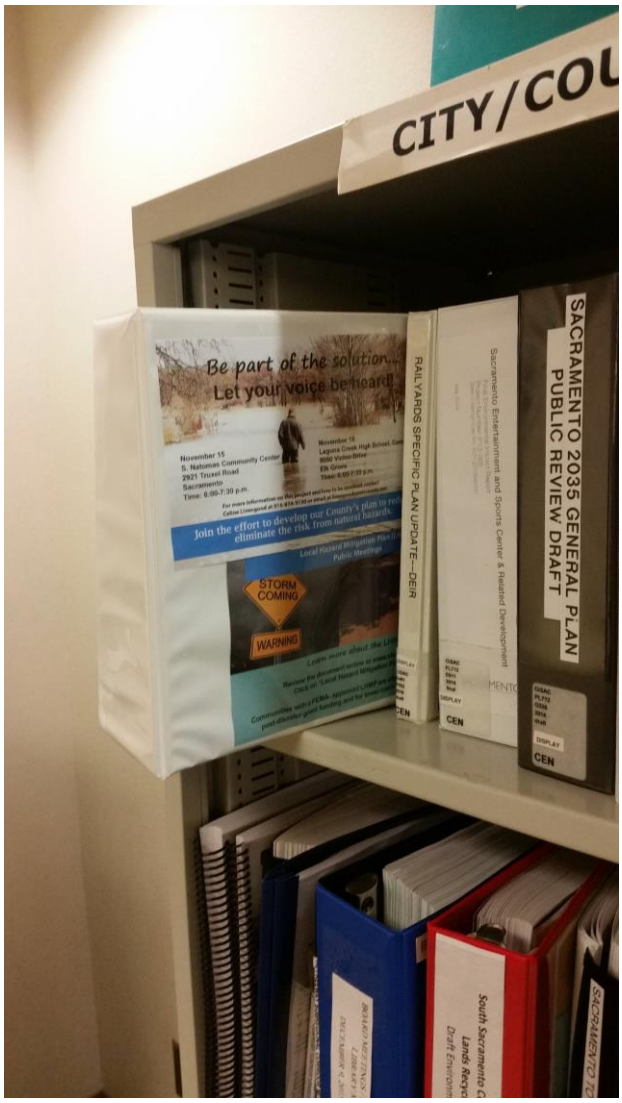
A - For elevation certificates that were produced using NGVD 29 (the datum is shown on the EC), the increase to the Finished Floor Elevation and base flood elevation (BFE) will be 2.43 feet higher due to a change in the vertical datum from NGVD to NAVD. The base flood elevation changes by the same amount so the floor is the same compared to the BFE.

Q - What happened to the Sacramento River?

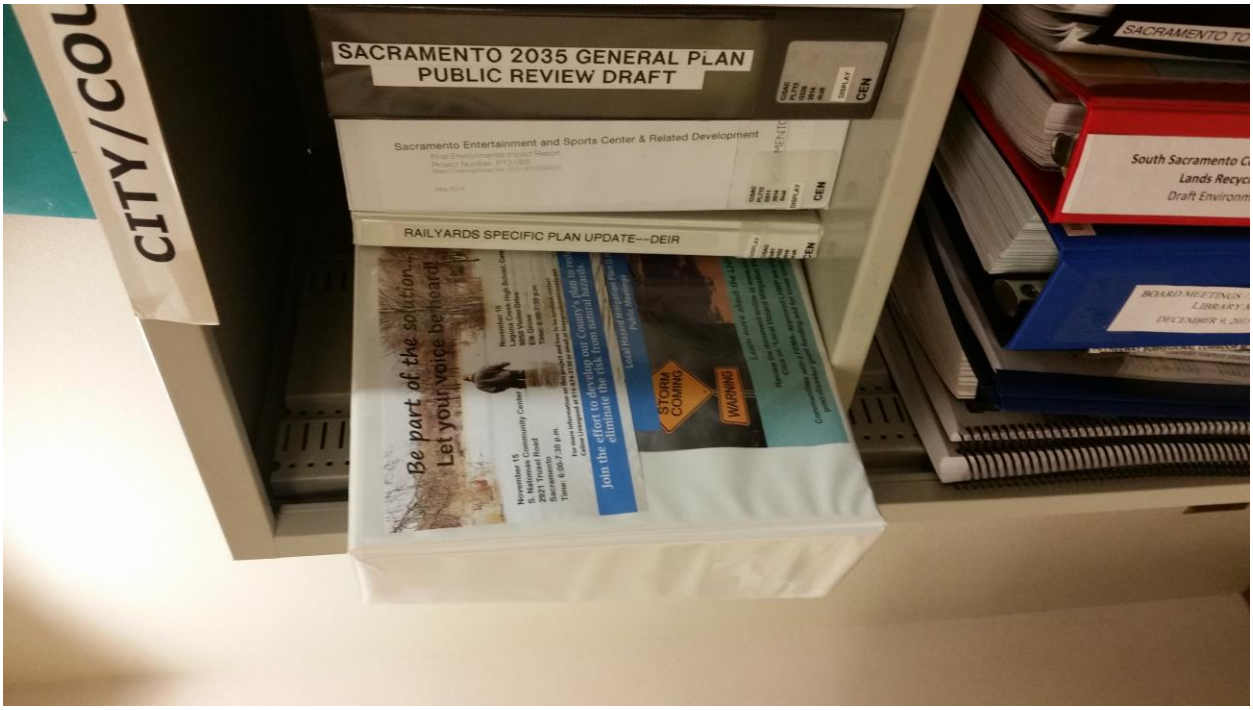
Sacramento County Storm Water Quality Division Exhibit at State of California, Green Fair Event

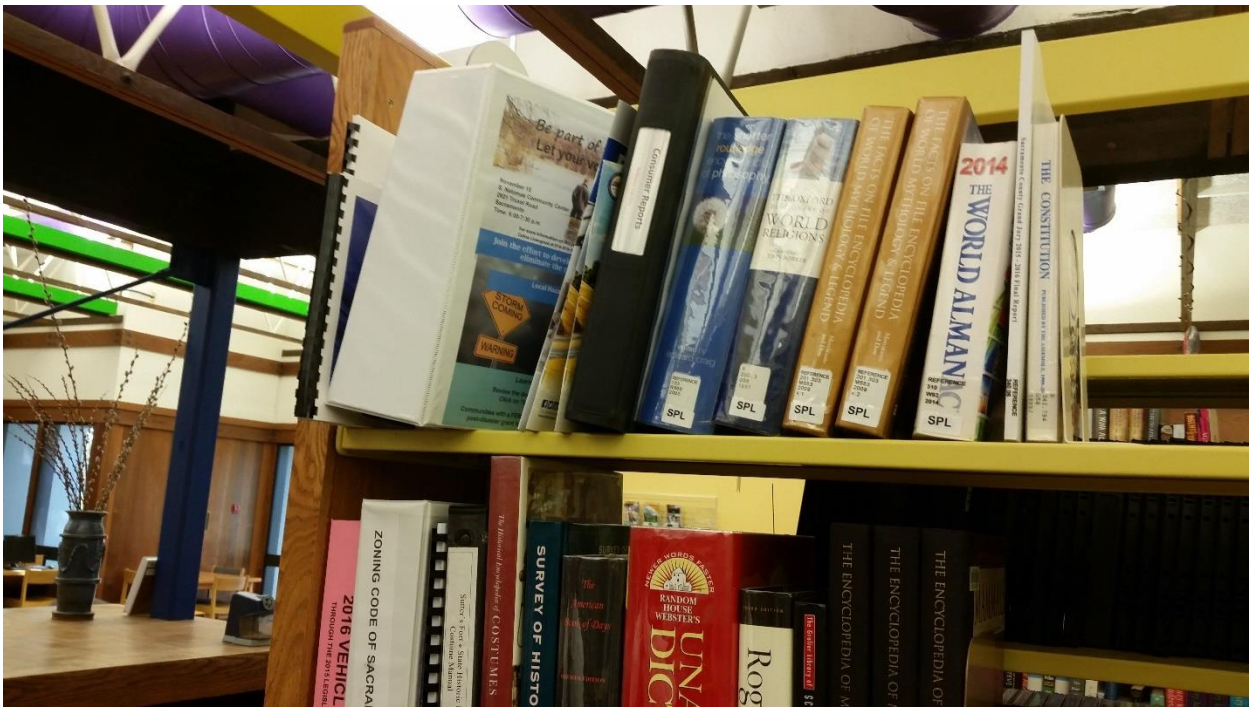
Public Outreach at Sacramento County Public Library, Sacramento County Main Library location





Public Outreach at Sacramento County Public Library, Sacramento County Elk Grove Library location





Supervisor Kennedy's Public Meeting Fern Bacon Middle School, October 27, 2016

From: Robinson. Matthew [mailto:Robinsonma@saccounty.net]
Sent: Thursday, December 08, 2016 12:14 PM
To: Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: RE: LHMP Update -Public Review Draft and Final Meetings

Here's the agenda. We supplied 500 Storm Ready kits. The event was a community meeting held on October 27, 5:30-7:00, at Fern Bacon Middle School, 4140 Cuny Avenue. If you'd like, I can send you a picture of what was the kits contained.

Matt Robinson
Communications & Media Officer
Sacramento County
916-874-4517 (o)
916-591-2292 (c)
www.saccounty.net


Sacramento County
STORMREADY.ORG
Stormwater Utility
Are You
torm Ready?
SACRAMENTO
COUNTY
First Aid Guide
TABLE OF CONTENTS
HOMEOWNER FLOOD INSURANCE
AFFORDABILITY ACT OF 2014
Sacramento County
STORMREADY.ORG
Stormwater Utility
Sacramento County
STORMWATER UTILITY

FERN BACON MIDDLE SCHOOL AND BOWLING GREEN ELEMENTARY SCHOOLS

1. **WELCOME! AND THANK YOU, PRINCIPAL MARY CORONADO**
2. **PRINCIPAL SPEAKS**
3. **WE ARE HAPPY TO HAVE REPRESENTATIVES FROM :**
   - **SHERIFF'S DEPARTMENT: LAURA GROSSMAN**
   - **THE TREE FOUNDATION: MEREDITH THOMPSON**
   - **ANIMAL CONTROL:** either Danielle Russell or Libby Simmons
   - **DEPARTMENT OF WATER RESOURCES (INFORMATION IN BAGS)**
   - **CODE ENFORCEMENT** : Rosa Orellana
   - **SPECIAL TREAT—FLU SHOTS PROVIDED BY THE SACRAMENTO COUNTY HEALTH AND HUMAN SERVICES DEPARTMENT!!**
4. **THANK YOU ALL FOR COMING**
5. **MORE INFORMATION IS ON THE TABLES OUTSIDE**
6. **ENJOY A HOTDOG AS YOU CHECK OUT THE INFORMATION TABLES**

Directed email Outreach to Sacramento Residents

These folks are the ones that attended our BSL meeting regarding insurance changes and mitigation options for their homes. I would be surprised if we don't get some review comments from a few of them. The following is the list of email addresses it went to:

'deyesplace45@gmail.com'; 'mwhitney@frontiernet.net'; 'pastorneal@yahoo.com'; 'steph.kneppel@gmail.com'; 'lilrags2riches@aol.com'; 'nancybaldw@gmail.com'; 'huffmanrc@me.com'; 'wendyhardin@yahoo.com'; 'wmlane4hire@gmail.com'; 'walterjhoppe@gmail.com'; 'slavintracy@yahoo.com'; 'gsprak@frontiernet.net'; 'needinfo@frontiernet.net'; 'my59chevy@gmail.com'; 'ctorres1113@yahoo.com'; 'slourenc@egusd.net'; 'naves50@yahoo.com'

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Wednesday, November 02, 2016 12:17 PM
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: Draft Local Hazard Mitigation Plan Update - Public Review and Hazard Survey

Hello to you all.

You are receiving this email because you were interested in receiving notification on release of the Draft Local Hazard Mitigation Plan update (LHMP), now ready for review. The document is available on line at the following link:

http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Committee-2016-Plan-Update.aspx

If you have trouble in using this link, the second option is to go the County's home page, then 'Government', 'Departments', 'Water Resources'…at the bottom, left of that page click on 'Storm Ready'. Under the 'rain drop' is the link to the LHMP 2016.

Additionally, this document is available in hardcopy at two Sacramento County libraries, at Main Branch located at 828 I Street and at the Fair Oaks Branch located at 11601 Fair Oaks Blvd.

The comment period ends November 18th. Please send comments to me via email or to the fax number listed below.

In addition, our agency is requesting input on local natural hazards you are aware of through an online public survey. This survey, titled HMP (Hazard Mitigation Plan) Survey, is at the same web site as the Draft document. Click on the link just under the next meeting dates to participate.

Thank you so much for your time and interest, and feel free to contact me with any questions.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

A.3 Sacramento County Step 3: Coordinate

This planning step credits coordinating with other agencies and key stakeholders and incorporating other plans and other agencies' efforts into the floodplain management plan or LHMP. Other agencies and organizations were contacted to determine if they have studies, plans and information pertinent to the floodplain management plan, to determine if their programs or initiatives may affect the community's program, and to see if they could support the community's efforts in this LHMP Updare. Coordination efforts with these other agencies are documented in Table A 3 below.

Due to the multijurisdictional nature of this plan update, all agency coordination efforts described in this section were conduction in coordination with and on behalf of all participating jurisdictions, including the Sacramento County and the City of Sacramento, the two current CRS communities and other incorporated Sacramento communities considering participation in the CRS program.

Table A-2 List of Agencies and Key Stakeholders Coordinated with Through the LHMP Update Process

Agency Name/ Contact	Mechanism	Contacted via Mail/email	Contacted via Phone	Contacted Face-to Face	Topics Discussed
Kate Meis, Executive Director Sacramento Local Government Commission	Direct contact with Capital Region Climate Readiness Collaborative, Local Government Commission, and other climate change initiative agencies	X		X	Invited LHMP participation and input on the Climate Change and other components of the LHMP
Jenny Woods, Sacramento Local Government Commission	Direct contact with Capital Region Climate Readiness Collaborative, Local Government Commission, and other climate change initiative agencies	X		X	Invited LHMP participation and input on the Climate Change and other components of the LHMP
Larry Green, Sacramento Metropolitan Air Quality District	Direct contact with Capital Region Climate Readiness Collaborative, Local Government Commission, and other climate change initiative agencies & Risk Assessment Meeting	X		X	Invited LHMP participation and input on air quality and wildfire issues, the Climate Change hazard, and other components of the LHMP.
Shelly Jiang, Sacramento Metropolitan Air Quality District	Direct contact with Capital Region Climate Readiness Collaborative, Local Government Commission, and other climate change initiative agencies & Risk Assessment Meeting	X		X	Invited LHMP participation and input on air quality and wildfire issues, the Climate Change hazard, and other components of the LHMP. She developed air quality text for the risk assessment.

Agency Name/ Contact	Mechanism	Contacted via Mail/email	Contacted via Phone	Contacted Face-to Face	Topics Discussed
Meg Arnold, Valley Vision	Direct contact with Capital Region Climate Readiness Collaborative, Local Government Commission, and other climate change initiative agencies & Planning Team Meetings	X		X	Invited LHMP participation and input on local community issues, those involving the business community, and the Climate Change hazard, and other components of the LHMP.
Amber Mace UC Davis	Direct contact with Capital Region Climate Readiness Collaborative, Local Government Commission, and other climate change initiative agencies & Risk Assessment Meeting	X		X	Invited LHMP participation and input on air quality and wildfire issues, the Climate Change hazard, and other components of the LHMP.
Alicia Brown Sacramento Local Government Commission	Direct contact with Capital Region Climate Readiness Collaborative, Local Government Commission, and other climate change initiative agencies	X			Invited LHMP participation and input the Climate Change hazard and other components of the LHMP.
Curtis Alling Ascent Environmental	Emails and Meeting with Capital Region Climate Readiness Collaborative and Climate Change Consultants	X		X	Invited LHMP participation and input on the Climate Change component of the LHMP
Stephen D'Anduca Sacramento Metropolitan Air Quality District	Email from AQD to obtain AQ data for LHMP	X			
Erik deKok Ascent Environmental	Emails and Meeting with Capital Region Collaborative Board and Climate Change Consultants	X		X	Invited LHMP participation and input on the Climate Change component of the LHMP
Kathleen Ave Sacramento Municipal Utility District (SMUD)	Emails and targeted meeting with SMUD and County DWR, and Risk Assessment Meeting	X		X	Invited LHMP participation and input.
Raef Porter Sacramento Area Council of Governments (SACOG)	J. Robinson email transmittal of SACOG Climate Vulnerability Assessment & email for Haz ID input to LHMP	X			Invited LHMP participation and input. He provided SACOG Climate Vuln Assess document for consideration in the LHMP and input to Haz ID table for LHMP

Agency Name/ Contact	Mechanism	Contacted via Mail/email	Contacted via Phone	Contacted Face-to Face	Topics Discussed
Greg Chew Sacramento Area Council of Governments (SACOG)	J. Robinson email to Green Team for Haz ID input to LHMP	X			Invited LHMP participation and input. He provided input to Haz ID table for LHMP
Evan Schmidt Valley Vision	J. Robinson email to Green Team for Haz ID input to LHMP	X			Invited LHMP participation and input. He provided input to Haz ID table for LHMP
Paul Philley Sacramento Metropolitan Air Quality District	J. Robinson email to Green Team for Haz ID input to LHMP	X			Invited LHMP participation and input. He provided input to Haz ID table for LHMP
Molly Wright Sacramento Metropolitan Air Quality District	J. Robinson email to Green Team for Haz ID input to LHMP	X			Invited LHMP participation and input. He provided input to Haz ID table for LHMP
California DWR, Division of Flood Management/ Raul Barba, Water Resources Engineer	Direct Contact	X			Informed DWR NFIP Coordinator of the LHMP Update process and requested NFIP data for all communities
Victoria Lamar Haas Cal OES, Mitigation Division	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input. Also through direct calls with Victoria and Foster Morrison.	X	X		Coordinating with Cal OES on the Sac LHMP Update. Asked about obtaining an updated list of Disaster Declarations. Inquired if there were any specifics Cal OES would like to see addressed in this update. Invited to the LHMP Update process.
Tamara Scott-Smith Cal OES, Recovery Division	Direct email requesting information	X			Informed her of the LHMP Update Process/Coordinated with Scott-Smith on an updated list of disaster declarations
National Weather Service Michelle Mead	Email solicitations inviting participation and input; LHMP Meeting.	X		X	Invited LHMP participation and review of plan documents. Requested hazard related data from NWS

Agency Name/ Contact	Mechanism	Contacted via Mail/email	Contacted via Phone	Contacted Face-to Face	Topics Discussed
Pete Ghelfi Sacramento Area Flood Control Agency (SAFCA)	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input. Also through direct contact during SAFCA and City of Sacramento Community meetings.	X		X	Invited LHMP participation, input to the plan document, and review and comment of plan documents. Obtained information on ongoing Flood Control Efforts in the Sacramento Area.
Tim Kerr American River Flood Control District	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input. Also through direct contact during SAFCA and City of Sacramento Community meetings.	X		X	Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Maria Lorenzo-Lee Cal DWR	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input. Also through direct contact during LHMP meetings and follow up conversations	X	X	X	Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Sami Nall Cal DWR	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input. Also through direct contact during LHMP meetings.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Kirtland Stout California State University System	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input. Also through direct contact during LHMP meetings and follow up phone calls.	X	X	X	Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Hitomi, Bob Y California State University System	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.

Agency Name/ Contact	Mechanism	Contacted via Mail/email	Contacted via Phone	Contacted Face-to Face	Topics Discussed
Hitomi, Bob Y California State University System	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Ross Eckman Cal DWR Maintenance Area 9	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Colin Bailey, Environmental Coalition for Water Justice	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input. Also through contact at LHMP kickoff meeting.	X		X	Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Ellen, Carlson Elk Grove Water District	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Karla Tejada Golden State Water	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input. And through direct conversations at LHMP Kickoff meeting	X		X	Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Brandon Hancocks Golden State Water	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Fred Gayle South Suburban Water District	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Laura Strand Carmichael Water District	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.

Agency Name/ Contact	Mechanism	Contacted via Mail/email	Contacted via Phone	Contacted Face-to Face	Topics Discussed
Danilo Sanchez Fruitridge Vista Water District	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Joseph Tanner California American Water Company	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Debra Sedwick, Del Paso Manor Water District	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Stephen Fraher Arcade Creek Rec and Park District	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Chief Henricks Herald Fire Department	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input.	X			Invited LHMP participation, input to the plan document, and review and comment of plan documents.
David Welsh Courtland Fire Department	Through direct emails throughout the planning process extending invitations to meetings, review of draft documents, and other input. Courtland Fire provided meeting locations for Delta LHMP and public meetings.	X	X	X	Invited LHMP participation, input to the plan document, and review and comment of plan documents.
Corine Seaver California Highway Patrol	Sacramento County Emergency Action Planning Project – Agency Coordination Meeting			X	Updated agencies on LHMP status and how to provide draft document review and input.
Elsy Votind Cal OES	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
Kyle Neterer Cal OES	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.

Agency Name/ Contact	Mechanism	Contacted via Mail/email	Contacted via Phone	Contacted Face-to Face	Topics Discussed
William Mah WBZ Corp	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
Erik Mover, Pacific Gas & Electric	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
Randy Fessler Cal DWR	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
Russ Eckman Cal DWR	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
Casey Lund Cal DWR	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
Richard Rodriguez Pacific Gas & Electric	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
Pamela Perdue Pacific Gas & Electric	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
Rob Brown California Highway Patrol	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
John Paasch Cal DWR	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.

Agency Name/ Contact	Mechanism	Contacted via Mail/email	Contacted via Phone	Contacted Face-to Face	Topics Discussed
Donna Nash California Highway Patrol	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.
Michael Ridguray Cal DWR	Sacramento County Emergency Action Planning Project – Agency Coordination			X	Updated agencies on LHMP status and how to provide draft document review and input.

From: Robinson. Judy [mailto:robinsonju@SacCounty.NET]
Sent: Monday, April 18, 2016 4:56 PM
To: Livengood. Celine <LivengoodC@saccounty.net>; Curtis Alling (curtis.alling@ascentenvironmental.com) <curtis.alling@ascentenvironmental.com>; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com) <erik.dekok@ascentenvironmental.com>
Cc: Booth. George <boothg@SacCounty.NET>; Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: RE: Copies of Printed Health Docs BRACE

Hi Celine
This morning was very beneficial. Thank you and George

CRC Members already planning to attend meetings are: Curtis, Meg, possibly Kathleen and myself. CRC members to include in emails are:
Curtis Alling (curtis.alling@ascentenvironmental.com)
Kate Meis (kmeis@lgc.org)
Kathleen Ave (Kathleen.Ave@smud.org)
Meg Arnold (Meg.Arnold@valleyvision.org)
Larry Greene (LGreene@airquality.org)
Jenny Woods jwoods@lgc.org
Amber Mace (mace.ucdavis@gmail.com)

I am copying Curtis and Erik from Ascent Environmental as they are the consultants doing the County's Climate Action/Adaptation Plan. Curtis, Erik and I had a conversation this afternoon and there are some things they can do that will be important to the LHMP. Coordination (like we discussed this morning) is one of them, providing climate adaptation info is another. We discussed that we need to have a coordination meeting ASAP with you, Planning and Ascent in order to get needed information into the LHMP in the short timeframe. We're all on the same page ☺

Judy Robinson
Sacramento County
Robinsonju@saccounty.net
916.874.4551

From: Meg Arnold [mailto:Meg.Arnold@valleyvision.org]
Sent: Wednesday, March 02, 2016 9:49 AM
To: Livengood. Celine
Subject: Re: 2016 Multi-jurisdictional Local Hazard Mitigation Plan Update (LHMP) - Committee Participation

Celine,

Tanks so much for reaching out, and I'm pleased that Jeanine mentioned Valley Vision and our Business Resiliency Initiative (BRI). I very much appreciate the invitation to join the nascent Sacramento LHMP update process, and I'd be happy to be part of the planning committee, especially because a key part of the BRI encourages businesses to become involved with, and informed about, the public sector preparedness efforts. I'd be interested to try to establish LHMP forums that could foster exactly that public/private interaction, and provide good input into the resulting LHMP.

Thanks,

- Meg

Meg Arnold
Project Leader, Business Resiliency Initiative

530-867-1921 (mobile)
916-325-1630 (office)
meg.arnold@valleyvision.org

Valley Vision
2320 Broadway
Sacramento, CA 95818

From: "Livengood. Celine" <LivengoodC@saccounty.net>
Date: Tuesday, March 1, 2016 at 12:59 PM
To: Meg Arnold <meg.arnold@valleyvision.org>
Cc: "Rains. Mark" <rainsm@SacCounty.NET>
Subject: 2016 Multi-jurisdictional Local Hazard Mitigation Plan Update (LHMP) - Committee Participation

Hello Meg.

This morning your name was mentioned by our consultant, Jeanine Foster of the Foster- Morrison Group, in reference to disaster mitigation planning. I see from the web site that Valley Vision helps businesses to be prepared for natural disasters, so I'm certain your input would be valuable to this Plan.

Last week our agency, Sacramento County DWR, received a FEMA Disaster Mitigation Assistance grant for the 2016 LHMP update. This April we will begin the process to update the (existing) Plan by identifying regional natural hazards and mitigation for those hazards. As staff with SCDWR, I will be coordinating the update process between the participants and the consultant..

Along with the County, the planning committee consists of seven incorporated cities (within the County), many Districts, other agencies and individuals representing their communities are committed to this effort. There will be five meetings held between April and October, with the kick-off anticipated in the first week in April (dates pending) and, thereafter, one per month. A formal invitation will be sent, but for now I am completing a list of Planning Committee participants. Please let me know, at your earliest convenience, if you or someone from your agency would like to be on the planning committee.

I hope you'll join us.

Best regards, Celine

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

Here is the 2nd email addressing losses from the King Fire that weak so need to include. Please let Kathleen Ave know if you need a source for her comments below. Thank you

Judy Robinson
Sacramento County
Robinsonju@saccounty.net<mailto:Robinsonju@saccounty.net>
916.874.4551

Begin forwarded message:

From: Kathleen Ave <Kathleen.Ave@smud.org<mailto:Kathleen.Ave@smud.org>>
Date: April 22, 2016 at 7:00:16 PM PDT
To: 'Curtis Alling'
<curtis.alling@ascentenvironmental.com<mailto:curtis.alling@ascentenvironmental.com>>, Shelley Jiang <SJiang@airquality.org<mailto:SJiang@airquality.org>>, Jenny Woods <jwoods@lgc.org<mailto:jwoods@lgc.org>>, "Robinson. Judy" <robinsonju@saccounty.net<mailto:robinsonju@saccounty.net>>
Cc: "Kate Meis (kmeis@lgc.org<mailto:kmeis@lgc.org>)" <kmeis@lgc.org<mailto:kmeis@lgc.org>>, LARRY GREENE <LGREENE@airquality.org<mailto:LGREENE@airquality.org>>, "Meg Arnold (Meg.Arnold@valleyvision.org<mailto:Meg.Arnold@valleyvision.org>)" <Meg.Arnold@valleyvision.org<mailto:Meg.Arnold@valleyvision.org>>, Amber J Mace <ajmace@ucdavis.edu<mailto:ajmace@ucdavis.edu>>, "Olson. Karen" <OlsonK@saccounty.net<mailto:OlsonK@saccounty.net>>, Alicia Brown <abrown@lgc.org<mailto:abrown@lgc.org>>
Subject: RE: FW: Hazard Identification Table

I agree, and added this comment in response to your question for me Jenny - sorry for the delay.

In the case of the King Fire, production from the UARP was disrupted for 2 weeks, requiring an additional unbudgeted $37 million for replacement power, by far the largest cost compared to the approximately $4M in immediate physical damage. I'd be inclined to call this one a "Critical" because the additional air quality & commercial impacts can be so widespread KA

From: Curtis Alling [mailto:curtis.alling@ascentenvironmental.com]
Sent: Wednesday, April 20, 2016 7:56 AM
To: Shelley Jiang; Jenny Woods; Robinson. Judy
Cc: Kathleen Ave; Kate Meis (kmeis@lgc.org<mailto:kmeis@lgc.org>); LARRY GREENE; Meg Arnold (Meg.Arnold@valleyvision.org<mailto:Meg.Arnold@valleyvision.org>); Amber J Mace; Olson. Karen; Alicia Brown
Subject: RE: FW: Hazard Identification Table

Hi Judy, Jenny,

Attached are my comments, which focus on creating a separate column for "Climate Change Influence" on the other hazards. I believe this is the way to address climate vulnerabilities in a LHMP, i.e., it's not a hazard, itself, but is woven through the other hazards.

Thanks,

From: Jenny Woods <jwoods@lgc.org<mailto:jwoods@lgc.org>>
Date: April 22, 2016 at 8:23:05 PM PDT
To: Kathleen Ave <Kathleen.Ave@smud.org<mailto:Kathleen.Ave@smud.org>>
Cc: Curtis Alling <curtis.alling@ascentenvironmental.com<mailto:curtis.alling@ascentenvironmental.com>>, Shelley Jiang <SJiang@airquality.org<mailto:SJiang@airquality.org>>, "Robinson. Judy" <robinsonju@saccounty.net<mailto:robinsonju@saccounty.net>>, "Kate Meis (kmeis@lgc.org<mailto:kmeis@lgc.org>)" <kmeis@lgc.org<mailto:kmeis@lgc.org>>, LARRY GREENE <LGREENE@airquality.org<mailto:LGREENE@airquality.org>>, "Meg Arnold (Meg.Arnold@valleyvision.org<mailto:Meg.Arnold@valleyvision.org>)" <Meg.Arnold@valleyvision.org<mailto:Meg.Arnold@valleyvision.org>>, Amber J Mace <ajmace@ucdavis.edu<mailto:ajmace@ucdavis.edu>>, "Olson. Karen" <OlsonK@saccounty.net<mailto:OlsonK@saccounty.net>>, Alicia Brown <abrown@lgc.org<mailto:abrown@lgc.org>>
Subject: Re: Hazard Identification Table

This is a brief but interesting article about historic preservation needs in disaster preparedness efforts:

http://www.citylab.com/housing/2016/04/why-historic-preservation-needs-to-be-part-of-disaster-planning/477318/

Jenny

Sent from my iPhone

Thanks Judy!
Celine & Jeanine – Please let us know what kind of air quality data you need for the LHMP. We'd be happy to help and are excited that the Sacramento County LHMP is going to be one of the first to look at climate change. We can also send someone to the next planning committee meeting and can help contribute to the air quality and climate change sections of the LHMP.

Best wishes,

Shelley

From: Robinson. Judy [mailto:robinsonju@SacCounty.NET]
Sent: Wednesday, April 20, 2016 4:01 PM
To: Shelley Jiang; JANICE LAM; Stephen D'Andrea; Livengood. Celine; Janine Foster (jeanine.foster@fostermorrison.com) (jeanine.foster@fostermorrison.com); Booth. George
Subject: RE: Air quality data for Sacramento County's Local Hazard Mitigation Plan update

Thanks Shelley
This is another great reason why the Air District needs to be participating in the Planning meetings. Your district is a critical and important source of air quality information and identifying harmful levels and days/conditions when folks need to remain indoors. Your district has more accurate information on the local front than anywhere else and it needs to be included in the LHMP. Specifically what the consultant needs I'm not sure of but Janine is copied in this email as are the project manager and staff. Please contact Janine with questions you may have. Thanks so much for helping with this important work.

Judy Robinson
Sacramento County
Robinsonju@saccounty.net
916.874.4551

From: Shelley Jiang [mailto:SJiang@airquality.org]
Sent: Wednesday, April 20, 2016 3:37 PM
To: JANICE LAM; Stephen D'Andrea
Cc: Robinson. Judy
Subject: Air quality data for Sacramento County's Local Hazard Mitigation Plan update

Hi Janice and Stephen,
The County of Sacramento is conducting the five-year update of its Local Hazard Mitigation Plan (LHMP) right now, and for the first time, climate change is going to be included (per new legislation SB 379).

The consultant is including air quality and smoke (from wildfires) as part of the climate change section, and to inform this process it would be good to provide them with data for Sacramento County on PM 2.5, wildfire smoke impacts, and ozone (if possible correlated with extreme heat). And do you have projections of future PM 2.5 and ozone trends for the County? I'm copying on this email Judy Robinson from the County, who was at the initial planning meeting for the LHMP update, in case she has more details about the information they're looking for.

Thank you!

Shelley

Meeting Record

Project: LHMP Sacramento County	**Date**: May 5, 2016
Meeting Purpose: Coordination between LHMP Update and Climate Adaptation Plan (CAP) (new)	

Attendees		
Name	**Title**	**Contact Phone**
Erik de Kok	Sr. Planner – Ascent Environmental	916-842-3164
Curtis Alling	Planner – Ascent Environmental	
Mike Winter	Sr. Planner – Sac County	
Todd Taylor	Associate Planner – Sac County	916) 874-3125
Celine Livengood	Principal Engineer Tech - SCDWR	916-874-3130
Heidi Huber	Assistant Engineer - SCDWR	(916) 874-8650
George Booth	Sr. Civil Engineer - SCDWR	(916) 874-6484
Jeanine Foster (phoned in)	LHMP consultant – Principal of Foster Morrison Group	(303) 717-7171

Items Discussed
AB 379 – Climate Adaptation Plan (State mandate) and timeline (2018), Sac Co is ahead of deadline with completion scheduled for 2017. Consultants will share information between documents for efficiency and better data. Clarification on which document should expand and support the other and how and when to best coordinate. Discussed air quality, vector control, temps, weather (as a result of hazards or as the hazard itself , depending on which document.

Follow-up – Ascent Environmental and Foster Morrison Group will coordinate and share information with the next phone conference anticipated in late June, after the LHMP committee meeting on vulnerability		
By	**Name**	**Organization**
	Celine Livengood	SCDWR

From: Robinson. Judy [mailto:robinsonju@SacCounty.NET]
Sent: Tuesday, April 19, 2016 7:00 PM
To: Livengood. Celine <LivengoodC@saccounty.net>; Booth. George <boothg@SacCounty.NET>; Jeanine Foster <jeanine.foster@fostermorrison.com>; Rains. Mark <rainsm@SacCounty.NET>
Subject: FW: FW: Hazard Identification Table

Attached is a table with input from some of our Climate Readiness Collaborative Executive Team members. I think the comments are worthy of further discussion, especially about lumping so much stuff into climate adaptation. Health is a significant factor and I just heard a presentation last night from the Sacramento-Yolo Mosquito District about the increase in mosquito related diseases that are increasing and in some cases fatal. As I receive more of these should I continue forwarding to everyone on this email? Thank you

Judy Robinson
Sacramento County
Robinsonju@saccounty.net
916.874.4551

From: Jenny Woods [mailto:jwoods@lgc.org]
Sent: Tuesday, April 19, 2016 11:41 AM
To: Robinson. Judy
Cc: Kathleen Ave; Kate Meis (kmeis@lgc.org); Greene. Larry (Air Quality); Meg Arnold (Meg.Arnold@valleyvision.org); Amber J Mace; Curtis Alling (curtis.alling@ascentenvironmental.com); Olson. Karen; Shelley Jiang; Alicia Brown
Subject: Re: FW: Hazard Identification Table

Hi Judy -

Thanks for emailing this out. Here are my additions. I made them in the table with your feedback as well. Do others have any other feedback that they would like incorporated into this document? Judy needs the information back ASAP (I am waiting to hear about a hard deadline for feedback).

Kathleen - I did leave a question related to energy infrastructure in this document for you if you have time to take a quick look.

Thanks.

Jenny Woods

Local Government Commission
980 9th Street, Suite 1700
Sacramento, Ca 95814
(916) 448-1198 ext. 324

Jeanine
I'm forwarding some emails that contains information that needs to be considered in the LHMP. Thank you

Judy Robinson
Sacramento County
Robinsonju@saccounty.net<mailto:Robinsonju@saccounty.net>
916.874.4551

Begin forwarded message:

From: Jenny Woods <jwoods@lgc.org<mailto:jwoods@lgc.org>>
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Cc: Curtis Alling <curtis.alling@ascentenvironmental.com<mailto:curtis.alling@ascentenvironmental.com>>, Shelley Jiang <SJiang@airquality.org<mailto:SJiang@airquality.org>>, "Robinson. Judy" <robinsonju@saccounty.net<mailto:robinsonju@saccounty.net>>, "Kate Meis (kmeis@lgc.org<mailto:kmeis@lgc.org>)" <kmeis@lgc.org<mailto:kmeis@lgc.org>>, LARRY GREENE <LGREENE@airquality.org<mailto:LGREENE@airquality.org>>, "Meg Arnold (Meg.Arnold@valleyvision.org<mailto:Meg.Arnold@valleyvision.org>)" <Meg.Arnold@valleyvision.org<mailto:Meg.Arnold@valleyvision.org>>, Amber J Mace <ajmace@ucdavis.edu<mailto:ajmace@ucdavis.edu>>, "Olson. Karen" <OlsonK@saccounty.net<mailto:OlsonK@saccounty.net>>, Alicia Brown <abrown@lgc.org<mailto:abrown@lgc.org>>
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http://www.citylab.com/housing/2016/04/why-historic-preservation-needs-to-be-part-of-disaster-planning/477318/

Jenny

Sent from my iPhone

On Apr 22, 2016, at 7:00 PM, Kathleen Ave <Kathleen.Ave@smud.org<mailto:Kathleen.Ave@smud.org>> wrote:

I agree, and added this comment in response to your question for me Jenny – sorry for the delay.

In the case of the King Fire, production from the UARP was disrupted for 2 weeks, requiring an additional unbudgeted $37 million for replacement power, by far the largest cost compared to the approximately $4M in immediate physical damage. I'd be inclined to call this one a "Critical" because the additional air quality & commercial impacts can be so widespread KA

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Thanks,

Curtis E. Alling, AICP | Principal
D: 916.930.3181 | C: 916.337.8284

From: Jenny Woods [mailto:jwoods@lgc.org]
Sent: Tuesday, April 19, 2016 11:41 AM
To: Robinson. Judy
Cc: Kathleen Ave; Kate Meis (kmeis@lgc.org); Greene. Larry (Air Quality); Meg Arnold (Meg.Arnold@valleyvision.org); Amber J Mace; Curtis Alling (curtis.alling@ascentenvironmental.com); Olson. Karen; Shelley Jiang; Alicia Brown
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Kathleen - I did leave a question related to energy infrastructure in this document for you if you have time to take a quick look.

Thanks.

Jenny Woods

Local Government Commission
980 9th Street, Suite 1700
Sacramento, Ca 95814
(916) 448-1198 ext. 324

Save the Dates! The 2nd California Adaptation Forum will be held September 7-8 in Long Beach, CA. Visit www.CaliforniaAdaptationForum.org in the coming months for more details!

On Thu, Apr 14, 2016 at 4:56 PM, Robinson. Judy <robinsonju@saccounty.net> wrote:

OK Team

I'd love you to update this table with your thoughts of significance on the hazard table. There's a table from 2011 with Climate Change added for 2016. I've also attached my thoughts on this. Please send me your table with any track changes ASAP. Thanks so much

Judy Robinson

Attached is a table with input from some of our Climate Readiness Collaborative Executive Team members. I think the comments are worthy of further discussion, especially about lumping so much stuff into climate adaptation. Health is a significant factor and I just heard a presentation last night from the Sacramento-Yolo Mosquito District about the increase in mosquito related diseases that are increasing and in some cases fatal. As I receive more of these should I continue forwarding to everyone on this email? Thank you

Judy Robinson
Sacramento County
Robinsonju@saccounty.net
916.874.4551

From: Jenny Woods [mailto:jwoods@lgc.org]
Sent: Tuesday, April 19, 2016 11:41 AM
To: Robinson. Judy
Cc: Kathleen Ave; Kate Meis (kmeis@lgc.org); Greene. Larry (Air Quality); Meg Arnold (Meg.Arnold@valleyvision.org); Amber J Mace; Curtis Alling (curtis.alling@ascentenvironmental.com); Olson. Karen; Shelley Jiang; Alicia Brown
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Jenny Woods

Local Government Commission

From: Robinson. Judy [mailto:robinsonju@SacCounty.NET]
Sent: Thursday, April 21, 2016 4:33 PM
To: Darrow. Matthew <DarrowM@SacCounty.NET>; Booth. George <boothg@SacCounty.NET>; Livengood. Celine <LivengoodC@saccounty.net>; Jeanine Foster <jeanine.foster@fostermorrison.com>; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com) <erik.dekok@ascentenvironmental.com>; Curtis Alling (curtis.alling@ascentenvironmental.com) <curtis.alling@ascentenvironmental.com>; Olson. Karen <OlsonK@SacCounty.net>
Cc: Taylor. Todd <taylorto@saccounty.net>; Woo, Daniel (CDPH-DEODC-OHE) (Daniel.Woo@cdph.ca.gov) <Daniel.Woo@cdph.ca.gov>; English, Dorette (CDPH-DEODC-OHE) <Dorette.English@cdph.ca.gov>
Subject: FW: SACOG Transportation adaptation Plan

Hi All
Please find attached the SACOG Transportation Climate Vulnerability Assessment completed last year and adopted by the SACOG Board

Dan and Dorette
I don't know if you will find this helpful or not with your BRACE work.

Judy Robinson
Sacramento County
Robinsonju@saccounty.net
916.874.4551

From: Raef Porter [mailto:RPorter@sacog.org]
Sent: Thursday, April 21, 2016 3:26 PM
To: Robinson. Judy
Subject: Transportation adaptation

Hi Judy,

Attached is the final report, with appendices. Let me know if you need more info.

Thanks,

Raef

Raef Porter
Climate and Energy Team Manager
SACOG
rporter@sacog.org
916.340.6261

From: Livengood. Celine
Sent: Wednesday, July 13, 2016 2:56 PM
To: Janine Foster (jeanine.foster@fostermorrison.com)
Subject: FW: 2016 July - LHMP

Hi Jeanine.

On Tuesday July 12th, I gave a presentation on the LHMP process to the County Green Team. The talking points I shared are attached. Shared discussion and how various departments and outside agencies can participate and add projects (hazards) went on for about 20 minutes + - and I suspect we'll have some follow up involvement with new participants.

Those in attendance were as follows;

Judy Robinson, Todd Taylor, John Lundgren, Tiffany Pham (Airports), Dana Booth (storm water quality), Dan Shoeman (DOT), Brenda Bongiorno

Please add this to our CRS outreach log.
Thanks so much.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net

From: Livengood. Celine
Sent: Tuesday, July 12, 2016 11:12 AM
To: Robinson. Judy
Subject: 2016 July - LHMP

Hi Judy.

Attached is the outline of, (my talking points), the LHMP requirements and brief overview of CRS. I thought it important to mention that program and how it ties in with the set criterion to qualify.

Please let everyone know they can contact me with any questions or to discuss any potential hazards.

Thank you for including us in the meeting.
Celine

Celine Livengood

County Green Team Member List 8-10-16

Director Leads: Paul Philleo and Michael Morse
Chair: Judy Robinson, Sustainability Manager, Robinsonju@saccounty.net

County Departments/Attendees:

Marie Wooden, Environmental Mgt Dept. WoodinM@saccounty.net
Dan Mendonsa, General Services-Energy Effic, mendonsad@SacCounty.NET
Dana Booth, Water Resources-Drainage, BoothD@saccounty.net
Celine Livengood, Water Resources-LHMP, LivengoodC@saccounty.net
Jeanette Huddleston, Water Resources-LID, huddlestonj@saccounty.net
Clark Whitten, Community Dev-Econ Dev,WhittenC@saccounty.net
Kathy Gallino, Community Dev-Econ Dev, gallinok@saccounty.net
Robert Logsdon, Community Dev-Building Inspection, logsdonr@SacCounty.NET
Leighann Moffitt, Community Dev-Planning-Director, moffittl@saccounty.net
Chris Pahule, Community Development-Planning, pahulec@saccounty.net
John Lundgren, Community Dev-CAP, lundgrenj@saccounty.net
Todd Taylor, Community Dev-Planning-CAP, taylorto@saccounty.net
Kate Rose, Community Dev-Environmental, rosekat@saccounty.net
Paul Philleo, Waste Mgt & Recycling Director,philleop@SacCounty.NET
Keith Goodrich, Waste Mgt & Recycling, goodrichk@SacCounty.NET
Michael Morse, General Services- Director, morsem@SacCounty.NET
Keith Leech, General Services-Fleets, leechk@saccounty.net
Dan Shoeman, Transportation-Chief, shoemand@SacCounty.NET
Ron Vicari, Transportation, vicarir@SacCounty.NET
Bree Taylor, Airports-Sustainability, taylorbr@saccounty.net
Tiffany Pham, Airports-Sustainability, phamti@saccounty.net
Jamie White, Public Health-Epidemiologist, WhiteJa@saccounty.net
Karen Olson, Pubic Health-Climate/BRACE, OlsonK@SacCounty.net

Brenda Bongiorno, Comm/Media-Green webpage, bongiornob@saccounty.net

Outside County Attendees/Invitees:

Christoph Dobson, Sac Sewer District, dobsonc@sacsewer.com
Bernie Creelman, Sac Sewer District, creelmanb@sacsewer.com
David Ocenosak, Sac Sewer District, ocenosakd@sacsewer.com
Paul Philley, Sac Metro Air Quality District, pphilley@airquality.org
Molly Wright, Sac Metro Air Quality District, MWright@airquality.org
Greg Chew, SACOG, gchew@sacog.org;
Raef Porter, SACOG,RPorter@sacog.org
Evan Schmidt, Valley Vision, Evan.Schmidt@valleyvision.org

From: Robinson. Judy
Sent: Friday, June 24, 2016 1:33 PM
To: Woodin. Marie; Raef Porter; Dobson. Christoph (SDA); Paul Philley (pphilley@airquality.org); Mendonsa. Dan; Booth. Dana; Whitten. Clark; Philleo. Paul; Leech. Keith; Morse. Michael; Taylor. Todd; huddlestonj@saccouny.net; Gallino. Kathy; Shoeman. Dan; Goodrich. Keith; Moffitt. Leighann; Taylor. Bree; Vicari. Ron; Rose. Kate; Bongiorno. Brenda; gchew@sacog.org; White. Jamie; Olson. Karen; Evan Schmidt; Pahule. Chris; Logsdon. Robert; Booth. George; Rains. Mark; Livengood. Celine; Winter. Mike; Lundgren. John; Leatherman. Jeff; McDaniel. Mikki
Cc: Molly Wright; Huddleston. Jeanette; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com)
Subject: RE: Quarterly Green Team Meeting - July 12

Hi Everyone
I wanted to make sure you all were aware of the Local Hazard Mitigation Plan (LHMP) that is currently underway, under the leadership of County Dept of Water Resources.
http://www.waterresources.saccounty.net/stormready/Pages/Hazard-Mitigation-Planning-Committee-2016-Plan-Update.aspx

Two Planning sessions have been held, most recently this past week. I have not seen much representation from County Departments at these meetings so I am reaching out to you all to make sure your departments are aware of this work going on and participate. Types of plans and projects could be those that help to mitigate climate events especially those that can help reduce flood risks, urban heat island, drought, wildfire, etc. Creek naturalization projects could help reduce flood risks with secondary groundwater recharge benefits. Open space acquisition that can serve as a wildfire buffer, to urban areas or that mitigate flood impacts or provide groundwater recharge are examples of acceptable projects. Of course they also want the projects that you will want FEMA reimbursement for during various storm or disaster events. George Booth is the Project Lead, along with Mark Rains and Celine Livengood. They are on a tight time line to wrap this up before the end of the year. **There are some important meetings coming up July 12 & 13 that you will want to make sure you/your department participates in – if you have interest in having plans and/or projects included in the LHMP**. The LHMP is updated every 5 years and Climate Change was merely referenced in the last update. Climate Change and mitigation projects will be included in the current LHMP effort underway, but it's up to you to bring these projects forward.

Please contact George, Mark or Celine for more information or how to participate if your department is not already.

Judy Robinson
Sacramento County
Robinsonju@saccounty.net
916.874.4551

-----Original Appointment-----
From: Robinson. Judy
Sent: Wednesday, June 24, 2015 4:39 PM
To: Robinson. Judy; Woodin. Marie; Raef Porter; Dobson. Christoph (SDA); Paul Philley (pphilley@airquality.org); Mendonsa. Dan; Booth. Dana; Whitten. Clark; Philleo. Paul; Leech. Keith; Morse. Michael; Taylor. Todd; huddlestonj@saccouny.net; Gallino. Kathy; Shoeman. Dan; Goodrich. Keith; Moffitt. Leighann; Taylor. Bree; Vicari. Ron; Rose. Kate; Bongiorno. Brenda; gchew@sacog.org; White. Jamie; Olson. Karen; Evan Schmidt; Pahule. Chris; Logsdon. Robert
Cc: Molly Wright; Huddleston. Jeanette
Subject: Quarterly Green Team Meeting - July 12
When: Tuesday, July 12, 2016 10:00 AM-11:00 AM (UTC-08:00) Pacific Time (US & Canada).
Where: 827-7th Street, 2nd floor Planning Cosumnes River Room 250

From: Ghelfi. Pete
Sent: Friday, June 10, 2016 10:23 AM
To: Livengood. Celine
Subject: RE: 2016 LHMP Update - June Meeting Date(s)

Celine –

Does SAFCA need to attend?

Pete

From: Livengood. Celine
Sent: Friday, June 03, 2016 7:44 AM
Subject: 2016 LHMP Update - June Meeting Date(s)
Importance: High

Hello all.

In an earlier email, we asked that you save the dates of June 21st and 22nd for the next LHMP committee meetings. As a committee member you only need to attend one. These are duplicate meetings offering the same agenda, yet the input attendees offer will, of course, vary.

The times and venues are as follows;

Tuesday, June 21st: 1:00 pm – 4:00 pm
Laguna Creek High School - Career Room
9050 Vicino Dr., Elk Grove, CA 95758

Wednesday, June 22nd: 1:00 pm – 4:00 pm
Bannon Creek Elementary School - Multi-Purpose Room
2775 Millcreek Drive, Sacramento, CA 95833

Thank you and I look forward to seeing you there.

Celine Livengood
Principal Engineer Tech - Drainage | Department of Water Resources
827 Seventh Street, Room 301 | Sacramento, CA 95814
Office: (916) 874-3130 | Fax: (916) 874-3789
www.waterresources.saccounty.net
SACRAMENTO COUNTY

Good Morning Jeanine,
Attached you will find the Community Information Systems Reports for the 8 Communities that you requested. Please contact me if there are any questions.

Regards,
Raul

Raul Barba, PE, CFM | Water Resources Engineer

Division of Flood Management | Department of Water Resources
Address 3464 El Camino Avenue, Suite 210, Sacramento, California 95821
tel 916.574.1441 | fax 916.574.1478 | e-mail Raul.Barba@water.ca.gov

From: Jeanine Foster [mailto:jeanine.foster@fostermorrison.com]
Sent: Tuesday, March 29, 2016 8:53 AM
To: Barba, Raul@DWR
Cc: Chris Morrison
Subject: Sacramento County Flood Insurance Data

Hello,

I am working with Sacramento County and incorporated communities, in the update of their Local Hazard Mitigation Plan. I would like to request updated flood insurance information. Specifically I would like to obtain printouts to include:

- Community Overview
- Insurance Overview
- Insurance Occupancy
- Insurance Zone
- Insurance Pre/Post FIRM
- Community Repetitive Loss

We would like the requested data for:
Sacramento County,
City of Sacramento
City of Citrus Heights
City of Elk Grove
City of Folsom
City of Galt
Town of Isleton
City of Rancho Cordova

Please let me know if you have questions or need additional information.

Thanks very much,

From: LaMar-Haas, Victoria@CalOES [mailto:Victoria.LaMar-Haas@CalOES.ca.gov]
Sent: Tuesday, April 05, 2016 11:12 AM
To: Chris Morrison <chris.morrison@fostermorrison.com>
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: RE: Cal OES State Disaster Decs

Contact Tamera Scott-Smith in recovery. Her email is Tamera.Scott-Smith@caloes.ca.govry

She works on the Recovery Division's Proclamation team and should have what you need. If not, let me know and we can try another route.

-Victoria

From: Chris Morrison [mailto:chris.morrison@fostermorrison.com]
Sent: Monday, April 04, 2016 1:42 PM
To: LaMar-Haas, Victoria@CalOES
Cc: Jeanine Foster
Subject: Cal OES State Disaster Decs

Victoria,

Often we get State of California Disaster Declarations from the State Plan (Annex M in 2013). Is there a way to get them through Cal OES? We are working on Sacramento County now, and were looking to get them from 2011 to present?

Let me know when you have a chance!

From: Michelle Mead - NOAA Federal [mailto:michelle.mead@noaa.gov]
Sent: Wednesday, August 17, 2016 12:49 PM
To: Livengood. Celine
Subject: Re: FW: 2016 LHMP Update - RFI

Hi Celine~
This is not something I have been asked to do in the past. I supply the Storm Data information, and you all at the county assess the impacts from the storm events and input those into your LHMP.

I realized after looking at the report I had forgotten to click a few of the elements you had requested. I ran it again and you can get a copy of it here: https://verification.nws.noaa.gov/stormdat/downloads/data/qunzcdtyzu35uypjryyvem3d-08-17-2016-15-58.pdf

Sincerely,
Michelle

On Wed, Aug 17, 2016 at 7:25 AM, Livengood. Celine <LivengoodC@saccounty.net> wrote:

Hello Michelle.

The information needs to be filled in on the worksheet attached, bottom of page 6 and top of page 7.

I do appreciate your time in filling it out.

Thanks and I hope to meet you at one of our upcoming meetings.

-----Original Message-----
From: Shelley Jiang [mailto:SJiang@airquality.org]
Sent: Friday, September 30, 2016 5:44 PM
To: Jeanine Foster; Robinson. Judy
Cc: Livengood. Celine; lgreene@airquality.net; Chris Morrison; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com); Taylor. Todd; Kathleen Ave
Subject: RE: LHMP Planning Team Review Draft Document

Hi Jeanine,
I'm still waiting to hear back from the study, which examines recent wildfire smoke trends in the last few years, but in the meantime I have revised what you sent me from Placer County for a more general Sacramento description. Here it is. I am hoping to get an update about the study soon and will try to provide that information if it works with your timeline. In the meantime this can serve as a placeholder.

Thanks!

Shelley

-----Original Message-----
From: Jeanine Foster [mailto:jeanine.foster@fostermorrison.com]
Sent: Friday, September 30, 2016 6:24 AM
To: Shelley Jiang; Robinson. Judy
Cc: Livengood. Celine; lgreene@airquality.net; Chris Morrison; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com); Taylor. Todd; Kathleen Ave
Subject: RE: LHMP Planning Team Review Draft Document

Hi Shelly,

I had previously given you some text about the wildfire and the smoke/air quality issue that we did for Placer County and asked if you had wanted to edit it for Sacramento given your general concerns with wildfires and smoke (outside of the climate change issue). It sounded like you were waiting for a report to come with updated information.
Anyway, if you would like to include some information on the District's concerns with smoke and air quality, you are welcome to. Just let us know as we have a placeholder

Thanks,
Jeanine

From: Livengood. Celine
Sent: Wednesday, June 29, 2016 1:13 PM
To: 'rd1601@frontiernet.net'; 'cneudeck@ksninc.com'; 'ssinnock@ksninc.com'; 'cneudeck@ksninc.com'; 'cosio@mbkengineers.com'; 'ginny@greeneandhemly.com'; 'rabercrombie@tfewines.com'; 'cosio@mbkengineers.com'; 'pdevereux@rd1000.org'; 'pcarey@water.ca.gov'; 'pwervin@wbecorp.com'; Peterson. Todd; Booth. George; Rains. Mark; Thomas. Don; Radmacher. Richard; Ghelfi. Pete; Darrow. Matthew; Tamayo. Dave; Johnson. Michael; Rickelton. Glen; Acosta. Diana; Robinson. Judy; Taylor. Todd; Winter. Mike; 'alstonjoan@comcast.net'; 'walterjhoppe@gmail.com'; 'manager@woodsidehoa.com'; 'henry@wbecorp.com'; 'ckchu52@comcast.net'; 'Glabrie@dccengineering.net'; 'emily@dccengineering.net'; 'Kevin Becker'; 'bmurdoch@elkgrovecity.org'; 'bfragiao@elkgrovecity.org'; 'cnelson@elkgrovecity.org'; 'jcline@elkgrovecity.org'; 'rphillips@folsom.ca.us'; 'leighton.johe@folsomfsc.org'; 'sstaley@folsom.ca.us'; 'communitysuggestion@fairoakspark.org'; 'carriec51@earthlink.net'; 'mnisenboym@fowd.com'; Kristopher Borders (FOPD); 'jbehrmann@ci.galt.ca.us'; 'wforrest@ci.galt.ca.us'; 'abernardino@ci.galt.ca.us'; 'swinkler@ci.galt.ca.us'; 'djhengineering@hughes.com'; 'sandra.rutledge@cityofisleton.com'; 'romi.balbini@gmail.com'; 'javed.siddiqui@jtsengineering.com'; 'aquynn@cityofranchocordova.org'; 'cperkins@cityofsacramento.org'; 'ksherfey@cityofsacramento.org'; 'rmendoza@cityofsacramento.org'; 'rserran@cityofsacramento.org'; 'ldeklinski@cityofsacramento.org'; 'jsirney1@pd.cityofsacramento.org'; 'rec1146@aol.com'; 'swinton@pd.cityofsacramento.org'; 'Brian.Heiland@water.ca.gov'; 'alan.haynes@noaa.gov'; 'jeff@sactoflood.com'; 'derek@larsenwurzel.com'; 'Dhenderson@esri.com'; 'tferguson@nwhm.com'; Moore. Stephen (SDA); Nebozuk. Steven (SDA); 'hitomib@csus.edu'; 'turnerd@losrios.edu'; 'salfen@arcohe.net'; 'Greg.Rash@twinriversusd.org'; 'mikejordan@centerusd.k12.ca.us'; 'ecarlson@egwd.org'; 'karla.tejada@gswater.com'; 'brandyn.hancocks@gswater.com'; 'fgayle@sswd.org'; 'laura@carmichaelwd.org'; 'des@cpuc.ca.gov'; 'joseph.tanner@amwater.com'; 'debrasedwick@sbcglobal.net'; 'nwadmin@natomaswater.com'; 'sfraher@acrpd.com'; 'mail@carmichaelwd.org'; 'ssingh-martin@southgaterecandpark.net'; 'klove@sacsheriff.com'; 'ewhite@elkgrovepd.org'; 'bnoblett@elkgrovepd.org'; 'rooney@pd.cityofsacramento.org'; 'James-hendricks@heroldfiredistrict.com'; 'krishubbard@csdfire.com'; 'casentini.gregory@metrofire.ca.gov'; 'davidwelch@courtlandfire.com'; 'meg.arnold@valleyvision.org'; 'jim@gillumco.com'; 'hehillmann@comcast.net'; 'alexia.berlanda@dbiservices.com'; 'gbwhitney@gmail.com'; 'sdavis@golyon.com'; 'delliot@golyon.com'; '123her@citilink.net'; 'arvail@sbcglobal.net'; 'jkim@lgc.org'; 'Kathleen.Ave@smud.org'; 'amanda@ejcw.org'; 'colin@ejcw.org'; 'Moore, Charlea (MSA)'; 'kmeis@lgc.org'; 'mace.ucdavis@gmail.com'; 'curtis.alling@ascentenvironmental.com'; Greene. Larry (Air Quality); 'jwoods@lgc.org'; 'ezapata@cityofsacrmento.org'; 'cferrari@geiconsultants.com'; 'Rob.Mead@comcast.net'; Olson. Karen; 'asadakhtar@csus.edu'; 'wolmsted@comcast.net'; 'rec1146@aol.com'; 'ivan.gennis@gmail.com'; 'generalwelfare@surewest.com'; 'lance.egcitizen@gmail.com'; 'pimentald@sccounty.net'; 'rlane@cityofsacramento.org'; 'linda@chaplaw.us'; 'giranch@frontiernet.net'; 'virvitch@aol.com'; 'redibble@gmail.com'; 'jedibble@gmail.com'; 'spammyrussell@gmail.com'; 'tim@timhodgson.us'; 'michelle_franusich@yahoo.com'; 'Hkhapp@aol.com'; 'WaterJHoppe@gmail.com'; 'Bob33Berger@gmail.com'; 'Peterwestleystone@gmail.com'; 'Emily@dccengineering.net'; 'saberin@frontiernet.net'; Flynn. MaryJo; 'incer@saccounty.net'; 'cantelmes@saccounty.net'; 'Jose.Lara@caloes.ca.gov'; 'Megan.Walton@caloes.ca.gov'; 'Victoria.LaMar-Haas@CalOES.ca.gov'; 'YRodrigu@placer.ca.gov'; 'michelle.mead@noaa.gov'; 'eckman@water.ca.gov'; 'mlorenzo@water.ca.gov'; 'chrisferrari@geiconsultants.com'; 'msvls@cwo.com'; 'daniel@kaydix.com'; 'jwoodling@rwah2o.org'; 'rd1601@frontiernet.net'; 'cneudeck@ksninc.com'; 'ssinnock@ksninc.com'; 'cneudeck@ksninc.com'; 'cosio@mbkengineers.com'; 'ginny@greeneandhemly.com'; 'rabercrombie@tfewines.com'; 'cosio@mbkengineers.com'; 'pdevereux@rd1000.org'; 'pcarey@water.ca.gov'; 'pwervin@wbecorp.com'; 'henry@wbecorp.com'; 'ckchu52@comcast.net'; 'Glabrie@dccengineering.net'; 'emily@dccengineering.net'; 'msvls@cwo.com'; 'daniel@kaydix.com'; 'jwoodling@rwah2o.org'; Peterson. Todd; Booth. George; Rains. Mark; Livengood. Celine; Thomas. Don; Radmacher. Richard; Darrow. Matthew; Tamayo. Dave; Johnson. Michael; Rickelton. Glen; Acosta. Diana; Robinson. Judy; Taylor. Todd; Winter. Mike; 'alstonjoan@comcast.net'; 'walterjhoppe@gmail.com'; 'manager@woodsidehoa.com'

Cc: Rains. Mark; Booth. George; Janine Foster (jeanine.foster@fostermorrison.com)
Subject: LHMP Update - Committee) Meetings #3 and #4

Hello to you all.

The upcoming July meetings are #3 and #4 which are the two most important meetings for this LHMP Update. Goals and objectives will be updated and mitigation projects identified and prioritized.
The time commitment in July is necessary to complete the LHMP requirements. The meetings will take place over two days, with the same information offered in the morning and the afternoon for convenience in attending your choice of location.

For committee members, attendance is required at one 3-hour meeting block on June 12th for the Goals Meeting and one 3-hour meeting block on June 13th for the Mitigation Alternatives/Projects Meeting. Individuals from the general public are welcome and encouraged to participate also. Meeting times and locations are as follows;

Tuesday July 12th – Meeting #3	**Wednesday July 13th – Meeting #4:**
8:30 — 11:30 **Bannon Creek Elementary School - Multi-Purpose Room** **2775 Millcreek Drive, Sacramento, CA** ***Or*** **1:00 pm – 4:00 pm** **Laguna Creek High School - Career Room** **9050 Vicino Dr., Elk Grove, CA**	**8:30 — 11:30** **Bannon Creek Elementary School - Multi-Purpose Room** **2775 Millcreek Drive, Sacramento, CA** ***Or*** **1:00 pm – 4:00 pm** **Laguna Creek High School - Career Room** **9050 Vicino Dr., Elk Grove, CA**

Key County and City departmental Staff, District staff, as well as community groups and members of the public with recommendations for mitigation projects to address identified natural hazards should attend these meetings. Your input is critical to success of this important document. Please forward this email or distribute the attached flyer to anyone who may be interested in contributing to the Plan.

If you haven't attended previous meetings, please RSVP so we have enough seating for all attendees. We look forward to seeing you then and hearing your thoughts.

Celine Livengood

-----Original Message-----
From: Shelley Jiang [mailto:SJiang@airquality.org]
Sent: Friday, September 30, 2016 5:44 PM
To: Jeanine Foster; Robinson. Judy
Cc: Livengood. Celine; lgreene@airquality.net; Chris Morrison; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com); Taylor. Todd; Kathleen Ave
Subject: RE: LHMP Planning Team Review Draft Document

Hi Jeanine,
I'm still waiting to hear back from the study, which examines recent wildfire smoke trends in the last few years, but in the meantime I have revised what you sent me from Placer County for a more general Sacramento description. Here it is. I am hoping to get an update about the study soon and will try to provide that information if it works with your timeline. In the meantime this can serve as a placeholder.

Thanks!

Shelley

-----Original Message-----
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Sent: Friday, September 30, 2016 6:24 AM
To: Shelley Jiang; Robinson. Judy
Cc: Livengood. Celine; lgreene@airquality.net; Chris Morrison; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com); Taylor. Todd; Kathleen Ave
Subject: RE: LHMP Planning Team Review Draft Document

Hi Shelly,

I had previously given you some text about the wildfire and the smoke/air quality issue that we did for Placer County and asked if you had wanted to edit it for Sacramento given your general concerns with wildfires and smoke (outside of the climate change issue). It sounded like you were waiting for a report to come with updated information.
Anyway, if you would like to include some information on the District's concerns with smoke and air quality, you are welcome to. Just let us know as we have a placeholder

Thanks,
Jeanine

-----Original Message-----
From: Shelley Jiang [mailto:SJiang@airquality.org]
Sent: Thursday, September 29, 2016 5:59 PM
To: Jeanine Foster <jeanine.foster@fostermorrison.com>; Robinson. Judy <robinsonju@SacCounty.NET>
Cc: Livengood. Celine <LivengoodC@saccounty.net>; lgreene@airquality.net; Chris Morrison <chris.morrison@fostermorrison.com>; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com) <erik.dekok@ascentenvironmental.com>; Taylor. Todd <taylorto@saccounty.net>; Kathleen Ave <Kathleen.Ave@smud.org>
Subject: RE: LHMP Planning Team Review Draft Document

Hi Judy and Jeanine,

I added something about how increased wildfires in northern California due to climate change will likely increase wildfire smoke in Sacramento County - are you looking for anything more specific than that?

Thanks!

Shelley

_____

From: Jeanine Foster [jeanine.foster@fostermorrison.com]
Sent: Thursday, September 29, 2016 10:54 AM
To: Robinson. Judy
Cc: Livengood. Celine; Shelley Jiang; lgreene@airquality.net; Chris Morrison; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com); Taylor. Todd; Kathleen Ave
Subject: RE: LHMP Planning Team Review Draft Document

Hi Judy,

Thanks for the edits. We will go through them and incorporate.

Also do you know if we will have any input on the Wildfire and Smoke issue? And also the City of Sacramento was inquiring to see if the Air Quality District had any project they were interested in including on the wildfire/smoke issue. Is there a project anyone is interested in including? The City was interested in doing some type of focused public outreach on this and wondered what else is being considered.

Thanks,

Jeanine

-----Original Message-----
From: Robinson. Judy [mailto:robinsonju@SacCounty.NET]
Sent: Thursday, September 29, 2016 11:29 AM
To: Jeanine Foster <jeanine.foster@fostermorrison.com>
Cc: Livengood. Celine <LivengoodC@saccounty.net>; sjiang@airquality.org; lgreene@airquality.net; Chris Morrison <chris.morrison@fostermorrison.com>; Erik deKok - Ascent Environmental, Inc (erik.dekok@ascentenvironmental.com) <erik.dekok@ascentenvironmental.com>; Taylor. Todd <taylorto@saccounty.net>; Kathleen Ave <Kathleen.Ave@smud.org>
Subject: RE: LHMP Planning Team Review Draft Document

Hi Jeanine
Thanks for allowing the extra time to submit comments. Here are the comments/edits that incorporate my comments and that of the Capital Region Climate Readiness Collaborative. Thank you in advance for including them in this important document. I/we also realize the timing constraints with the LHMP and the Climate Action Plan schedules and appreciate all you can do within these and other limitations. Please let me know if/how we can be of further assistance. Thanks again.

Judy Robinson
Sacramento County
Robinsonju@saccounty.net
916.874.4551

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Friday, October 21, 2016 4:35 PM
To: Peterson. Todd <petersont@SacCounty.NET>; Booth. George <boothg@SacCounty.NET>; Rains. Mark <rainsm@SacCounty.NET>; Livengood. Celine <LivengoodC@saccounty.net>; Thomas. Don <thomasdon@SacCounty.NET>; Radmacher. Richard <RADMACHERR@saccounty.net>; Darrow. Matthew <DarrowM@SacCounty.NET>; Tamayo. Dave <tamayod@SacCounty.NET>; Johnson. Michael <johnsonm@SacCounty.NET>; Rickelton. Glen <RickeltonG@saccounty.net>; Acosta. Diana <AcostaD@saccounty.net>; Robinson. Judy <robinsonju@SacCounty.NET>; Wright. Archie <WrightAr@SacCounty.NET>; Taylor. Todd <taylorto@saccounty.net>; Winter. Mike <WINTERM@saccounty.net>; alstonjoan@comcast.net; walterjhoppe@gmail.com; manager@woodsidehoa.com; Ghelfi. Pete <ghelfip@SacCounty.NET>; rd1601@frontiernet.net; cneudeck@ksninc.com; ssinnock@ksninc.com; cneudeck@ksninc.com; cosio@mbkengineers.com; ginny@greeneandhemly.com; rabercrombie@tfewines.com; cosio@mbkengineers.com; pdevereux@rd1000.org; pcarey@water.ca.gov; pwervin@wbecorp.com; henry@wbecorp.com; ckchu52@comcast.net; Glabrie@dccengineering.net; emily@dccengineering.net; msvls@cwo.com; daniel@kaydix.com; jwoodling@rwah2o.org; eckman@water.ca.gov; mlorenzo@water.ca.gov; cferrari@geiconsultants.com; michelle.mead@noaa.gov; Flynn. MaryJo <FlynnM@saccounty.net>; Ince. Roger <incer@SacOES.Org>; Cantelme. Steve <cantelmes@sacoes.org>; Jose.Lara@caloes.ca.gov; Megan.Walton@caloes.ca.gov; Victoria.LaMar-Haas@CalOES.ca.gov; YRodrigu@placer.ca.gov; Becker, Kevin (MSA) <kbecker@citrusheights.net>; bmurdoch@elkgrovecity.org; bfragiao@elkgrovecity.org; cnelson@elkgrovecity.org; jcline@elkgrovecity.org; rphillips@folsom.ca.us; leighton.johe@folsomfsc.org; sstaley@folsom.ca.us; communitysuggestion@fairoakspark.org; carriec51@earthlink.net; mnisenboym@fowd.com; Kristopher Borders (FOPD) <kborders@fairoakspark.org>; jbehrmann@ci.galt.ca.us; wforrest@ci.galt.ca.us; abernardino@ci.galt.ca.us; swinkler@ci.galt.ca.us; djhengineering@hughes.com; sandra.rutledge@cityofisleton.com; romi.balbini@gmail.com; javed.siddiqui@jtsengineering.com; aquynn@cityofranchocordova.org; cperkins@cityofsacramento.org; ksherfey@cityofsacramento.org; rmendoza@cityofsacramento.org; rserran@cityofsacramento.org; ldeklinski@cityofsacramento.org; jsirney1@pd.cityofsacramento.org; rec1146@aol.com; swinton@pd.cityofsacramento.org; Brian.Heiland@water.ca.gov; alan.haynes@noaa.gov; jeff@sactoflood.com; derek@larsenwurzel.com; Dhenderson@esri.com; tferguson@nwhm.com; Moore. Stephen (SDA) <moorest@sacsewer.com>; Nebozuk. Steven (SDA) <nebozuks@sacsewer.com>; hitomib@csus.edu; turnerd@losrios.edu; salfen@arcohe.net; Greg.Rash@twinriversusd.org; Beth.Brose@twinriversusd.org; mikejordan@centerusd.k12.ca.us; ecarlson@egwd.org; karla.tejada@gswater.com; brandyn.hancocks@gswater.com; fgayle@sswd.org; laura@carmichaelwd.org; des@cpuc.ca.gov; joseph.tanner@amwater.com; debrasedwick@sbcglobal.net; nwadmin@natomaswater.com; sfraher@acrpd.com; mail@carmichaelwd.org; ssingh-martin@southgaterecandpark.net; klove@sacsheriff.com; ewhite@elkgrovepd.org; bnoblett@elkgrovepd.org; rooney@pd.cityofsacramento.org; James-hendricks@heraldfiredistrict.com; krishubbard@csdfire.com; casentini.gregory@metrofire.ca.gov; davidwelch@courtlandfire.com; meg.arnold@valleyvision.org; jim@gillumco.com; hehillmann@comcast.net; alexia.berlanda@dbiservices.com; gbwhitney@gmail.com; sdavis@golyon.com; delliot@golyon.com; 123her@citilink.net; arvail@sbcglobal.net; jkim@lgc.org; Kathleen.Ave@smud.org; amanda@ejcw.org; colin@ejcw.org; Moore, Charlea (MSA) <charhorseranch@aol.com>; kmeis@lgc.org; mace.ucdavis@gmail.com; curtis.alling@ascentenvironmental.com; Greene. Larry (Air Quality) <LGreene@airquality.org>; jwoods@lgc.org; katie@vgconsulting.org; ezapata@cityofsacrmento.org; cferrari@geiconsultants.com; Rob.Mead@comcast.net; Olson. Karen <OlsonK@SacCounty.net>; asadakhtar@csus.edu; wolmsted@comcast.net; rec1146@aol.com; ivan.gennis@gmail.com; generalwelfare@surewest.com;

lance.egcitizen@gmail.com; pimentald@saccounty.net; rlane@cityofsacramento.org; linda@chaplaw.us; giranch@frontiernet.net; virvitch@aol.com; redibble@gmail.com; jedibble@gmail.com; spammyrussell@gmail.com; tim@timhodgson.us; michelle_franusich@yahoo.com; Hkhapp@aol.com; WalterJHoppe@gmail.com; Bob33Berger@gmail.com; Peterwesleystone@gmail.com; Emily@dccengineering.net; saberin@frontiernet.net; kirtland@csus.edu; saminall@water.ca.gov; rob.mead@comcast.net; rlane@cityofsacramento.org; lgreene@airquality.net; ajmace@ucdavis.edu; sjiang@airquality.org; rec1146@aol.com; jcowles@cityofranchocordova.org; Ozorak. Etienne <ozorake@saccounty.net>; Hines. Kyle <HINESK@SacCounty.NET>; mmirmazaheri@geiconsultants.com; huddlestonj@sacounty.net; beth.brose@twinriversusd.org; teague.michael@metrofire.ca.gov; dnugen@folsom.ca.us; Wright. Archie <WrightAr@SacCounty.NET>
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>
Subject: 2016 LHMP Update - Final Meeting(s)

Hello to you all.

The upcoming meetings in November are the last to complete the LHMP 5-year update! Once again, there will be two meetings on subsequent days, with the same information offered each day. This is for your convenience in attending your choice of location or day.

Attendance from committee members is required at one of the meetings. Individuals from the general public are welcome and encouraged to participate also. If you know of people in the general public that would like to attend a meeting, there will be two evening meetings, of which you are not required to attend.

Please forward this email to anyone who may be interested in contributing to the Plan.

Your attendance at one of the final committee meetings is critical for ensuring FEMA participation requirements are met.

The meetings are scheduled as follows;

Hazard Mitigation Planning/Steering Committee Meetings–

Committee Members - November 16th 9:00-11:00 AM at South Natomas Community Center, Conference Room
2921 Truxel Rd, Sacramento, CA 95833

Committee Members - November 17th 9:00-11:00 AM at Hood/Courtland Fire House (Station 2)
1125 Hood Franklin RD, Hood, CA 95639

Public Meetings -

General Public - November 15th 6:00-7:30 PM at South Natomas Community Center, Conference Room
2921 Truxel Rd, Sacramento, CA 95833

General Public - November 16th 6:00-7:30 PM at Laguna Creek High School, Career Room
9050 Vicino Dr., Elk Grove, CA 95758

While you are welcome to come and support the public meetings, please plan on attending one of the final Planning/Steering Committee meetings to provide input on the Draft LHMP and to address public comments. After the review and comment period, the LHMP will be submitted to Cal OES/FEMA for approval and subsequently will be adopted by the governing boards for each participating jurisdiction.

Please let me know if you have questions. In addition to your attendance at one of the final planning/steering committee meetings, you can also provide written comments on the public review draft by:

- Email comments to Jeanine.foster@fostermorrison.com or LivengoodC@saccounty.net
- Bring comments to one of the meetings

For all participating jurisdictions, Jeanine will be in touch with you this week to provide a final punch list of any outstanding items for your Annexes.

Thank you for all your time and commitment to this important document.

Celine Livengood

From: Livengood. Celine [mailto:LivengoodC@saccounty.net]
Sent: Friday, September 02, 2016 8:33 AM
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Subject: LHMP Planning Team Review Draft Document

Hello,

We are providing a link to the Planning Team Review DRAFT 2016 Sacramento County LHMP Update document:

There are three sets of pdf documents on the Dropbox:

- a complete document of the Base Plan and all Jurisdictional Annexes
- a Base Plan document (chapters 1-7)
- a document containing all Jurisdictional Annexes.

https://www.dropbox.com/sh/myhrggxifggb3my/AADAE8XNA7UX3MGGDq5-7Wr1a?dl=0

Please distribute to the entire planning team for their review and comment. A couple things to note:

1. Some areas in the Base Plan and Annexes are still in process: There are areas highlighted in yellow where we still need input from the planning team. Everyone, send your input and edits. You can email any inserts of text that will help make this document more accurately reflect the hazards, risks, and vulnerability of the planning area. Areas highlighted in green are areas for Foster Morrison to finish.
2. Keep in mind that the data sources relied on are generally "Best Available Information" based on what has been reported, existing documentation, and information obtained to date from the planning team. If you have more accurate information, additional details, etc. of how identified natural hazards in general or a past hazard event affected the planning area or input on any other areas of the plan, please provide.

The deadline to turn around comments on this Planning Team Draft LHMP is Friday, September 23.

Please have everyone send their input directly to me at the below email. We realize this is a large document, please focus your review efforts on those areas which you have the most knowledge and input. Everyone does not need to provide a complete review, especially for the Annexes.

If anyone has questions or would like to discuss, please have them call or email me. The individual Annexes in a word version will also be sent over the next couple of days directly to the responsible agency for their review and input.

Thanks very much for everyone's help!

Jeanine

Jeanine Foster, J.D.
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Celine Livengood

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Sac Metro AQMD	Amber Mace	ajmace@ucdavis.edu
	Shelley Jiang	sjiang@airquality.org
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Sacramento Metro Fire	Mike Teague	teague.michael@metrofire.ca.gov
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Hi Jeanine.

These are photos of the materials handed out and discussed at the EAP meeting that George and I attended last week, on November 4th.

The photo shows the flyer that Kelly put together and I didn't have time to add our logo. The photo shows the side with the Draft document discussed (website and libraries to review it) and the other side has the meeting dates noted.

Also, I took various shots of the sign in to be certain that all the names were legible.

I'm in all day so hope to get all the County pieces caught up on this.
Thank you. Celine

Celine Livengood
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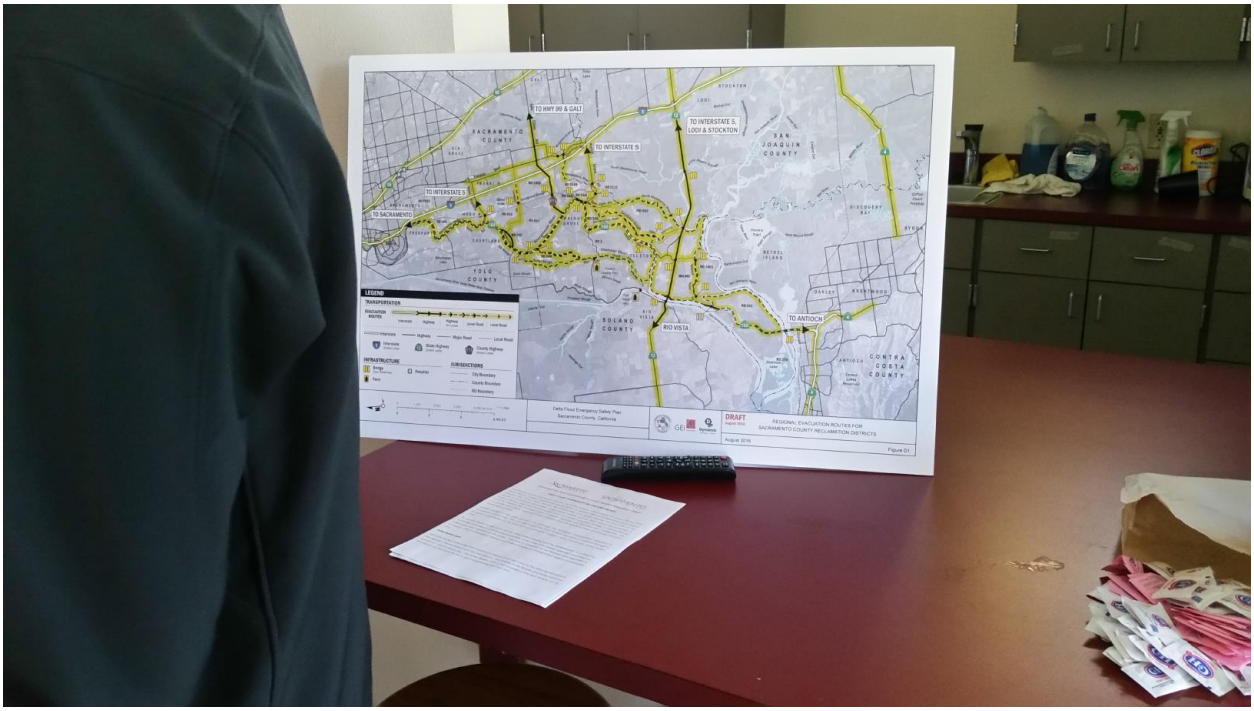
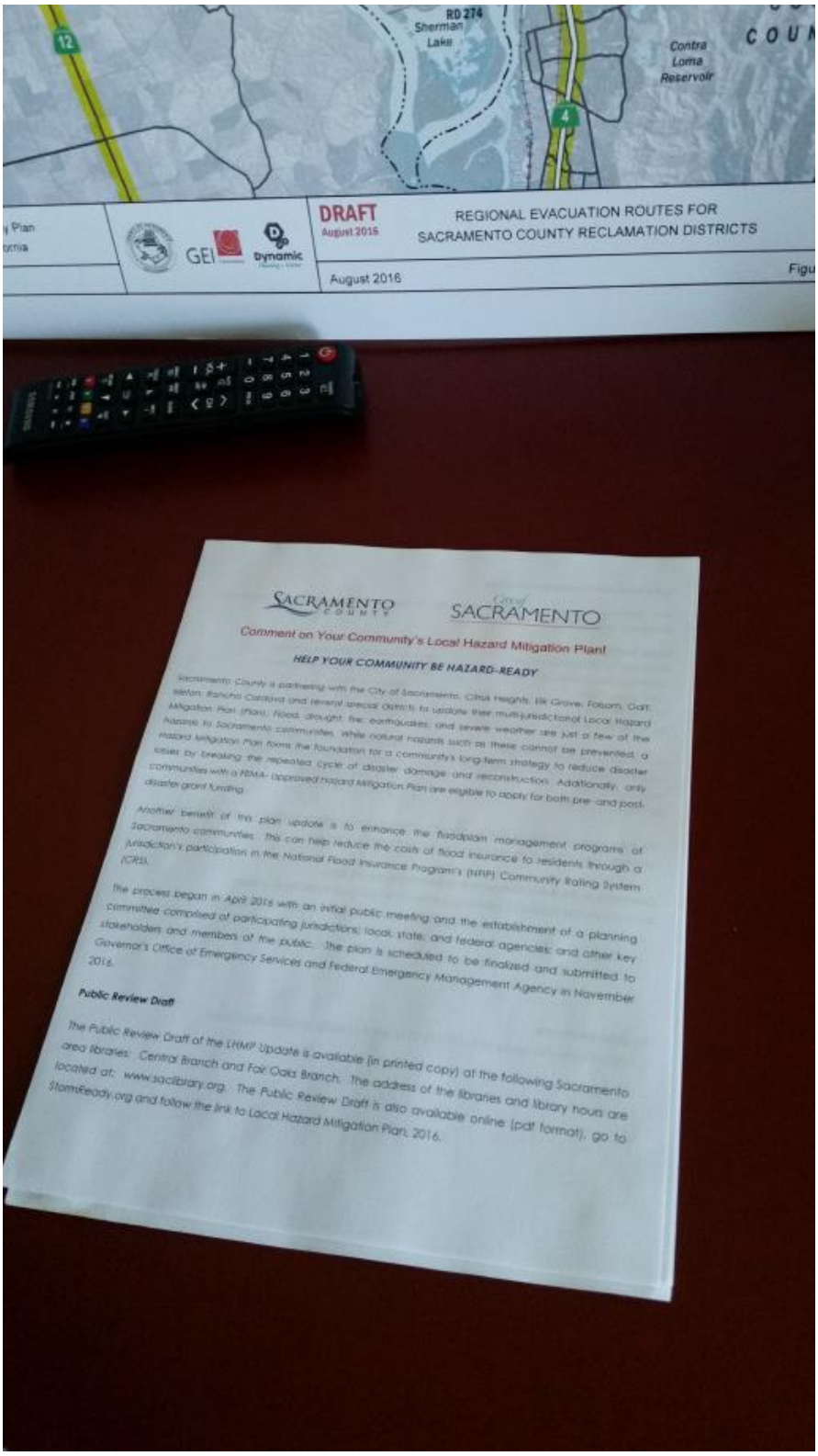
SACRAMENTO COUNTY

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Sherman Lake
Contra Loma Reservoir
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August 2016
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SACRAMENTO COUNTY RECLAMATION DISTRICTS
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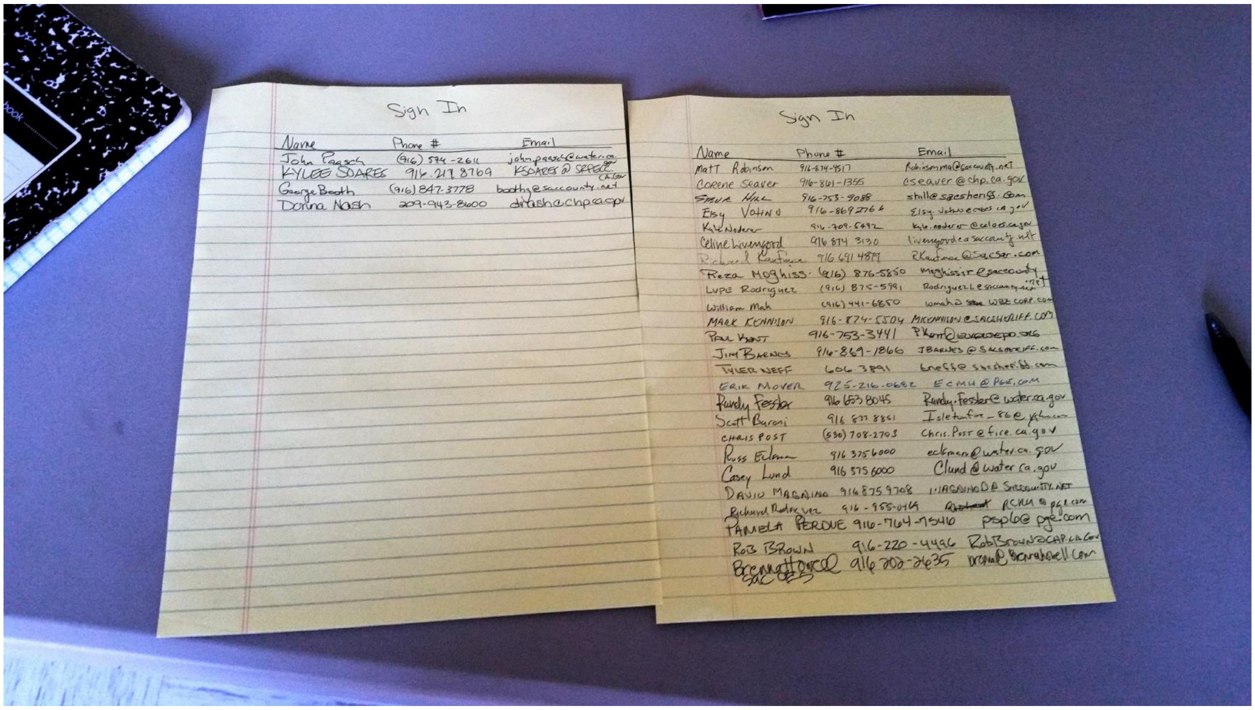
SACRAMENTO
Comment on Your Community's Local Hazard Mitigation Plan!
HELP YOUR COMMUNITY BE HAZARD-READY
Public Review Draft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KYLEE SOARES 916.217.8769
George Booth (916) 847-3778 boothg@saccounty.net
Donna Nash 209-943-8600
Sign In
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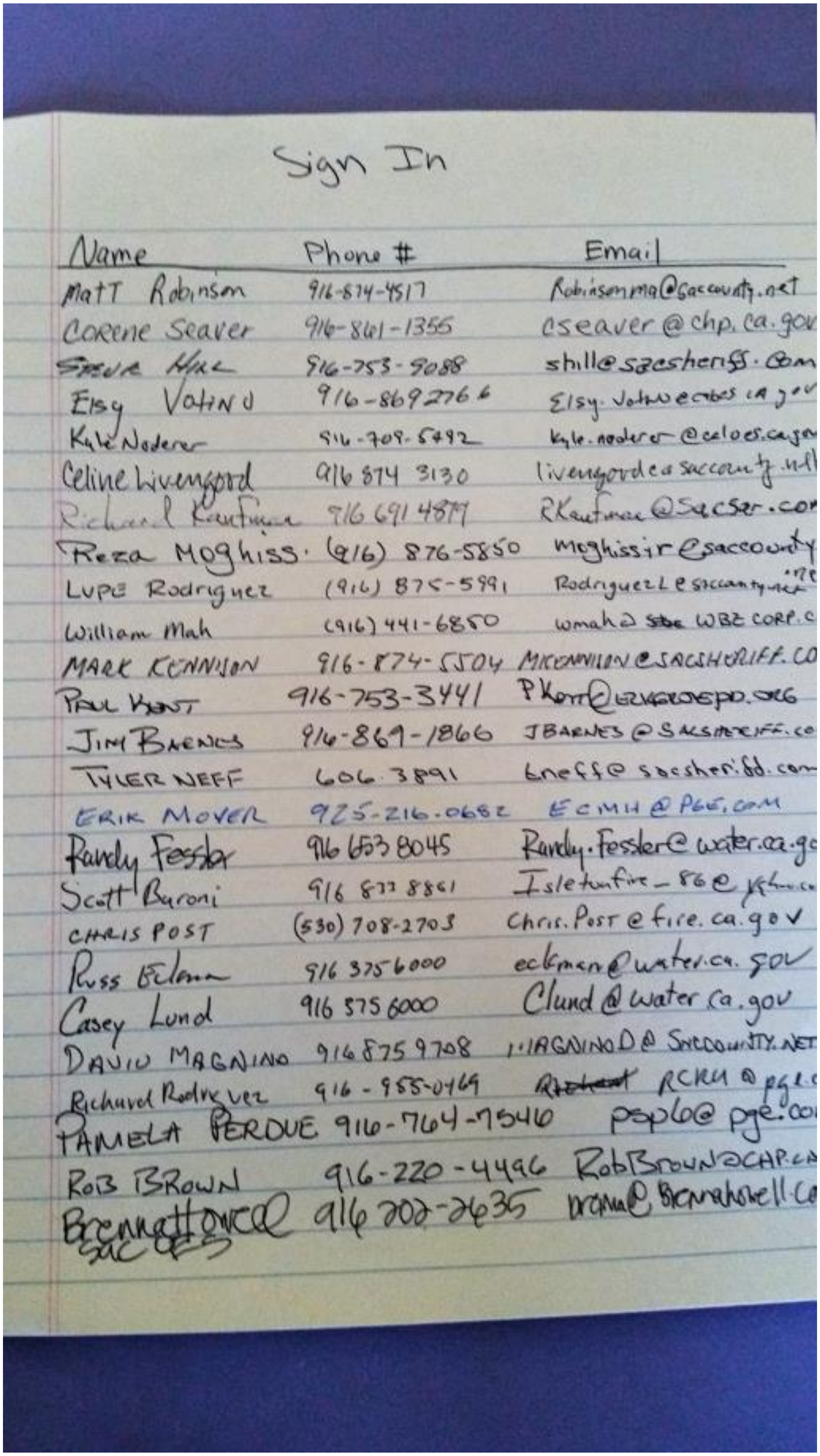
916 202-2635
SAC OES



Sign In

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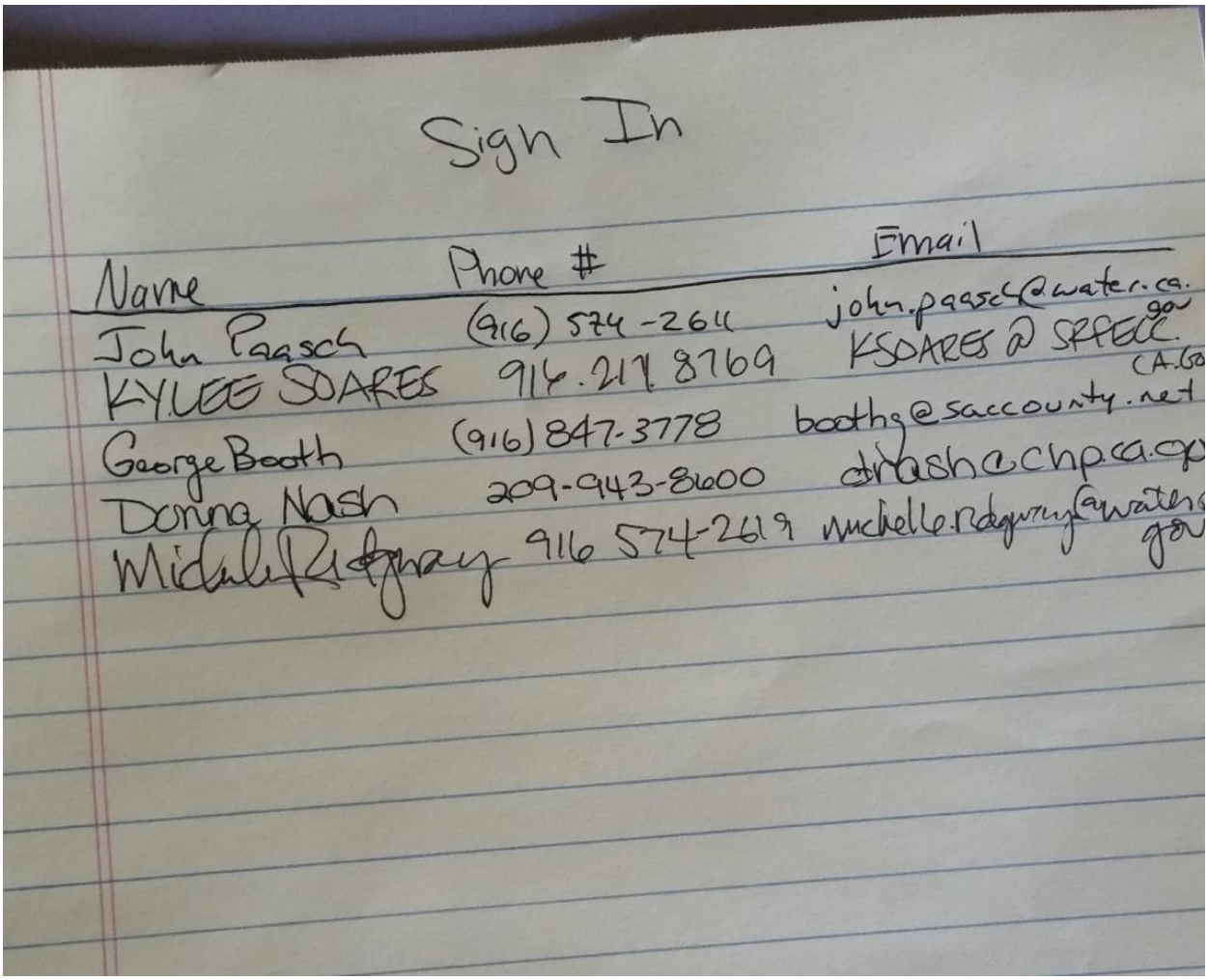

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Appendix C Mitigation Strategy

C.1 Mitigation Strategy Meeting Handout

Sacramento County
Local Hazard Mitigation Plan Update
Mitigation Strategy Meetings #3 and #4
June 12 and 13, 2016

Table of Contents:

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AGENDA

Sacramento County
Local Hazard Mitigation Plan (LHMP) Update
Mitigation Strategy Meetings
July 12 & 13, 2016

HMPC Meeting #3

1. Introductions
2. Watershed Management Plan (WMP) Status
3. Status of the DMA Planning Process
4. Risk Assessment Update
5. Develop Updated Plan Goals and Objectives
6. Identify and Review Mitigation Alternatives/Projects

HMPC Meeting #4

1. Introductions
2. Watershed Management Plan (WMP) Status
3. Identify and discuss Mitigation Alternatives/Projects
4. Review Mitigation Selection Criteria
5. Prioritize Mitigation Projects
6. Review of Schedule/Data Needs

Risk Assessment & Mitigation Strategy Meetings

Day 1

Hazard Identification & Profiles

Table 1 Sacramento County Hazard Identification Table

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Agricultural Hazards	Significant	Highly Likely	Critical	Medium	Medium
Bird Strike	Limited	Highly Likely	Critical	Medium	Low
Climate Change	Extensive	Highly Likely	Critical	High	N/A
Dam Failure	Significant	Unlikely	Catastrophic	Med-High	High
Drought and Water Shortage	Extensive	Likely	Limited	Med -High	High
Earthquake	Limited	Occasional	Critical	Medium	None
Earthquake: Liquefaction	Significant	Occasional	Limited	Medium	None
Flood: 100/200/500-year	Significant	Occasional	Catastrophic	High	High
Flood: Localized Stormwater Flooding	Limited	Highly Likely	Limited	Med-High	High
Landslides	Limited	Unlikely	Negligible	Low	Medium
Levee Failure	Significant	Occasional	Catastrophic	High	High
River/Stream/Creek Bank Erosion	Limited	Highly Likely	Limited	Medium	High
Severe Weather: Extreme Temperatures – Cold/Freeze	Extensive	Highly Likely	Limited	Low	High
Severe Weather: Extreme Temperatures - Heat	Extensive	Highly Likely	Critical	High	High
Severe Weather: Fog	Extensive	Highly Likely	Limited	Low	Medium
Severe Weather: Heavy Rains and Storms (Thunderstorms/Hail, Lightning)	Extensive	Highly Likely	Critical	Med-High	High
Severe Weather: Wind and Tornadoes	Limited	Highly Likely	Limited	Medium	Medium
Subsidence	Significant	Highly Likely	Limited	Low	Medium
Volcano	Limited	Unlikely	Limited	Low	None
Wildfire:(Burn Area/Smoke)	Significant	Highly Likely	Limited	Med-High	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **Highly Likely**: Near 100% chance of occurrence in next year, or happens every year.
- **Likely**: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
- **Occasional**: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
- **Unlikely**: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Calculating Vulnerability

Vulnerability is measured in general, qualitative terms, and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential:

- **Extremely Low**: The occurrence and potential cost of damage to life and property is very minimal to non-existent.
- **Low**: Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**: Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**: Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have already occurred in the past.
- **Extremely High**: Very widespread and catastrophic impact.

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for the plan. These factors include the following:

- **Past Occurrences**: Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences**: Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures**: This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of a community to a given hazard event.

Risk Assessment Summary: Placer County Planning Area

Agricultural Hazard

- Most agricultural disasters in Sacramento County associated with severe weather events, including heavy rains, floods, heat, and drought; insects and noxious weeds also a concern.
- According to the 2014 crop report, despite the severe drought conditions of 2014, Sacramento County's 2014 crop production value of $495,379,000 is the highest ever recorded for the county and represents a 7. 7% increase over the 2013 crop production value.
- 28 USDA disaster declaration from 1982-2015, most associated with severe weather events
- WHAT ARE THE BIGGEST AG ISSUES?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Bird Strike

- The County of Sacramento operates five airports, which have a collective economic impact in excess of $3 billion annually (2008 dollars)
- The FAA data shows 2,812 bird strike incidents for Sacramento County since 1990
- ANY INPUT ON NOTABLE BIRD STRIKE INCIDENTS?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Climate Change

- The 2013 State of California Multi-Hazard Mitigation Plan stated that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. Climate Change has the potential to alter the nature and frequency of most hazards.
- ANY HMPC INPUT ON CLIMATE CHANGE ISSUES IN SACRAMENTO?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Dam failure

- There are 27 dams in Sacramento County constructed for flood control, storage, electrical generation, and recreational purposes. Of the 27 dams, 16 are rated as High Hazard, 5 as Significant Hazard, 5 as Low Hazard, and 1 was not rated.
- 8 high hazard dams located in neighboring counties also have the potential to impact the Sacramento County Planning Area

- A search of the National Performance of Dams database data shows two dam failure incidents for Sacramento County since 1994, both related to the Folsom Dam. However, these incidents were limited in scope and since the incidents occurred, improvements to the Folsom Dam system have been made.
- Likelihood of Future Occurrence: Jurisdictional Dams: Unlikely/Smaller, non-jurisdictional Dams: Occasional
- Vulnerability: Extremely High
- Priority Hazard

Drought and Water Shortage

- Historical drought data for the Sacramento County Planning Area and region indicate there have been 5 significant droughts in the last 84 years.
- Since 2012, snowpack levels in California have dropped dramatically, with an increase in 2015.
- 1 federal disaster declarations in 1977; 1 state disaster declaration in 2008; 1 drought State of Emergency in 2014
- HMPC – CAN YOU PROVIDE DAMAGES OR RESTRICTIONS THAT HAVE OCCURRED IN THE COUNTY RECENTLY DUE TO THE CURRENT DROUGHT. WHAT HAS BEEN IMPACTED THE MOST? WHAT IS THE PRIMARY SOURCE OF WATER AND HOW HAS WATER SUPPLY BEEN AFFECTED IN THE COUNTY?
- Likelihood of Future Occurrence: Likely
- Vulnerability: High
- Priority Hazard

Earthquake

- Geological literature indicates that no major active faults transect the County; however, there are several subsurface faults in the Delta.
- There have been two disaster declarations in Sacramento County: 1989 Loma Prieta; 2014 Napa
- There have been several felt occurrences in the County from area earthquakes, with limited damages to the County: USGS reports 13 earthquakes of 5.0 magnitude or greater within 90 miles of Sacramento County since 1975.
- WERE THERE ISSUES IN THE COUNTY FROM THE MORE RECENT EARTHQUAKES?
- Likelihood of Future Occurrence: Unlikely – large, damaging earthquake; Occasional – minor earthquake
- Vulnerability: High
- Priority Hazard

Earthquake: Liquifaction

- Sacramento County has two areas that have been suggested as posing potential liquefaction problems due to loose sandy soils and silt and presence of faults- the downtown area and the Delta.
- Although no historic examples of seismically induced levee failure are known in the Delta, the modern levee network has not been subjected to strong shaking.
- HAVE THERE BEEN ANY ISSUES IN THE COUNTY ASSOCIATED WITH LIQUEFACTION?
- Likelihood of Future Occurrence: Occasional
- Vulnerability: High
- Priority Hazard

Flood Hazards

100/200/500 year

- Historically, portions of Sacramento County have always been at risk to flooding because of its annual percentage of rainfall and the number of watercourses and miles of levees that traverse the County.
- Multiple state and federal disaster declarations related to heavy rains and flooding.
- Likelihood of Future Occurrence: 100-Occasional; 200-Unlikely; 500-Unlikely
- Vulnerability: High to Extremely High
- Priority Hazard

Localized/Stormwater flooding

- Significant localized flood history in the County – occurs annually
- Each jurisdiction is updating this information.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium to High
- Priority Hazard

Landslides and Debris Flows

- The NCDC contains no records of landslides in the County. There have been no disaster declarations associated with landslides in Sacramento County.
- PAST OCCURRENCES?
- Likelihood of Future Occurrence: Occasional
- Vulnerability: Low
- Non-Priority Hazard

Levee Failure

- Many miles of levees throughout the County.
- There have been two federal disaster declarations in Sacramento County related to levee failure: 1980 Delta Levee Break and 1972 Andrus Island Levee Break.
- Although numerous documented levee breaks in the Delta area since 1900, most were prior to 1990 and do not reflect future failure potential due to extensive levee improvements in the area.
- All levees in the Sacramento Area have been decertified (although not reflected in current DFIRMs), but many are undergoing significant improvements to certify levees to the 200 year+ level of protection
- Likelihood of Future Occurrence: Occasional
- Vulnerability: Extremely High
- Priority Hazard

Severe weather

Extreme Temperatures: Cold and Freeze

- Annual occurrences of winter weather
- The NCDC data recorded 22 cold and freeze incidents for Sacramento County since 1993.

- No state or FEMA disaster declarations related to cold or freeze.
- ANY NOTABLE EXTREME COLD/FREEZE EVENTS SINCE 2011 PLAN?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Non-Priority Hazard

Extreme heat

- Annual occurrences – it gets hot every summer
- The NCDC data shows 32 extreme heat incidents for Sacramento County since 1993.
- ANY NOTABLE EXTREME HEAT EVENTS SINCE 2011? HOW MANY TIMES WERE COOLING CENTERS OPENED?
- Climate change might affect this hazard in the future
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium - High
- Priority Hazard

Fog and Freezing Fog

- Annual occurrences of fog events
- The NCDC data shows 6 fog incidents for Sacramento County since 1993
- ANY NOTABLE FOG EVENTS SINCE 2011?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Low
- Non-Priority Hazard

Heavy rains and storms (Thunderstorms, Hail, Lightning)

- Significant County history: annual occurrences
- Multiple state and federal disaster declarations associated with Heavy Rains and Storms
- The NCDC data shows 33 extreme heavy rains and storm events for Sacramento County since 1950.
- Severe storms/heavy rains are the primary cause of most major flooding
- ANY NOTABLE HEAVY RAINS/STORM EVENTS SINCE 2011?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Wind and Tornadoes

- Annual occurrences of wind events
- The NCDC data shows 52 high wind events for Sacramento County since 1993
- The NCDC data shows 18 tornado events (6 funnel clouds, 8 F0s, 3 F1s, 1 F2) for Sacramento County since 1993
- ANY NOTABLE HIGH WINDS OR TORNADO EVENTS SINCE 2011?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

River/Stream/Creek Bank Erosion

- Due to the high number of linear feet of levees and creek banks, erosion and deposition are occurring continually at varying rates over the planning area.
- USACE/DWR maintain an inventory program to identify and repair erosion sites. As areas are fixed, new areas are identified.
- ARE THERE ANY KEY AREAS THAT SHOULD BE A NOTED CONCERN?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Subsidence

- Subsidence in the Delta has been a historical problem, occurring on an annual basis. Areas with peat thickness over 10 feet have a great potential for continued subsidence.
- ANY NOTABLE AREAS OF CONCERN BOTH IN OUR OUTSIDE OF THE DELTA AREA?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Low
- Non-Priority Hazard

Volcano

- Of the approximately 20 volcanoes in the California, only a few are active and pose a threat. Of these, Long Valley Caldera and Lassen Peak are the closest to Sacramento County.
- According to the State Multi-Hazard Mitigation Plan, Sacramento County is not considered to be vulnerable to eruption and/or ash from these volcanoes.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Extremely Low
- Non-Priority Hazard

Wildfire

- Wildfires occur on an annual basis in the Sacramento County Planning Area
- Any ignition has the potential to become an out of control wildfire.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: High
- Priority Hazard

Sacramento County: Summary of Priority Hazards

Unincorporated Sacramento County

- Agricultural Hazards
- Bird Strike
- Climate Change
- Dam Failure
- Drought & Water Shortage
- Earthquake
- Earthquake Liquifaction
- Flood: 100/200/500–year
- Flood: Localized/Stormwater
- Levee Failure
- River/Stream/Creek Bank Erosion
- Severe Weather: Extreme Temperatures - Heat
- Severe Weather: Heavy rains and Storms
- Severe Weather: Winds/Tornadoes
- Wildfire: Burn Area/Smoke

Participating Jurisdictions: Data Needs

Review of Jurisdictional Participation Requests to date:

- Letter of Commitment
- Review, input, and update of existing Annexes (for 2011 plan participants)
- Hazard Identification Worksheet #1
- Historic Hazard Worksheet #2
- Mitigation Action Strategy Status Update (for 2011 plan participants)
- Electronic Logos
- Map of Jurisdictions (excluding County and incorporated communities)
- Photos – of past hazard events, areas, before and after (past mitigation projects)
- Vulnerability Worksheets #3 and Capability Tables

Future Jurisdictional Participation Needs:

- Review of Base Plan Chapter 4 and Draft Plan Document
- Review of Updated Jurisdictional Annexes
- New Mitigation Actions for all Jurisdictions and Priority Hazards

Mitigation Strategy: Goals

The most important element of the LHMP is the resulting mitigation strategy which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy is comprised of three components:

1. Mitigation Goals
2. Mitigation Actions
3. Action (Implementation) Plan

Mitigation Goals

Up to now, the HMPC has been involved in collecting and providing data for the Placer County Local Hazard Mitigation Plan Update. From this information, a Risk Assessment has been developed that describes the risk and vulnerability of the Placer County planning area to identified hazards and includes an assessment of the area's current capabilities for countering these threats through existing policies, regulations, programs, and projects.

This analysis identifies areas where improvements could or should be made. Formulating Goals will lead us to incorporating these improvements into the Mitigation Strategy portion of the plan. Our planning goals should provide direction for what loss reduction activities can be undertaken to make the planning area more disaster resistant.

Mitigation Goals are general guidelines that represent the community's vision for reducing or avoiding losses from identified hazards. Goals are stated without regard for achievement, that is, implementation cost, schedule, and means are not considered. Goals are public policy statements that:

- Represent basic desires of the jurisdiction;
- Encompass all aspects of planning area, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- Are time-independent, in that they are not scheduled events.

While goals are not specific (quantitative), they should not be so general as to be meaningless or unachievable.

Goals statements will form the basis for objectives. They should be stated in such a way as to develop one or more objectives related to each goal.

The key point in writing goals is to remember that they must deal with results, not the activities that produce those results.

Finally, before we formulate our goals, we should discuss other planning area goals from other regional/county/city programs and priorities. This keeps us from "reinventing the wheel," as well as being consistent with Multi-Objective Management --- or "MOM" --- where communities strive for efficiency by combining projects/needs that are similar in nature or location. Utilizing "MOM" effectively can result in

identifying multiple sources of funding that can be "packaged" and broadening the supporting constituency base by including "outcomes" desired by various stakeholder groups.

Types/Sources of other area mitigation plans and programs include:

- Emergency Operations Plans
- General Plans
- Stormwater Program and Plans
- Flood/Watershed Management Plans and Studies
- Drought Plans
- Community Wildfire Protection Plans
- Dam Failure Plans
- Other?

Sample Goals from other Plans

Goals from the 2013 California State Hazard Mitigation Plan

- Significantly reduce life loss and injuries
- Minimize damage to structures and property, as well as minimizing interruption of essential services and activities
- Protect the environment
- Promote hazard mitigation as an integrated public policy and as a standard business practice

Goals from the Sacramento County General Plan

AGRICULTURAL ELEMENT

Economic Viability of Agriculture

GOAL: Enhanced viability of Sacramento County's agricultural economy.

CONSERVATION ELEMENT

Water Resources

GOAL: Ensure that a safe, reliable water supply is available for existing and planned urban development and agriculture while protecting beneficial uses of Waters of the state of California, including important associated environmental resources.

Habitat Protection and Management

GOAL: Preserve and manage natural habitats and their ecological functions throughout Sacramento County.

Aquatic Resources

GOAL: Preserve, protect, and manage the health and integrity of aquatic resources in Sacramento County.

Rivers and Streams

GOAL: Preserve, protect, and enhance natural open space functions of riparian, stream and river corridors.

Vernal Pools

GOAL: Preserve and enhance self-sustaining vernal pool habitats.

SAFETY ELEMENT

Seismic and Geologic Hazards

GOAL: Minimize the loss of life, injury, and property damage due to seismic and geological hazards.

Flooding

GOAL: Minimize the loss of life, injury, and property damage due to flood hazards.

Fire Hazards

GOAL: Minimize the loss of life, injury, and property damage due to fire hazards.

Emergency Response

GOAL: An Emergency Preparedness System that can effectively respond in the event of a natural or manmade disaster.

Goals from the American River Community Wildfire Protection Plan

The overarching goal of this CWPP is to implement a comprehensive plan that results in the protection of human life and reduction of the loss of property, critical infrastructure, and natural resources due to wildfire.

Goals from City of Sacramento General Plan, Public Health and Safety

- GOAL PHS 4.1 Response to Natural and Human-Made Disasters. Promote public safety through planning, preparedness, and emergency response to natural and human-made disasters.
- GOAL PHS 5.1 Human Services and Healthy Communities. Improve the provision of human services and promote public health and safety.

Goal Development

You will each be given 3 sticky notes. On each note you will write what you think the goals for this mitigation planning effort should be. To get you started, provided below are possible goals for this mitigation plan. You may reword these or develop your own. These goal statements should serve as examples. It is vital that our Hazard Mitigation Planning Committee establish its own goals. Use one note for each goal. The purpose of the goal development is to reach a consensus on plan goals.

- Minimize risk and vulnerability from natural hazards
- Increase communities' awareness of vulnerability to hazards
- Increase the use of shared resources
- Improve communities' capabilities to mitigate losses
- Maintain coordination of disaster plans with changing DHS/FEMA needs
- Maintain FEMA eligibility/position jurisdictions for grant funding
- Maintain/enhance the flood mitigation program to provide 200/500-year flood protection
- Maintain current service levels
- Provide protection for existing buildings from hazards
- Provide protection for future development from hazards
- Provide protection for natural and cultural resources from hazard impacts
- Provide protection for people's lives from hazards
- Provide protection for public health
- Provide protection for critical services (fire, police, etc.) from hazard impacts
- Provide protection for critical lifeline utilities from hazard impacts
- Reduce exposure to hazard related losses
- Reduce the number of emergency incidents
- Make better use of technology

When done, we will:

- Pin/tape them to the wall/easel-chart and arrange them by category
- Combine and reword them into 3-4 goals for the plan.

Risk Assessment and Mitigation Strategy Meetings
Day 2

Mitigation Strategy: Actions

Mitigation Actions are specific projects and activities that help achieve the goals and accomplish risk reduction in the community.

Categories of Mitigation Measures

PREVENTION: Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open Space Preservation
- Land Development Regulations
  - ✓ Subdivision regulations
  - ✓ Building Codes
    - Fire-Wise Construction
  - ✓ Floodplain development regulations
  - ✓ Geologic Hazard Areas development regulations (for roads too!)
- Storm Water Management
- Fuels Management, Fire-Breaks

EMERGENCY SERVICES: protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (flooding, tornadoes, winter storms, geologic hazards, fire)
  - ✓ NOAA Weather Radio
  - ✓ Sirens
  - ✓ "Reverse 911" (Emergency Notification System)
- Emergency Response
  - ✓ Evacuation & Sheltering
  - ✓ Communications
  - ✓ Emergency Planning
    - Activating the EOC (emergency management)
    - Closing streets or bridges (police or public works)
    - Shutting off power to threatened areas (utility company)
    - Holding/releasing children at school (school district)
    - Passing out sand and sandbags (public works)
    - Ordering an evacuation (mayor)
    - Opening emergency shelters (Red Cross)
    - Monitoring water levels (engineering)
    - Security and other protection measures (police)
- Critical Facilities Protection (Buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)

- ✓ Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
- ✓ Lifeline Utilities Protection

➢ Post-Disaster Mitigation

➢ Building Inspections
- ✓ ID mitigation opportunities & funding before reconstruction

PROPERTY PROTECTION: Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

➢ Retrofitting/disaster proofing
- ✓ Floods
  - Wet/Dry floodproofing (barriers, shields, backflow valves)
  - Relocation/Elevation
  - Acquisition
  - Retrofitting
- ✓ High Winds/Tornadoes
  - Safe Rooms
  - Securing roofs and foundations with fasteners and tie-downs
  - Strengthening garage doors and other large openings
- ✓ Winter Storms
  - Immediate snow/ice removal from roofs, tree limbs
  - "Living" snow fences
- ✓ Geologic Hazards (Landslides, earthquakes, sinkholes)
  - Anchoring, bracing, shear walls
  - Dewatering sites, agricultural practices
  - Catch basins
- ✓ Drought
  - Improve water supply (transport/storage/conservation)
  - Remove moisture competitive plants (Tamarisk/Salt Cedar)
  - Water Restrictions/Water Saver Sprinklers/Appliances
  - Grazing on CRP lands (no overgrazing-see Noxious Weeds)
  - Create incentives to consolidate/connect water services
  - Recycled wastewater on golf courses
- ✓ Wildfire, Grassfires
  - Replacing building components with fireproof materials
  - Roofing, screening
  - Create "Defensible Space"
  - Installing spark arrestors
  - Fuels Modification

- ✓ Noxious Weeds/Insects
  - Mowing
  - Spraying
  - Replacement planting
  - Stop overgrazing
  - Introduce natural predators
- Insurance

NATURAL RESOURCE PROTECTION: Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- storage of floodwaters
- absorption of flood energy
- reduction in flood scour
- infiltration that absorbs overland flood flow
- groundwater recharge
- removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- habitat for flora and fauna
- recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Wetlands Protection
- Riparian Area/Habitat Protection/Threatened-Endangered Species
- Erosion & Sediment Control
- Best Management Practices

Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:

1. Avoidance: setting construction projects back from the stream.
2. Reduction: Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
3. Cleanse: Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained

- Dumping Regulations
- Set-back regulations/buffers

- Fuels Management
- Water Use Restrictions
- Landscape Management
- Weather Modification

STRUCTURAL: Projects that have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they "stop" flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats or requiring Environmental Assessments.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/Retention structures
- Erosion and Sediment Control
- Basins/Low-head Weirs
- Channel Modifications
- Culvert resizing/replacement/Maintenance
- Levees and Floodwalls
- Anchoring, grading, debris basins (for landslides)
- Fencing (for snow, sand, wind)
- Drainage System Maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm Sewers

PUBLIC INFORMATION: A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard Maps and Data
- Outreach Projects (mailings, media, web, speakers, displays)
- Library Resources
- Real Estate Disclosure
- Environmental Education

Sacramento County Mitigation Actions from 2011 Plan

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Multi-Hazard Mitigation Actions					
Enhance Public Awareness of the Affects of Natural Hazards and Public Understanding of Disaster Preparedness	Sacramento County		X		
CRS Public Information Pilot Program	Sacramento County, City of Sacramento	X (City)	X (County)		
Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	Sacramento County City of Citrus Heights City of Elk Grove City of Folsom City of Galt City of Rancho Cordova City of Sacramento	X (Sacramento County) X (City of Sacramento)			
Flood Insurance Promotion	Sacramento County		X		
Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas	Sacramento County		X (Sacramento County) X (City of Sacramento)		
Finalize and Implement the Actions of the South Sacrament Habitat Conservation Plan	Sacramento County City of Elk Grove City of Galt City of Rancho Cordova Sacramento Regional County Sanitation District Sacramento County Water Agency, Southeastern Connector	X (Sacramento County)			
SAFELY OUT™ Evacuation Preparedness	Sacramento County Citizen Voice			X	
Public Education Program	City of Elk Grove				
Alerts and Warning System	City of Elk Grove				
Emergency Operation Center (EOC)	City of Elk Grove				
Critical Facilities Database Development and Data Maintenance Processes	City of Elk Grove				
Increase Redundancy/ Functionality of Water Wells and Sewer Lift Stations	City of Galt				
Increase Data Capacity of Emergency Frequencies	City of Galt				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Evaluation and Mitigation of Critical Facilities in Identified Hazard Areas	City of Sacramento				
Data Center Disaster Recovery Improvement	Los Rios Community College District				
Community Emergency Response Training (CERT)	Los Rios Community College District				
Update the critical facilities identified during this DMA planning effort with the City's GIS technical group to support emergency management efforts.	City of Sacramento	X			
Bird Strike Mitigation Actions					
Wildlife Hazard Management Plan	Sacramento County Airport System	X			
Dam Failure Mitigation Actions					
Mather Dam Improvements	Sacramento County		X		
Alder Creek Miners Dam	Sacramento County			X	
Improved Flood Inundation and Evacuation Plan for Probable maximum flow from New Spillway at Folsom Dam	Sacramento County		X		
Folsom Dam Joint Federal Project	SAFCA				
Folsom Dam Raise	SAFCA				
Drought Mitigation Actions					
Drought Contingency Plan	Southgate Park & Recreation District				
Earthquake Mitigation Actions					
Hughes Stadium Renovation at Sacramento City College	Los Rios Community College District				
Flood Mitigation Actions					
Improve County ALERT (Automated Local Evaluation in Real Time) system of stream and rain gages	Sacramento County		X		
Elevation Projects to Mitigate Flood Risk	Sacramento County		X		
Arcade Creek Corridor Plan	Sacramento County		X		
Elevate up to Three Homes on Long Island (Grand Island Road, Sacramento River)	Sacramento County		X		
Mitigation Projects for Repetitive Loss Structures/Areas	Sacramento County		X		

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Improve Strawberry Creek Basins at East Stockton Blvd	Sacramento County	X	X		
Triangle Detention Basin	Sacramento County		X		
Unionhouse Detention Basin Upstream of East Stockton Blvd Partnering with Park District and SAFCA	Sacramento County		X		
Unionhouse Creek Joint Use Detention Basins – Park Active or Passive Joint Use	Sacramento County		X		
South Sacramento Stream Group Detention Basins	Sacramento County		X		
Elder and Gerber Creek	Sacramento County		X		
Florin Creek Basins –Florin Vineyard Drainage Master Plan	Sacramento County		X		
Joint Use Detention-Park Basins on Laguna Creek	Sacramento County	X	X		
Pasa Robles Drive - Concrete Channel Lining Rehabilitation	Sacramento County			X	
Chicken Ranch Slough - Concrete Channel Lining Rehabilitation	Sacramento County		X		
Morrison Creek - Concrete Channel Lining Rehabilitation	Sacramento County			X	
Mayhew Slough - Concrete Channel Lining Rehabilitation	Sacramento County			X	
Strong Ranch Slough - Concrete Channel Lining Rehabilitation	Sacramento County			X	
Keep Watershed Management Plan Current CRS Activity 450 (county and cities)	Sacramento County		X		
Woodside Condominiums Repetitive Flood Loss Property	Sacramento County			X	
Conversion to NAVD88 vertical datum (from NGVD29)	Sacramento County		X		
Mitigation projects to reduce flood risk to critical facilities.	Sacramento County		X		
Hydrologic and Hydraulic Modeling in Compliance with 2012 Central Valley Flood Protection Plan	Sacramento County		X		
Delta Area Fire Station Needs to be Elevated or Flood Proofed to Protect Against Levee Breach Flooding to Assure Function in that Disaster Event.	Sacramento County			X	

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Update and Adopt Floodplain Management Ordinance in Light of Levee De-accreditation	Sacramento County	X	X		
Mitigate Peak Flow on Dry Creek and Tributaries (including Sacramento County and City of Roseville)	Sacramento County		X		
Repetitive Loss Church Building on Dry Creek	Sacramento County		X		
Determine Cause and Mitigate Mercury and Methyl Mercury Coming from Tributaries of American River	Sacramento County		X		
Pump Stations	Sacramento County	X	X		
Public Outreach Mailers	Sacramento County		X		
Drainage improvements to reduce flooding on key evacuation routes	Sacramento County		X		
South Branch Arcade Creek – Gum Ranch Basin (with Fair Oaks Park District)	Sacramento County			X	
Dry Creek Flood Hazard Mitigation Acquisitions with County Park Dept	Sacramento County			X	
Arcade Creek at Evergreen Estates Floodwall improvements	Sacramento County		X		
Linda Creek Peak Flow Mitigation	Sacramento County		X		
Improve flood protection and/or Evacuation Planning for Mobile Home/RV Park at Manzanita/Auburn. Alternatively, the park Should Establish Flood Warning and Evacuation Procedures.	Sacramento County		X	X	
Capital Improvement Projects – Pipelines (2012-13)	Sacramento County	X	X		
Capital Improvement Projects – Pipelines (2014-15)	Sacramento County	X	X		
New City Sump 90 Operation Plan	Sacramento County		X	X	
Land Acquisition	Southgate Park & Recreation District				
Conservation Easements	Southgate Park & Recreation District				
Multi-jurisdictional Cooperation within Watersheds	Southgate Park & Recreation District				
South Sacramento Streams Group	SAFCA				
American River Common Features	SAFCA				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
CVFPP - Flood Emergency Plan	City of Sacramento		X		
Adopt Additional Floodplain Development Standards	City of Sacramento		X		
Update the General Plan to include the requirements of the CVFPP	City of Sacramento	X			
Historic Magpie Creek Study	City of Sacramento	X	X		
South Sacramento Streams Project: Union Pacific Railroad Flood Wall	City of Sacramento	X			
Natomas Levee Improvement Project (NLIP)	City of Sacramento	X	X		
Retrofit of Repetitive Loss Properties	City of Sacramento	X	X		
Preferred Risk Policy (PRP) Outreach Campaign	City of Sacramento		X		
Drainage Projects for Repetitive Loss Properties	City of Sacramento	X	X		
Unionhouse Creek Existing Conditions LOMR and Channel Improvements	City of Sacramento	X			
Emergency Notification and Evacuation Planning	City of Sacramento	X			
Drainage Projects from the City's Priority Drainage Project List	City of Sacramento	X	X		
Riconada Flood Wall	City of Citrus Heights				
Storm Debris Removal	City of Elk Grove				
Drainage and Flood Control Programs	City of Elk Grove				
LID Rain Garden Plaza	City of Elk Grove				
School Street Alley Drainage Improvements	City of Elk Grove				
Elk Grove Creek Outfalls	City of Elk Grove				
Elk Grove Creek Restoration	City of Elk Grove				
Waterman Road Culvert Repair and Replacement	City of Elk Grove				
Waterman Road Culvert Replacement	City of Elk Grove				
Elk Grove Creek Flood Protection and Clean Water	City of Elk Grove				
Elk Grove Watershed Recommended Improvements	City of Elk Grove				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Multi-Functional Drainage Corridor for Shed C	City of Elk Grove				
9816 Sheldon Road – Enlarge Culverts	City of Elk Grove				
Sheldon Road Drainage Project	City of Elk Grove				
Sleepy Hollow Detention Basin Retrofit	City of Elk Grove				
Sleepy Hollow Lane Drainage Improvements	City of Elk Grove				
East Elk Grove Area/ Rural Region Improvements	City of Elk Grove				
Sheldon Road Ditch Improvements and Multi-Use Trails	City of Elk Grove				
Laguna Creek Watershed Improvements (New Pipeline and Enlarge Existing Pipelines)	City of Elk Grove				
Deer Creek Watershed Improvements (New Detention Basins)	City of Elk Grove				
SCADA System for the Stormwater Pump Stations	City of Elk Grove				
Dry Well Installation at Kent Street and St. Anthony Court	City of Elk Grove				
Elk Crest Drive Pipes	City of Elk Grove				
Strawberry Creek Detention Basin Retrofit	City of Elk Grove				
Laguna Creek and Whitehouse Creek Multi-Functional Corridor Enhancement	City of Elk Grove				
Whitehouse Creek Watershed Improvements	City of Elk Grove				
Grant Line Channel Improvements (Pump Station and Enlarge Pipes)	City of Elk Grove				
Alder Creek Watershed Council	City of Folsom				
Redevelopment Area Drainage Improvements	City of Folsom				
Drainage System Maintenance Tax Assessment	City of Folsom				
Floodplain Mapping	City of Folsom				
Drain Inlet Retrofit Capital Improvement Plan (CIP)	City of Galt				
Creek/Streams Vegetation Management Plan	City of Galt				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Sunrise Boulevard Widening Kiefer to Jackson	City of Rancho Cordova				
Flood Response Equipment	Cosumnes Community Services District Fire Department				
Flood Response Training	Cosumnes Community Services District Fire Department				
Coordinate with SAFCA, CA-DWR, USACE, and Sacramento County on Proposed Flood Control projects on Magpie Creek	City of Sacramento			X	
Storm Water Management Practices - Implement Storm Water Management Practices as identified in Stormwater Quality Design Manual	Southgate Park & Recreation District				
Main Drainage Canal Bank Stabilization and Sediment Removal	Reclamation District #1000				
Security of District Facilities	Reclamation District #1000				
South River Pump Station Flood Protection Project	Sacramento Regional County Sanitation District				
SRCSD Critical Facilities Flood Study (Planning)	Sacramento Regional County Sanitation District				
Levee Failure Mitigation Actions					
Hydromodification and Stormwater Quality countywide	Sacramento County			X	
Ring Levees to Protect Delta Historic Villages	Sacramento County			X	
Levee Breach Scenario, Inundation, Evacuation, and Recovery Planning for Rural Areas South of Freeport	Sacramento County		X		
Improved Flood Inundation and Evacuation Plan for Structural Flood Control System Failure Scenarios in Urban Areas	Sacramento County		X		
Human Vertical Evacuation Structures in Areas of Widespread Flood Hazard	Sacramento County		X		
Livestock Vertical Evacuation Mounds in Areas of Widespread Flood Hazard	Sacramento County		X	X	

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Implement the Recommended Actions of the Sherman Island Five Year Plan	Reclamation District #341				
Highway 16 Levee Rehabilitation Project	Reclamation District #800				
Bank and Levee erosion	Reclamation District #1000				
Severe Weather: Heavy Rains and Storms Mitigation Actions					
Public Education/Outreach Extreme Weather	City of Folsom				
Heating and Cooling Centers for Extreme Weather	City of Folsom				
District Wide Roofing Renovations	Los Rios Community College District				
Tree Management	Southgate Park & Recreation District				
Wildfire Mitigation Actions					
Fuels Reduction in the American River Parkway	City of Sacramento/Sacramento Metropolitan Fire District	X	X		
Coordinate with the County and State to Create defensible space to protect vital infrastructure located in the American River Parkway from wildfires (from 2005 Plan)	City of Sacramento		X		
Fuel Reduction and Modification	City of Folsom				
Wildfire Prevention Outreach	City of Folsom				
Wildfire Hazard Identification	City of Folsom				
Arson Prevention & Control Outreach	City of Folsom				
Ignition Resistant Building Construction Upgrades	City of Folsom				
Reduction of Fire Hazard SRCSD Bufferlands	Sacramento Regional County Sanitation District				
Twin Rivers School District Annex*					
Reduce Risk to Flooding of Northern Area Schools	Twin Rivers School District				
New drainage plans to sites within the flood areas including, site drainage, storm drain upgrades and re-grading fields to shed water (on-site) away from buildings	Twin Rivers School District				

Mitigation Action	Lead Jurisdiction	Complete	Ongoing	Not Started	Project in 2016 Update
Work with City/County/Water departments to create defensible spaces at sites where nearby creeks are prone to flooding. Build-up earthen berms (off-site) to shed water away from critically located schools.	Twin Rivers School District				
Update the Emergency Preparedness Plan and the Emergency Operations Plan so that in event of emergency or disastrous event, personnel and procedures are in place and streamlined. This will include purchase of new equipment not reliant on typical system power; including communications equipment, emergency housing and supplies.	Twin Rivers School District				
Working with the Department of the State Architect (DSA) on Earthquake Retrofit Plan on all sites.	Twin Rivers School District				
Revise and update district-wide Storm Water Prevention Plan	Twin Rivers School District				
Create email notification system for families for emergency situations.	Twin Rivers School District				
Incorporate new rules for M&O department to keep drains clear, trees trimmed and vegetation removed to minimize impact during heavy rains.	Twin Rivers School District				
Create defensible perimeter space – for fire areas. Trees trimmed and vegetation removed to minimize impact during fire season.	Twin Rivers School District				
Updating Evacuation Plans.	Twin Rivers School District				
Updating District Policy for new Construction.	Twin Rivers School District				
Updating Evacuation Plans for Excessive Heat	Twin Rivers School District				
Updating Evacuation Plans for Streambank Erosion	Twin Rivers School District				
Updating Evacuation Plans for Fog	Twin Rivers School District				

Mitigation Strategy: Action Plan

The mitigation action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the community's existing planning mechanism. Each participating jurisdiction must have a mitigation actions and an action plan specific to that jurisdiction and its priority hazards and vulnerabilities.

Mitigation Criteria

For use in selecting and prioritizing Proposed Mitigation Measures

1. STAPLEE

Social: Does the measure treat people fairly? (different groups, different generations)

- Community Acceptance
- Effect on Segment of Population
- Social Benefits

Technical: Will it work? (Does it solve the problem? Is it feasible?)

- Technical Feasibility
- Reduce Community Risk
- Long Tem Solution/Sustainable
- Secondary Impacts

Administrative: Do you have the capacity to implement & manage project?

- Staffing
- Funding Allocated
- Maintenance/Operations

Political: Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?

- Political Support
- Local Champion
- Public Support
- Achieves Multiple Objectives
- Supported by a broad array of Stakeholders

Legal: Does your organization have the authority to implement? Is it legal? Are there liability implications?

- Existing Local Authority
- State Authority
- Potential Legal Challenges

Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?

- Benefit of Action

- Cost of Action
- Cost Effective/Economic Benefits
- Economically Viable
- Outside Funding Required

Environmental: Does it comply with Environmental regulations?

- Effect on Land/Water
- Effect on Endangered Species
- Effect on Cultural Resources
- Effect on Hazmat sites
- Consistent with Community Environmental Goals
- Consistent with Environmental Laws
- Environmental Benefits

2. SUSTAINABLE DISASTER RECOVERY

- Quality of Life
- Social Equity
- Hazard Mitigation
- Economic Development
- Environmental Protection/Enhancement
- Community Participation

3. SMART GROWTH PRINCIPLES

- Infill versus Sprawl
- Efficient Use of Land Resources
- Full Use of Urban Resources
- Mixed Uses of Land
- Transportation Options
- Detailed, Human-Scale Design

4. OTHER

- Does measure address area with highest risk?
- Does measure protect …
  - ✓ The largest # of people exposed to risk?
  - ✓ The largest # of buildings?
  - ✓ The largest # of jobs?
  - ✓ The largest tax income?
  - ✓ The largest average annual loss potential?
  - ✓ The area impacted most frequently?
  - ✓ Critical Infrastructure (access, power, water, gas, telecommunications)
- Timing of Available funding
- Visibility of Project
- Community Credibility

Mitigation Action Prioritization Instructions

Our Team recommendations are listed on flip-chart paper around the room.

You each have 3 sets of colored dots:

- 3 red dots
- 3 blue dots
- 3 green dots

The red dots are for high priority (5 points each)

The blue dots are for medium priority (3 points each)

The green dots are for low priority (1 point each)

Place your dots on the recommendations, using the different colors to indicate your priority. You may use as many of your dots, of any color, on any recommendation --- or you may spread them out using as few of your dots as you wish. The dots will indicate the consensus of the team.

Use your list of criteria to help you make your determinations.

After the totals are counted, we will discuss them further to confirm or change any of the results as we see fit.

Mitigation Action Worksheet

Jurisdiction:	
Mitigation Action/Project Title:	
Hazards Addressed:	
Issue/Background:	
Other Alternatives:	
Existing Planning Mechanism(s) through which Action Will Be Implemented:	
Responsible Office/Partners:	
Cost Estimate:	
Benefits (Losses Avoided):	
Potential Funding:	
Timeline:	
Project Priority:	

Worksheet completed by:	
Name and Title:	
Phone:	

C.2 Categories of Mitigation Measures Considered

The following categories of mitigation measures are based on the Community Rating System.

- Prevention
- Property Protection
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information

C.3 Sacramento County Analysis of Alternative Mitigation Measures per Category

Note: This review of mitigation measures is in compliance with the FEMA's nationally accepted six mitigation categories and FEMA's CRS Program requirement to provide a comprehensive evaluation of the six mitigation categories with a specific requirement that Preventative Measures be thoroughly reviewed. This review leads to the projects incorporated into the mitigation strategy action plan. This Section specifically focuses on the mitigation measures and potential mitigation strategies specific to Sacramento County and City of Sacramento, the two CRS communities to this plan.

C.3.1. Preventive Measures

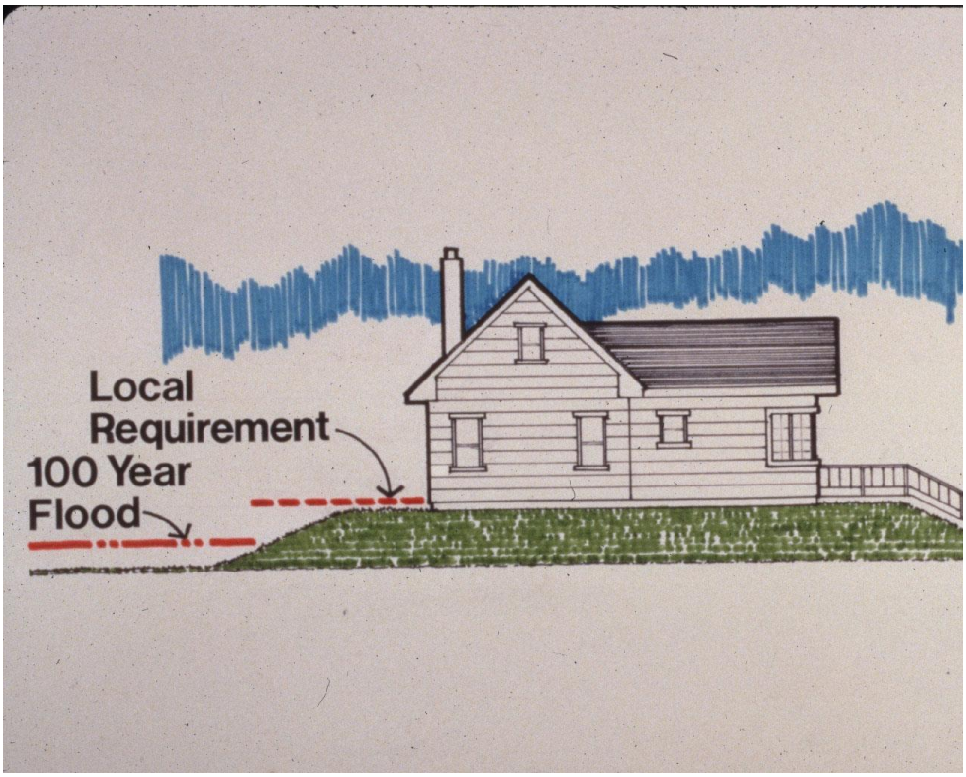
Preventive measures are designed to keep a problem - such as flooding - from occurring or from getting worse. The objective of preventive measures is to ensure that future development is not exposed to damage and does not cause an increase in damages to other properties. Building, zoning, planning and code enforcement offices usually administer preventive measures. Some examples of types of preventive measures include:

- Building codes and floodplain regulations
- Comprehensive land use planning, zoning, and open space preservation
- Stormwater management and subdivision regulations

Building Codes

Building codes provide one of the best methods of addressing natural hazards. When properly designed and constructed according to code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Building codes can ensure that the first floors of new buildings are constructed to be higher than the elevation of the 100-year flood (the flood that is expected to have a one percent chance of occurring in any given year). This is shown in Figure C-1.

Figure C-1 Building Codes and Flood Elevations



Floodplain Regulations

Most communities with a flood problem participate in the National Flood Insurance Program (NFIP). The NFIP sets minimum requirements for the participating communities' standards for development, subdivision of land, construction of buildings, installation of mobile homes, and improvements and repairs to buildings. These are usually spelled out in a separate ordinance.

The NFIP minimum requirements are summarized below. It should be stressed that these are minimum requirements. Local conditions, such as high velocity flooding or the presence of a potential dam failure, may warrant higher local standards.

Enforcement

To ensure that communities are meeting the NFIP standards, FEMA periodically conducts a Community Assessment Visit. During this visit, the maps and ordinances are reviewed, permits are checked, and issues are discussed with staff. Failure to meet all of the requirements can result in one or more consequences:

- Reclassification under the Community Rating System to a higher class
- Probation, which entails a $50 surcharge on every flood insurance policy in the community, or
- Suspension from the NFIP.

Suspension is the most serious. It means that the community is out of the NFIP and the following sanctions are imposed:

- Flood insurance will not be available. No resident will be able to purchase a flood insurance policy.
- Existing flood insurance policies will not be renewed.
- No direct federal grants or loans for development may be made in identified flood hazard areas under programs administered by federal agencies, such as HUD, EPA, and the Small Business Administration.
- Federal disaster assistance will not be provided to repair insurable buildings located in identified flood hazard areas for damage caused by a flood.
- No federal mortgage insurance or loan guarantees may be provided in identified flood hazard areas. This includes policies written by FHA, VA, and others.
- Federally insured or regulated lending institutions, such as banks and credit unions, must notify applicants seeking loans for insurable buildings in flood hazard areas that there is a flood hazard and the property is not eligible for federal disaster relief.

These sanctions can be severe for any community with a substantial number of buildings in the floodplain. Most communities with a flood problem have joined the NFIP and are in full compliance with their regulatory obligations.

One way to assure good administration and enforcement is to have Certified Floodplain Managers on staff. The Association of State Floodplain Managers administers the national Certified Floodplain Manager (CFM®) program.

Minimum National Flood Insurance Program Regulatory Requirements

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA). As a condition of making flood insurance available for their residents, communities that participate in the NFIP agree to regulate new construction in the area subject to inundation by the 100-year (base) flood. The floodplain subject to these requirements is shown as an A or V Zone on the Flood Insurance Rate Map (FIRM).

There are five major floodplain regulatory requirements. Additional floodplain regulatory requirements may be set by state and local laws.

1. All development in the 100-year floodplain must have a permit from the community. The NFIP regulations define "development" as any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.
2. Development along a river or other channel cannot obstruct flows so as to cause an increase in flooding on other properties. An analysis must be conducted to demonstrate that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.
3. New buildings may be built in the floodplain, but they must be protected from damage from the base flood. In riverine floodplains, the lowest floor of residential buildings must be elevated to be at or above the base flood elevation (BFE). Nonresidential buildings must be either elevated or floodproofed.

4. Under the NFIP, a "substantially improved" building is treated as a new building. The NFIP regulations define "substantial improvement" as any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. This requirement also applies to buildings that are substantially damaged.
5. Communities are encouraged to adopt local ordinances that are more comprehensive or provide more protection than the federal criteria. The NFIP's Community Rating System provides insurance premium credits to recognize the additional flood protection benefit of higher regulatory standards.

Local Implementation: Sacramento County and the City of Sacramento

Sacramento County and the City of Sacramento have adopted the 2013 California Building Code based on the 2012 International Building Code. Sacramento County has a Floodplain Management Ordinance (2014) that exceeds minimum NFIP standards and includes some higher regulatory standards. The County is in the process of updating their General Plan and Floodplain Management Ordinance to incorporate the 200-year flood standard of protection in urban or urbanizing areas (i.e., ULOP) as described in Chapter 4 of the Base plan. The City of Sacramento (2016) also has a Floodplain Management Ordinance that exceeds minimum NFIP standards and includes some higher regulatory standards. The City's ordinance was recently updated in March 2016 to incorporate the ULOP requirements of SB 5 as further described in Chapter 4 of the Base plan and in the City's Annex.

Just as important as having code standards is the enforcement of the code. Adequate inspections are needed during the course of construction to ensure that the builder understands the requirements and is following them. Making sure a structure is properly elevated and anchored requires site inspections at each step. Both Sacramento County and the City of Sacramento indicate that their Floodplain Management Ordinances are adequately enforced.

Reduce Future Flood Losses

Future flood losses should be reduced by enforcement of current floodplain regulations:

Sacramento County. For new residential construction or substantial improvements, Sacramento County requires that either the lowest finished floor be elevated at least 1.5 feet above the base flood elevation. For nonresidential construction or substantial improvements, Sacramento County requires that either the lowest finished floor be elevated at least 1.5 feet above the base flood elevation or that below the base flood level the structure is dry flood-proofed and watertight, with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

City of Sacramento. For new residential construction or substantial improvements in Zones A, AH and AE, the City of Sacramento requires that either the lowest floor, including basement, be elevated at least 1 foot above the base flood elevation. For new residential construction, or substantial improvements in Zone AO, the City of Sacramento requires that either the lowest floor, including basement, be elevated above the highest grade to the depth number specified in feet on the FIRM or 2 feet above the highest adjacent grade if no depth number is specified. For nonresidential construction or substantial improvements, the City of

Sacramento requires that either the lowest floor, including basement be elevated in conformance with the residential standards described above, together with attendant utility and sanitary facilities or be dry floodproofed below the elevation required for the lowest floor so that the structure is watertight, with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

Enacting and enforcing the current standards and/or adopting higher regulatory standards reduces future flood losses by regulating development within flood hazard areas.

Current Standards

As described above, Sacramento County and the City of Sacramento have Floodplain Management Ordinances that meet all of the NFIP's minimum floodplain regulatory requirements and exceed some of them such as establishing additional freeboard. Their regulations are designed to:

- Protect human life and health;
- Minimize expenditure of public money for costly flood control projects;
- Minimize the need for rescue and relief efforts associated with flooding;
- Minimize business interruptions;
- Minimize damage to public facilities, including streets, sewers, bridges, and utilities;

The County and City's regulations include methods and provisions for:

- Restricting or prohibiting development which are dangerous to health, safety, and property due to flood hazards, or which result in damaging increase in flood heights or velocities;
- Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;
- Controlling fill, grading, dredging, and other development which may increase flood damage; and
- Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

In addition, all new construction or substantial improvements shall be:

- Designed or modified and adequately anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy
- Constructed in ways that minimize flood damage
- Constructed with materials resistant to flood damage
- Constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities designed or located so as to prevent water from entering or accumulating within components during flooding

Sacramento County and the City of Sacramento also have regulations that exceed minimum NFIP standards. These include:

- Floodways are delineated and certain requirements apply to construction within these floodways so as to not result in any increase in flood levels during the occurrence of the base flood discharge.

- Requiring new construction and substantial improvements to have the lowest flood, including basement, elevated a minimum of 1.5 feet (Sacramento County) above the base flood elevation.
- For the City, base flood elevations for new construction are required to be 1 foot above the FIRM flood depth for zones A, AH, and AE. In zones AO, the lowest floor will be elevated to one foot above the FIRM flood depth, or two feet above the highest adjacent grade if not depth number is specified.
- Restrictions and standards are included on the use of enclosures below elevated buildings.

In addition, Sacramento County's and the City of Sacramento's floodplain management programs are implemented by Certified Floodplain Managers on staff.

Manufactured Homes

Manufactured or mobile homes are usually not regulated by local building codes. They are built in a factory in another state and are shipped to a site. They do have to meet construction standards set by the U.S. Department of Housing and Urban Development. All mobile homes constructed after 1976 must comply with HUD's National Manufactured Home Construction and Safety Standards. These standards apply uniformly across the country and it is illegal for a local unit of government to require additional construction requirements. Local jurisdictions may regulate the location of these structures and their on-site installation.

Local Implementation

Both the Sacramento County and the City of Sacramento Floodplain Management Ordinances include specific requirements for the placement, installation, elevation, and anchoring of manufactured homes

CRS Credit

Building Codes: The CRS encourages strong building codes. It provides credit in two ways: points are awarded based on the community's BCEGS classification and points are awarded for adopting the International Code series. The CRS also has a prerequisite for a community to attain a Class 6 or better within the CRS program, the community must have a BCEGS class of 5/5 or better. To attain a Class 4 or better in the CRS program, the community must have a BCEGS class of 4/4 or better.

Sacramento County has a BCEGS classification of 3/3. Sacramento County has adopted the 2013 California Building Code which includes the International Code series with State enhancements.

The City of Sacramento's BCEGS classification is a 2/2. The City of Sacramento has also adopted the 2013 California Building Code which includes the International Code series with State enhancements.

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. The National Flood Insurance Reform Act of 1994 codified the Community Rating System in the NFIP.

- The CRS recognizes 18 creditable activities, organized under four categories numbered 300 through 600:
  - ✓ Public Information
  - ✓ Mapping and Regulations
  - ✓ Flood Damage Reduction

- ✓ Flood Preparedness

- Sacramento County and the City of Sacramento participate in the Community Rating System (CRS) of the National Flood Insurance Program.
- By implementing these floodplain management activities, the residents of Sacramento County and the City of Sacramento qualify for flood insurance premium rate reductions. When communities go beyond the minimum standards for floodplain management, the CRS can provide discounts up to 45% off flood insurance premiums.

Sacramento County is currently a Class 2 community, which provides a 40% discount on flood insurance to properties located in the Special Flood Hazard Area and up to a 10% discount for those properties located outside the special flood hazard zone.

The City of Sacramento is currently a Class 5 community, which provides a 25% discount on flood insurance to properties located in the Special Flood Hazard Area and up to a 10% discount for those properties located outside the special flood hazard zone.

Floodplain Management – Higher Regulatory Standards: There are many higher regulatory standards that warrant CRS credit. These standards include:

- Delineating a floodway, the area of higher hazard near the channel. This would allow development outside the floodway (called the "floodplain fringe") without engineering studies to determine their impact on others.
- Requiring all new construction to be elevated one or two feet above the base flood elevation to provide an extra level of protection from waves and higher floods. This extra protection is reflected in a distinct reduction in flood insurance rates.
- Having all developers (not just the larger ones) provide flood data where none are available.
- Specifications to protect foundations from erosion, scour and settling.
- Prohibiting critical facilities from all or parts of the floodplain.
- Prohibiting hazardous materials.
- Requiring buffers adjacent to streams or natural areas.
- Restrictions on use of enclosures below elevated buildings.
- Flood storage lost due to filling and construction must be compensated for by removal of an equal volume of storage.
- The CRS also provides credit for having trained staff and a higher credit if the staff members are Certified Floodplain Managers.

It should be noted that one of the prerequisites for participation in the CRS is that the community be in full compliance with the minimum requirements of the NFIP. A community with a number of "potential violations" risks being removed from the CRS entirely.

Manufactured homes: The NFIP allows communities to exempt mobile homes in existing mobile home parks from some of the flood protection requirements. The CRS provides up to 50 points if the community does not use this exemption.

Comprehensive Land Use Planning, Zoning, and Open Space Preservation

Building codes provide guidance on how to build in hazardous areas. Planning and zoning activities direct development away from these areas, particularly floodplains and wetlands. They do this by designating

land uses that are compatible with the natural conditions of land that is prone to flooding, such as open space or recreation. Planning and zoning activities can also provide benefits by simply allowing developers more flexibility in arranging improvements on a parcel of land through the planned development approach.

General and Comprehensive Plans

These plans are the primary tools used by communities to address future development. They can reduce future flood-related damages by indicating open space or low density development within floodplains and other hazardous areas. Unfortunately, natural hazards are not always emphasized or considered in the specific land use recommendations.

Generally, a plan has limited authority. It reflects what the community would like to see happen. Its utility is that it guides other local measures, such as capital improvement programs, zoning ordinances, and subdivision regulations.

Capital Improvement Plans

A capital improvement plan can guide a community's major public expenditures for a 5- to 20-year period. Capital expenditures may include acquisition of open space within the hazardous areas, extension of public services into hazardous areas, or retrofitting existing public structures to withstand a hazard.

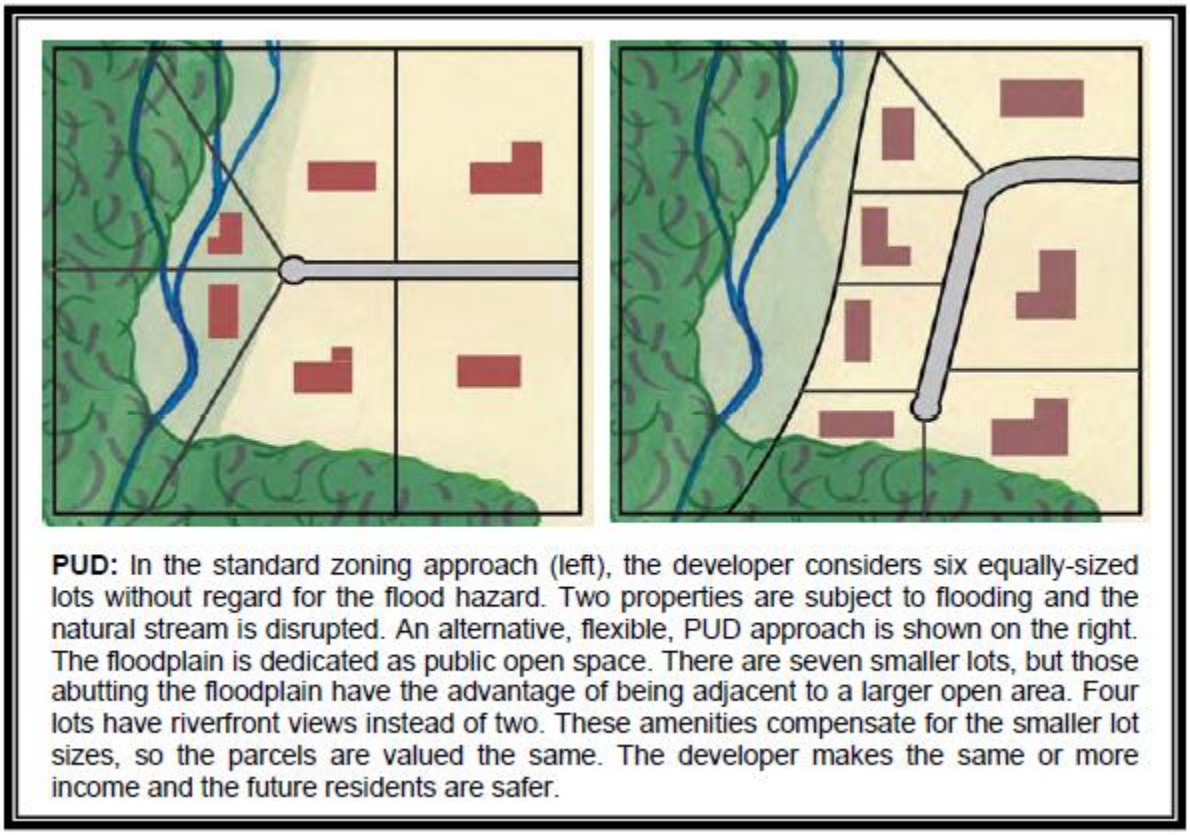
Zoning

A zoning ordinance regulates development by dividing a community into zones or districts and setting development criteria for each of those zones or districts. Zoning codes are considered the primary tool to implement a general/comprehensive plan's guidelines for how land should be developed.

Zoning ordinances can limit development in hazardous areas, such as reserving floodplain zones for agricultural uses. Often, developers will produce a standard grid layout. The ordinance and the community can allow flexibility in lot sizes and location so developers can avoid hazardous areas.

One way to encourage such flexibility is to use the planned unit development (PUD) approach or cluster development. The PUD and cluster approaches allow the developer to easily incorporate flood hazard mitigation measures into the project. Open space or floodplain preservation can be facilitated as site design standards and land use densities can be adjusted to fit the property's specific characteristics, as shown in Figure C-2.

Figure C-2 Zoning for Development in the Floodzone



PUD: In the standard zoning approach (left), the developer considers six equally-sized lots without regard for the flood hazard. Two properties are subject to flooding and the natural stream is disrupted. An alternative, flexible, PUD approach is shown on the right. The floodplain is dedicated as public open space. There are seven smaller lots, but those abutting the floodplain have the advantage of being adjacent to a larger open area. Four lots have riverfront views instead of two. These amenities compensate for the smaller lot sizes, so the parcels are valued the same. The developer makes the same or more income and the future residents are safer.

Open Space Preservation

Keeping the floodplain and other hazardous areas open and free from development is the best approach to preventing damage to new developments. Open space can be maintained in agricultural use or can serve as parks, greenway corridors and golf courses.

Comprehensive and capital improvement plans should identify areas to be preserved by acquisition and other means, such as purchasing an easement. With an easement, the owner is free to develop and use private property, but property taxes are reduced or a payment is made to the owner if the owner agrees to not build on the part set aside in the easement.

Although there are some federal programs that can help acquire or reserve open lands, open space lands and easements do not always have to be purchased. Developers can be encouraged to dedicate park land and required to dedicate easements for drainage and maintenance purposes. These are usually linear areas along property lines or channels. Maintenance easements also can be donated by streamside property owners in return for a community maintenance program.

Local Implementation

General Plan: Sacramento County's current General Plan was adopted in 2011. The County is in the process of finalizing updates to the 2011 General Plan to address new flood protections requirements that establish a 200-year state requirement for the ULOP. This is the primary policy change that will affect construction in urban or urbanizing areas that are in a SFHA or a Moderate Flood Zone. Areas not considered to be urbanizing will remain subject to the FEMA 0.1% standard of flood protection. Proposed amendments address: agency coordination, setbacks along levees, elevation and construction standards, flood map data, flood emergency response, floodway management, building design standards, and the process for making legal determinations and project approvals for development in flood hazard zones.

The City of Sacramento recently updated its General Plan in 2015 to include requirements for establishing 200-year state requirements for the ULOP to comply with Senate Bill (SB) 5 regarding floodplain management.

Zoning and Open Space Preservation: Sacramento County's General Plan, in coordination with the local Codes, protects current open space. As described above, the County is in the process of finalizing updates to the general plan which will also include updates to the County's Zoning Code.

The City of Sacramento's local codes in combination with the 2015 General Plan provides protection for and encourages open space preservation. The City's 2015 Floodplain Management Ordinance includes requirements for establishing 200-year state requirements for the ULOP to comply with Senate Bill (SB) 5 regarding floodplain management.

Reduce Future Flood Losses

Enacting the General Plans and the comprehensive zoning and future land uses contained in the County and City's General Plans will help to reduce future flood losses by managing development in hazardous areas and known floodplains.

Current Standards

Generally, Sacramento County's zoning ordinance separates hazardous land uses from sensitive land uses and addresses risks e.g. flood, erosion and traffic. The zoning ordinance contains a Flood (F) Combining Zoning District and Tributary Standards, and Natural Streams (NS) Combining Zoning District to reduce the impacts of flood hazards. Additionally, the ordinance contains a Parkway Corridor (PC) Combining Zoning District to ensure that bluff development does not create erosion or geologic instability.

Likewise, the City of Sacramento's zoning ordinance is an effective measure for reducing hazard impacts and is adequately administered and enforced. The City's ordinance includes a Flood Zone and an American River Parkway, Floodplain Zone (ARP-F). The Flood Zone is considered an Open Space Zone established to conditionally permit specified uses along the Sacramento and American Rivers and their tributaries. The ARP-F was established to prevent loss of life and property by prohibiting the erection of improvements or structures in a designated floodway, to protect the natural features of the American River floodplain, to prevent erosion and siltation, and to preserve valuable open space.

CRS Credit

The CRS provides flood insurance discounts to those communities that implement various floodplain management activities that meet certain criteria. Comparing local activities to those national criteria helps determine if local activities should be improved.

Credits are provided for regulations that encourage developers to preserve floodplains or other hazardous areas from development. There is no credit for a plan, only for the enforceable regulations that are adopted pursuant to a plan. Credits are also provided for setting aside floodplains for low density zoning, such as five acre lots or conservation

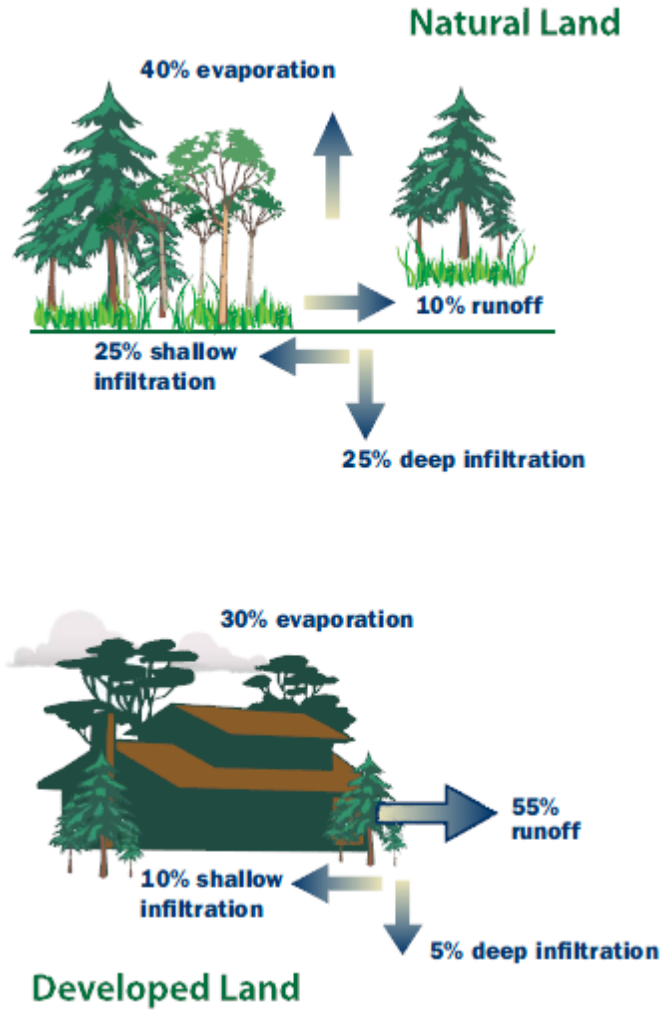
Preserving flood prone areas as open space is one of the highest priorities of the Community Rating System. Up to 1,450 points can be given, based on how much of the floodplain is in community public undeveloped properties, parks, wildlife refuges, golf courses, or other uses that can be depended on to stay open (Activity 420 - Open Space Preservation).

Stormwater Management and Subdivision Ordinance

Development in floodplains is development in harm's way. New construction in the floodplain increases the amount of development exposed to damage and can aggravate flooding on neighboring properties.

Development outside a floodplain can also contribute to flooding problems. Stormwater runoff is increased when natural ground cover is replaced by urban development (see Figure C-3). Development in the watershed that drains to a river can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality.

Figure C-3 Runoff and Infiltration of Natural and Developed Land



There are three ways to prevent flooding problems caused by stormwater runoff:

- Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties, and
- Regulating all development to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions.
- Set construction standards so buildings are protected from shallow water.

Most communities participate in the NFIP, which sets minimum requirements for regulating development in the floodplain. All new buildings must be protected from the base or 100-year flood and no development can cause an increase in flood heights or velocities.

Stormwater runoff regulations require developers to build retention or detention basins to minimize the increases in the runoff rate caused by impervious surfaces and new drainage systems. Generally, each

development must not let stormwater leave at a rate higher than what existed under pre-development conditions.

Standards for drainage requirements are typical in subdivision regulations. Standards for storm sewers, ditches, culverts, etc., are best set when an area is laid out and developed. Traditionally, the national standard is to require that the local drainage system carry the 10-year storm. Recently, communities are finding that older estimates of the 10-year storm understated the true hazard, so they are addressing larger storms.

One problem with requiring the drainage system to carry water away is that runoff increases with urban development. The runoff equivalent of a 10-year storm occurs more frequently, and from smaller storms. The problem is just sent downstream onto someone else's property.

Accordingly, modern subdivision regulations require new developments to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions. This is usually done by constructing retention or detention basins to hold the runoff for a few hours or days, until flows in the system have subsided and the downstream channels can accept the water without flooding.

If the storm sewers or roadside ditches cannot handle a heavy rain, the standard subdivision design uses the streets to carry excess runoff. If the flows exceed the streets' capacity, adjacent properties will flood. Therefore, the third approach to protecting from stormwater flooding is to make sure new buildings are elevated one or two feet above the street or above adjacent grade.

Local Implementation

Reduce Future Flood Losses

Current practices and tracking mechanisms are seeking to reduce flood risks. Future flood control and stormwater improvements in Sacramento County and the City of Sacramento will help reduce localized flood risks by improving flood control mechanisms and drainage. In order to reduce future flood losses, the County and City may consider revisiting their stormwater management ordinances.

Current Standards

Sacramento County and the City of Sacramento have stormwater management ordinances.

Sacramento County's Stormwater Management Ordinance authorizes the County to exercise its police power to protect and promote the public health, safety and general welfare. While stormwater runoff is one step in the natural cycle of water, human activities, including, but not limited to, agriculture, construction, manufacturing and the operation of an urban infrastructure, may result in undesirable discharges of pollutants and certain sediments. Such discharges may accumulate in local drainage channels and waterways and eventually may be deposited in the natural surface waters. The purpose of this chapter is to protect and enhance the watercourses within the unincorporated area of the County, by controlling the contribution of urban pollutants to stormwater runoff which enters the County storm drain system in a manner consistent with the Federal Clean Water Act, the Porter-Cologne Water Quality Control Act and Municipal discharge Permit No. CAS082597, and by controlling pollutants that are discharged directly to

natural surface waters. The County's Stormwater Program also uses its Land Grading and Erosion Control Ordinance to minimize damage to surrounding properties and public rights-of-way, the degradation of the water quality of watercourses, and the disruption of natural or County authorized drainage flows caused by the activities of clearing and grubbing, grading, filling and excavating of land, and sediment and pollutant runoff from other construction related activities, and to comply with the provisions of the County's National Pollutant Discharge Elimination System (NPDES) Permit Number, CA0082597, issued by the California Regional Water Quality Control Board (Regional Board). These goals will be achieved by establishing administrative procedures, minimum standards of review, and implementation and enforcement procedures for controlling erosion, sedimentation and other pollutant runoff, including construction debris and hazardous substances used on construction sites, and the disruption of existing drainage and related environmental damage caused by the aforementioned activities.

The City of Sacramento's Stormwater Management Ordinance is designed to protect and promote the health, safety and general welfare of the citizens of the City by controlling non-stormwater discharges to the stormwater conveyance system, by eliminating discharges to the stormwater conveyance system from spills, dumping, or disposal of materials other than stormwater, and by reducing pollutants in urban stormwater discharges to the maximum extent practicable. This chapter is intended to assist in the protection and enhancement of the water quality of watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the Federal Water Pollution Control Act, Porter-Cologne Water Quality Control Act, and National Pollutant Discharge Elimination System (NPDES) Permit No. CAS082597, as such permit is amended and/or renewed.

Subdivision Regulations

In addition to controlling stormwater runoff as described above, subdivision regulations govern how land will be subdivided and they set construction standards. These standards generally address roads, sidewalks, utilities, storm sewers, and drainage ways. They can include the following flood protection standards:

- Requiring that the final plat show all hazardous areas
- Requiring that each lot be provided with a building site above the flood level
- Requiring that all roadways be no more than one foot below the flood elevation

Local Implementation

Sacramento County's subdivision ordinance regulates the design and improvement of land divisions and the dedication of public improvements needed in connection with land divisions. The subdivision ordinance does not address hazards.

The City of Sacramento's Subdivision Ordinance is designed to assist in the systematic implementation of the general plan, specific and community plans, the zoning ordinance, and other land use regulations, and to provide for public needs, health and safety, convenience, and general welfare. The City's subdivision requirements address floodplain management requirements. Specifically, the ordinance requires that the design of all subdivisions shall provide adequate drainage to reduce exposure to flood damage and shall in all respects conform to the requirements of Title 15.104 of this code, Floodplain Management Regulations, and the national flood insurance program regulations, set forth in Subchapter B of Title 44 of the Code of Federal Regulations Parts 59 and 60. All final subdivision improvement plans will provide the elevation of the proposed building site. If the site is filled above the base flood, the final pad elevation shall be

certified by a qualified registered professional engineer or surveyor and provided to the local administrator. All subdivision proposals shall be consistent with the need to minimize flood damage. All subdivision proposals shall have public utilities and facilities such as sewer, gas, electrical and water systems located and constructed to minimize flood damage.

CRS Credit

CRS credit is provided for both higher regulatory standards in the floodplain and stormwater management standards for new developments. Credit is based on how those standards exceed the minimum NFIP requirements.

Conclusions and Recommendations

- Sacramento County and the City of Sacramento have floodplain development ordinances that exceed minimum national and state standards and will be helpful in preventing flood problems from increasing.
- With ongoing improvements to the regions' flood control facilities, requirements mandated by SB 5, and any resulting changes in the FEMA DFIRMs, the floodplain regulations for the County and City should be revisited and revised accordingly.
- Sacramento County and the City of Sacramento should continue to implement CRS activities to align with the recent changes in the 2013 Coordinator's Manual. The County and City should evaluate their floodplain management ordinances for incorporating additional higher standards.
- The County and City should review their zoning and subdivision ordinances for floodplain management and other hazard specific enhancements.
- The County and City should continue to enforce stormwater management best management practices to control post development site runoff. Consideration of a unified countywide stormwater ordinance will provide consistent regulations between all communities within the Sacramento County planning area.
- Standards in subdivision regulations for public facilities should account for the hazards present at the site. New building sites, streets, and water systems should facilitate access and use by fire and emergency equipment.

C.3.2. Property Protection Measures

Property protection measures are used to modify buildings or property subject to damage. Property protection measures fall under three approaches:

- Modify the site to keep the hazard from reaching the building,
- Modify the building so it can withstand the impacts of the hazard, and
- Insure the property to provide financial relief after the damage occurs.

Property protection measures are normally implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency.

Keeping the Hazard Away

Generally, natural hazards do not damage vacant areas. As noted earlier, the major impact of hazards is to people and improved property. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. For example, a berm can be built to prevent floodwaters from reaching a house.

Flooding

There are five common methods to keep a flood from reaching and damaging a building:

- Erect a barrier between the building and the source of the flooding.
- Move the building out of the floodprone area.
- Elevate the building above the flood level.
- Demolish the building.
- Replace the building with a new one that is elevated above the flood level.

Barriers

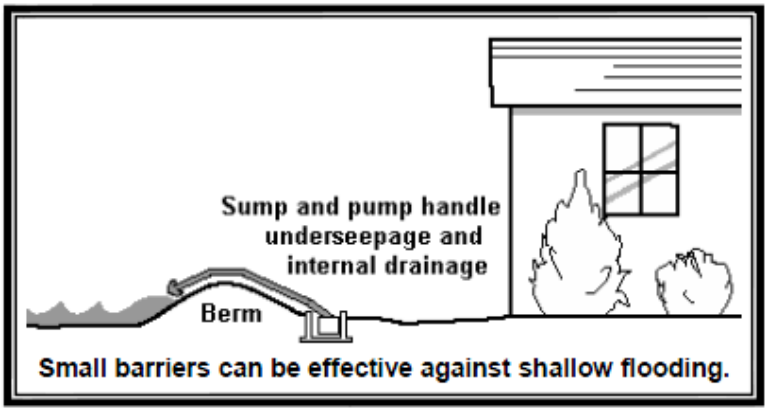
A flood protection barrier can be built of dirt or soil (a "berm") or concrete or steel (a "floodwall"). Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that will fall inside the perimeter. This is usually done with a sump or drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier.

Figure C-4 Types of Barriers

This low floodwall has landscaping to minimize the adverse impact on the property's appearance.

Small, wood frame buildings are the easiest to relocate

Source: Kennedy House Movers, Huntsville, AL



Small barriers can be effective against shallow flooding.

Barriers can only be built so high. They can be overtopped by a flood higher than expected. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and

properly maintained. A berm can also settle over time, lowering its protection level. A floodwall can crack, weaken, and lose its watertight seal. Therefore, barriers need careful design and maintenance (and insurance on the building, in case of failure).

Relocation

Moving a building to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost increases for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings.

In areas subject to flash flooding, deep waters, or other high hazard, relocation is often the only safe approach. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.

Building Elevation

Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents. Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

One concern with elevation is that it may expose the structure to greater impacts from other hazards such as wind and groundshaking. If not braced and anchored properly, an elevated building may have less resistance to the shaking of an earthquake and the pressures of high winds.

Demolition

Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damages. It is cheaper to demolish them and either replace them with new, flood protected structures ("pilot reconstruction"), or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move - such as larger, slab foundation or masonry structures - and for dilapidated structures that are not worth protecting. Generally, demolition projects are undertaken by a government agency, so the cost is not borne by the property owner, and the land is converted to public open space use, like a park.

Figure C-5 Demolition of Flooded Home

Demolishing a repetitively flooded home

One problem that sometimes results from an acquisition and demolition project is a "checkerboard" pattern in which nonadjacent properties are acquired. This can occur when some owners, especially those who have and prefer a waterfront location, are reluctant to leave their homes. Creating such an acquisition pattern in a community simply adds to the maintenance costs that taxpayers must support.

Pilot Reconstruction

If a building is not in good shape, elevating it may not be worthwhile or it may even be dangerous. An alternative is to demolish the structure and build a new one on the site that meets or exceeds all flood and wind protection codes. This was formerly known as "demo/rebuild." FEMA funding programs refer to this approach as "pilot reconstruction." It is still a pilot program, and not a regularly funded option.

Certain rules must be followed to qualify for federal funds for pilot reconstruction:

- Pilot reconstruction is only possible after it has been shown that acquisition or elevation are not feasible, based on the program's criteria.
- Funds are only available to people who owned the property at the time of the event for which funding is authorized.
- It must be demonstrated that the benefits exceed the costs.
- The new building must be elevated to the advisory base flood elevation.
- The new building must not exceed more than 10% of the old building's square footage.
- The new building must meet all flood and wind protection codes.
- There must be a deed restriction that states the owner will buy and keep a flood insurance policy.
- The maximum federal grant is 75% of the cost, up to $150,000. FEMA is developing a detailed list of eligible costs to ensure that disaster funds are not used to upgrade homes.

Local Implementation

Within the Sacramento County planning area, which includes the unincorporated Sacramento County and the City of Sacramento, acquisition and elevation projects have occurred. Historically, Sacramento County has participated in programs to acquire and elevate flooddprone structures within the County. The County is currently pursuing a FEMA HMGP Grant to elevate another approximately 35 structures. The City of Sacramento has also participated in similar programs.

CRS Credit

The CRS provides the most credit points for acquisition and relocation, because this measure permanently removes insurable buildings from the floodplain. The CRS credits barriers and elevating existing buildings (Activity 530 - Flood Protection). Elevating a building above the flood level will also reduce the flood insurance premiums on that individual building. Because barriers are less secure than elevation, not as many points are provided. Higher scores are possible, but they are based on the number of buildings removed compared to the number remaining in the floodplain.

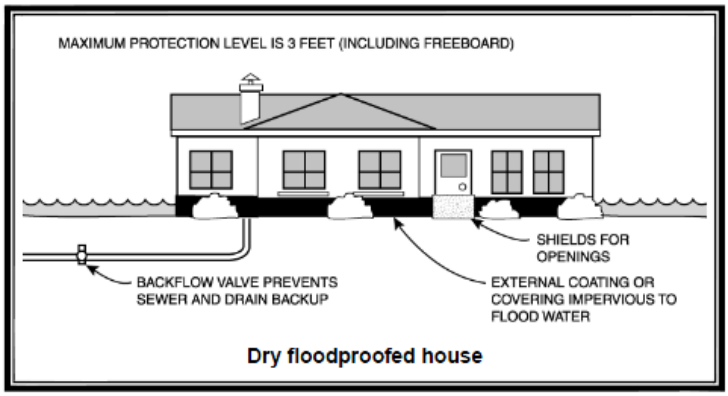
Retrofitting

An alternative to keeping the hazard away from a building is to modify or retrofit the site or building to minimize or prevent damage. There are a variety of techniques to do this, as described below.

Dry Floodproofing

Dry floodproofing means making all areas below the flood protection level watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings, such as doors, windows and vents, are closed, either permanently, with removable shields, or with sandbags. Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under state, FEMA and local regulations. Dry floodproofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry floodproofing techniques.

Figure C-6 Dry Floodproofing



Dry floodproofing is only effective for shallow flooding, such as repetitive drainage problems. It does not protect from the deep flooding along lakes and larger rivers caused by hurricanes or other storms.

Wet Floodproofing

The alternative to dry floodproofing is wet floodproofing: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

Local Implementation

Area residents have utilized both dry and wet floodproofing techniques for construction of homes in floodprone areas. Floodproofing requirements for new or substantially improved structures are addressed in the communities' Floodplain Management Ordinances.

CRS Credit

Credit for dry and wet floodproofing and sewer backup protection is provided under Activity 530 - Retrofitting. Because these property protection measures are less secure than barriers and elevation, not as many points are provided.

Insurance

Technically, insurance does not mitigate damage caused by a natural hazard. However, it does help the owner repair, rebuild, and hopefully afford to incorporate some of the other property protection measures in the process. Insurance offers the advantage of protecting the property, as long as the policy is in force, without requiring human intervention for the measure to work.

Private Property

Although most homeowner's insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the NFIP. Flood insurance coverage is provided for buildings and their contents damaged by a "general condition of surface flooding" in the area.

Figure C-7 Flood Insurance Coverage

Table 5-1 Example Flood Insurance Premiums	
Building Exposure	**Premium**
In the Special Flood Hazard Area (AE Zone)	
Pre-FIRM ("subsidized") rate	$1,689
Post-FIRM (actuarial) rates	
2 feet above the base flood elevation	$440
1 foot above the base flood elevation	$643
At the base flood elevation	$1,167
1 foot below the base flood elevation	$4,379
Outside the Special Flood Hazard Area	$1,029
Premiums are for $150,000 in building coverage and $75,000 in contents coverage for a one story house with no basement and a $500 deductible, using the October 2008 *Flood Insurance Manual*. Premiums include the 5% Community Rating System discount in unincorporated St. Tammany Parish. Premiums are higher in the municipalities, which are not in the CRS.	

Most people purchase flood insurance because it is required by the bank when they get a mortgage or home improvement loan. Usually these policies just cover the building's structure and not the contents. Contents coverage can be purchased separately. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building. Most people don't realize that there is a 30-day waiting period to purchase a flood insurance policy and there are limits on coverage.

Public Property

Governments can purchase commercial insurance policies. Larger local governments often self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can drain the government's budget. Communities cannot expect federal disaster assistance to make up the difference after a flood.

Under Section 406(d) of the Stafford Act:

> *"If an eligible insurable facility damaged by flooding is located in a [mapped floodplain] … and the facility is not covered (or is underinsured) by flood insurance on the date of such flooding, FEMA is required to reduce Federal disaster assistance by the maximum amount of insurance proceeds that would have been received had the buildings and contents been fully covered under a National Flood Insurance Program (NFIP) standard flood insurance policy. [Generally, the maximum amount of proceeds for a non-residential property is $500,000.]*

[Communities] Need to:

- Identify all insurable facilities, and the type and amount of coverage (including deductibles and policy limits) for each. The anticipated insurance proceeds will be deducted from the total eligible damages to the facilities.

- Identify all facilities that have previously received Federal disaster assistance for which insurance was required. Determine if insurance has been maintained. A failure to maintain the required insurance for the hazard that caused the disaster will render ineligible for Public Assistance funding…
- [Communities] must obtain and maintain insurance to cover [their] facility - buildings, equipment, contents and vehicles - for the hazard that caused the damage in order to receive Public Assistance funding. Such coverage must, at a minimum, be in the amount of the eligible project costs. FEMA will not provide assistance for that facility in future disasters if the requirement to purchase insurance is not met. - FEMA Response and Recovery Directorate Policy No. 9580.3, August 23, 2000

In other words, the law expects public agencies to be fully insured as a condition of receiving federal disaster assistance.

Local Implementation

Flood insurance is available in Sacramento County and the City of Sacramento.

Within Sacramento County, NFIP insurance data indicates that as of February 19, 2016, there were 10,468 policies in force in the unincorporated County, resulting in $2,939,536,100 of insurance in force. Of these, 9,698 are for residential properties; 770 are nonresidential. 3,171 of these are in A zones; 7,297 policies are for parcels in the B, C, & X zones. Of the 3,862 improved parcels within the 100-year floodplain, 3,171 (or 82.1 percent) of those parcels maintain flood insurance. Additional information on these policies for Sacramento County are described in Section 4.3.10 of the base plan.

Within the City of Sacramento, NFIP data indicates that as of February 19, 2016, there were 43,937 flood insurance policies in force in the City with $14,355,078,500 of coverage. Of the 43,937 policies, 42,827 were residential (single-family homes) and 1,110 were nonresidential; 2,153 of the policies were in A zones (the remaining 41,784 were in B, C, and X zones). The GIS parcel analysis detailed above identified 24,861 parcels in the 100-year flood zone. 2,153 policies for 24,861 parcels in the 100-year floodplain equates to insurance coverage of 28.8 percent. It should be noted, however, that many of the 24,861 parcels in the 100-yr floodplain are grandfathered into the X zone based on the date the structure was built. Additional information on these policies for the City of Sacramento are described in the City's Annex.

Both Sacramento County and the City of Sacramento make great efforts on flood insurance promotion. This includes public outreach efforts for flood insurance promotion under both of their CRS PPI programs as well as other outreach efforts as necessary to educate the public on this important mitigation program. More information on flood insurance, the County and City's PPI programs and other public outreach mechanisms regarding flood insurance promotion are included in Chapter 4 of the Base plan and the City's Annex.

CRS Credit

There is no credit for purchasing flood insurance, but the CRS does provide credit for local public information programs that explain flood insurance to property owners. The CRS also reduces the premiums for those people who do buy NFIP coverage.

The Government's Role

Property protection measures are usually considered the responsibility of the property owner. However, local governments should be involved in all strategies that can reduce flood losses, especially acquisition and conversion of a site to public open space. There are various roles a municipality can play in encouraging and supporting implementation of these measures.

One of the first duties of a local government is to protect its own facilities. Fire stations, water treatment plants and other critical facilities should be a high priority for retrofitting projects and insurance coverage. Often public agencies discover after the disaster that their "all-hazard" insurance policies do not cover the property for the type of damage incurred. Flood insurance is even more important as a mitigation measure because of certain Stafford Act provisions.

Providing basic information to property owners is the first step in supporting property protection measures. Owners need general information on what can be done. They need to see examples, preferably from nearby.

Communities can help owners by helping to pay for a retrofitting project. Financial assistance can range from full funding of a project to helping residents find money from other programs. Some communities assume responsibility for sewer backups, street flooding, and other problems that arise from an inadequate public sewer or public drainage system. Less expensive community programs include low interest loans, forgivable low interest loans and rebates. A forgivable loan is one that does not need to be repaid if the owner does not sell the house for a specified period, such as five years. These approaches don't fully fund the project, but they cost the community less and they increase the owner's commitment to the flood protection project. Often, small amounts of money act as a catalyst to pique the owner's interest to get a self-protection project moving.

The more common outside funding sources are listed below. Unfortunately, the last three are only available after a disaster, not before, when damage could be prevented.

Pre-disaster funding sources:

- FEMA's Pre-Disaster Mitigation (PDM) grants
- FEMA's Flood Mitigation Assistance (FMA) grants
- Community Development Block Grants
- Conservation organizations, although generally these organizations prefer to purchase vacant land in natural areas, not properties with buildings on them.

Post-disaster funding sources:

- Insurance claims
- The NFIP's Increased Cost of Compliance. This provision increases a flood insurance claim payment to help pay for a flood protection project required by code as a condition to rebuild the flooded building. It can also be used to help pay the non-federal cost-share of an elevation project.

Post-disaster funding sources, federal disaster declaration needed:

- FEMA's disaster assistance (for public properties). However, after a flood, the amount of assistance will be reduced by the amount of flood insurance that the public agency should be carrying on the property.
- Small Business Administration disaster loans (for non-governmental properties)
- FEMA's Hazard Mitigation Grant Program

Acquisition Agent

The community can be the focal point in an acquisition project. Most funding programs require a local public agency to sponsor the project. The local government could process the funding application, work with the owners, and provide some, or all, of the local share. In some cases, the local government would be the ultimate owner of the property, but in other cases another public agency could assume ownership and the attendant maintenance responsibilities.

Mandates

Mandates are considered a last resort if information and incentives are insufficient to convince a property owner to take protective actions. An example of a retrofitting mandate is the requirement that communities have to disconnect downspouts from the sanitary sewer line.

There is a mandate for improvements or repairs made to a building in the mapped floodplain. If the project equals or exceeds 50% of the value of the original building, it is considered a "substantial improvement." The building must then be elevated or otherwise brought up to current flood protection codes.

Another possible mandate is to require less expensive hazard protection steps as a condition of a building permit. For example, many communities require upgraded electrical service as a condition of a home improvement project. If a person were to apply for a permit for electrical work, the community could require that the service box be moved above the base flood elevation or the installation of a separate ground fault interrupter circuits in the basement.

Local Implementation

As previously described, both Sacramento County and the City of Sacramento have participated in programs to acquire and/or elevate structures in floodprone areas.

CRS Credit

Except for public information programs, the CRS does not provide credit for efforts to fund, provide incentives, or mandate property protection measures. CRS credits are provided for the actual projects after they are completed. However, to participate in CRS, a community must certify that it has adequate flood insurance on all properties that have been required to be insured. The minimum requirement is to insure those properties in the mapped floodplain that have received federal aid, as specified by the Flood Disaster Protection Act of 1973.

Repetitive Loss Properties and Analysis

Repetitive loss properties deserve special attention because they are more prone to damage by natural hazards than any other properties in the County planning area. Further, protecting repetitive loss buildings is a priority with FEMA mitigation funding programs.

According to FEMA's records and an analysis in Sacramento County Department of Water Resources' July 2015 Repetitive Loss Area Analysis (RLAA) Report, there are 101 Repetitive Loss Properties within Sacramento County. Several more properties within Sacramento County may have reached the damage threshold for Repetitive Loss Properties, but not all properties are covered by flood insurance and flood insurance claims are not submitted for all flood damage sustained. There are 11 severe repetitive loss properties. Much more information and analysis of the County's RL properties can be found in Section 4.3.10 of the Base plan and the County's RLAA 2015 Report, included as an appendix to this LHMP.

City of Sacramento: NFIP data further indicates that there are 21 repetitive loss (RL) buildings, with 5 RL buildings being insured. There have been a total of 49 RL losses, with 10 insured RL losses. None of the insured RL buildings has incurred 4 or more losses. 18 of the properties are located in the A zone, and 3 RL buildings are located outside of the 100- and 500-year floodplain in the B, C, or X zones. The RL properties are located throughout the city. Repetitive flooding is generally a result of a combination of poor drainage and homes below the street elevation. Drainage improvements in the area have alleviated some of the flooding issues to these RL structures over the years. Citizens are required to have flood insurance in an A zone if they have a federally backed mortgage. Repetitive loss properties are shown in **Error! Reference source not found.** and detailed in **Error! Reference source not found.**. A more detailed repetitive loss area analyses of the City's repetitive loss properties is located in the City's Annex to this LHMP and in their most recent RLAA Report, also included as an Appendix to this LHMP.

Conclusions and Recommendations

- There are several ways to protect individual properties from damage by natural hazards. The advantages and disadvantages of each should be examined for each situation.
- Property protection measures can protect some of the most damage-prone buildings in the Sacramento County planning area including repetitive loss properties.
- Flood insurance promotion has been effective within both Sacramento County and the City of Sacramento as evidenced by the numbers of flood insurance policies.
- Property owners can implement some property protection measures at little cost, especially for sites in areas of low hazards (e.g., shallow flooding, sewer backup, and thunderstorms). For other measures, such as relocation and elevation, the owners may need financial assistance.
- Local government agencies can promote and support property protection measures through several activities, ranging from public information to financial incentives to full funding.
- Government properties, including critical facilities, should be evaluated to determine the extent to which they are protected from flooding.
- Because properties in floodplains are likely to be damaged at some point, efforts should continue to provide information and advice to floodplain property owners. Special attention should be given to repetitive loss and high hazard areas.
- Public education materials can be developed/enhanced to explain property protection measures that can help owners reduce their exposure to damage by floods and the various types of insurance that are available.

- All property protection projects should be voluntary to be most effective. Other than state and federally mandated regulations, local incentives should be positive as much as possible, such as providing financial assistance.
- A FEMA Hazard Mitigation Assistance (HMA) Grant workshop focused on private firms and citizens could be conducted annually to showcase the assistance that FEMA (HMGP, PDM, FMA, RFC and SRL) provides and to encourage public participation.
- A standard checklist could be developed to evaluate a property's exposure to damage from floods. It should include a review of insurance coverage and identify where more information can be found on appropriate property protection measures. The checklist should be provided to each agency participating in this planning process and made available to the public.
- Sacramento County and the City of Sacramento should evaluate its own properties using the standard checklist. A priority should be placed on determining critical facilities' vulnerability to damage and whether public properties are adequately insured.
- Sacramento County and the City of Sacramento should protect their own publicly owned facilities with appropriate mitigation measures.

C.3.3. Natural Resource Protection

Resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. These activities enable the naturally beneficial functions of fields, floodplains, wetlands, and other natural lands to operate more effectively. Natural and beneficial functions of watersheds, floodplains and wetlands include:

- Reduction in runoff from rainwater and snow melt in pervious areas
- Infiltration that absorbs overland flood flow
- Removal and filtering of excess nutrients, pollutants and sediments
- Storage of floodwaters
- Absorption of flood energy and reduction in flood scour
- Water quality improvement
- Groundwater recharge
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

As development occurs, many of the above benefits can be achieved through regulatory steps for protecting natural areas or natural functions. The regulatory programs are discussed in Section 4.4, Capability Assessment, of the base plan. This Appendix C covers the resource protection programs and standards that can help mitigate the impact of natural hazards, while they improve the overall environment. Seven areas are reviewed:

- Wetland protection
- Erosion and sedimentation control
- River restoration
- Best management practices
- Dumping regulations
- Urban forestry
- Farmland protection

Wetland Protection

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flows. They also serve as a natural filter, which helps to improve water quality, and they provide habitat for many species of fish, wildlife and plants.

Wetlands that are determined to be part of the waters of the United States are regulated by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (US EPA) under Section 404 of the Clean Water Act. Before a "404" permit is issued, the plans are reviewed by several agencies, including the Corps and the U.S. Fish and Wildlife Service. Each of these agencies must sign off on individual permits.

There are also nationwide permits that allow small projects that meet certain criteria to proceed without individual permits. Wetlands not included in the Corps' jurisdiction or that are addressed by a nationwide permit may be regulated against by local authorities.

If a permit is issued by the Corps, County, or one of the cities, the impact of the development is typically required to be mitigated. Wetland mitigation can include creation, restoration, enhancement or preservation of wetlands elsewhere. Wetland mitigation is often accomplished within the development site, however, mitigation is allowed off-site and sometimes in another watershed. The appropriate type of mitigation is addressed in each permit.

Some developers and government agencies have accomplished the required mitigation by buying into a wetland bank. Wetland banks are large wetlands created for the purpose of mitigation. The banks accept money to reimburse the owner for setting the land aside from development.

When a wetland is mitigated at a separate site there are drawbacks to consider. First, it takes many years for a new wetland to approach the same quality as an existing one. Second, a new wetland in a different location (especially if it is in a different watershed) will not have the same flood damage reduction benefits as the original one did.

Local Implementation

Sacramento County and the City of Sacramento have ordinances that provide parameters for developing near wetlands. These include requirements for restricting grading and soil disturbances in wetlands, drainage ways, stream environment zones, or water bodies.

CRS Credit

The CRS focuses on activities that directly affect flood damage to insurable buildings. While there is no credit for relying on the Corps of Engineers' 404 regulations, there is credit for preserving open space in its natural condition or restored to a state approximating its natural condition. The credit is based on the percentage of the floodplain that can be documented as wetlands protected from development by ownership or local regulations. Likewise, there is credit for maintaining water quality buffers that protect streams, rivers, lakes and shorelines in their natural condition or restoring them to an approximate natural state. Credit is also available for an approved habitat conservation plan.

Erosion and Sedimentation Control

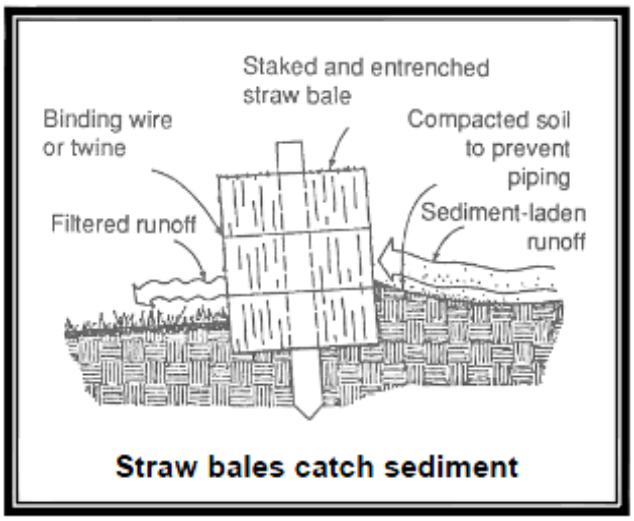
Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along stream banks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil.

Sediment suspended in the water tends to settle out where flowing water slows down. This can clog storm drains, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands. When channels are constricted and flooding cannot deposit sediment in the bottomlands, even more sediment is left in the channels. The result is either clogged streams or increased dredging costs.

Not only are the drainage channels less able to perform their job, but the sediment in the water reduces light, oxygen and water quality, and often carries chemicals, heavy metals and other pollutants. Sediment has been identified by the US EPA as the nation's number one nonpoint source pollutant for aquatic life.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

Figure C-8 Erosion Control



If erosion occurs, other measures are used to capture sediment before it leaves the site. Silt fences, sediment traps and vegetated filter strips are commonly used to control sediment transport. Runoff from the site can be slowed down by terraces, contour strip farming, no-till farm practices, hay or straw bales, constructed wetlands, and impoundments (e.g., sediment basins and farm ponds). Slowing surface water runoff on the way to a drainage channel increases infiltration into the soil and reduces the volume of topsoil eroded from the site.

Erosion and sedimentation control regulations mandate that these types of practices be incorporated into construction plans. The most common approach is to require applicants for permits to submit an erosion and sediment control plan for the construction project. This allows the applicant to determine the best practices for the site.

Local Implementation

Both Sacramento County and the City of Sacramento have comprehensive Stormwater Quality Programs and Erosion and Sediment Control Programs which include ordinances and practices for erosion and sedimentation control. In addition, the South Sacramento Habitat Conservation Plan is a regional approach to addressing issues related to urban development, habitat conservation and agricultural protection. The Plan is still in process and is estimated to be approved in Summer 2017.

CRS Credit

Local governments whose ordinances include erosion and sedimentation control provisions can qualify for up to 45 points for this measure.

River Restoration

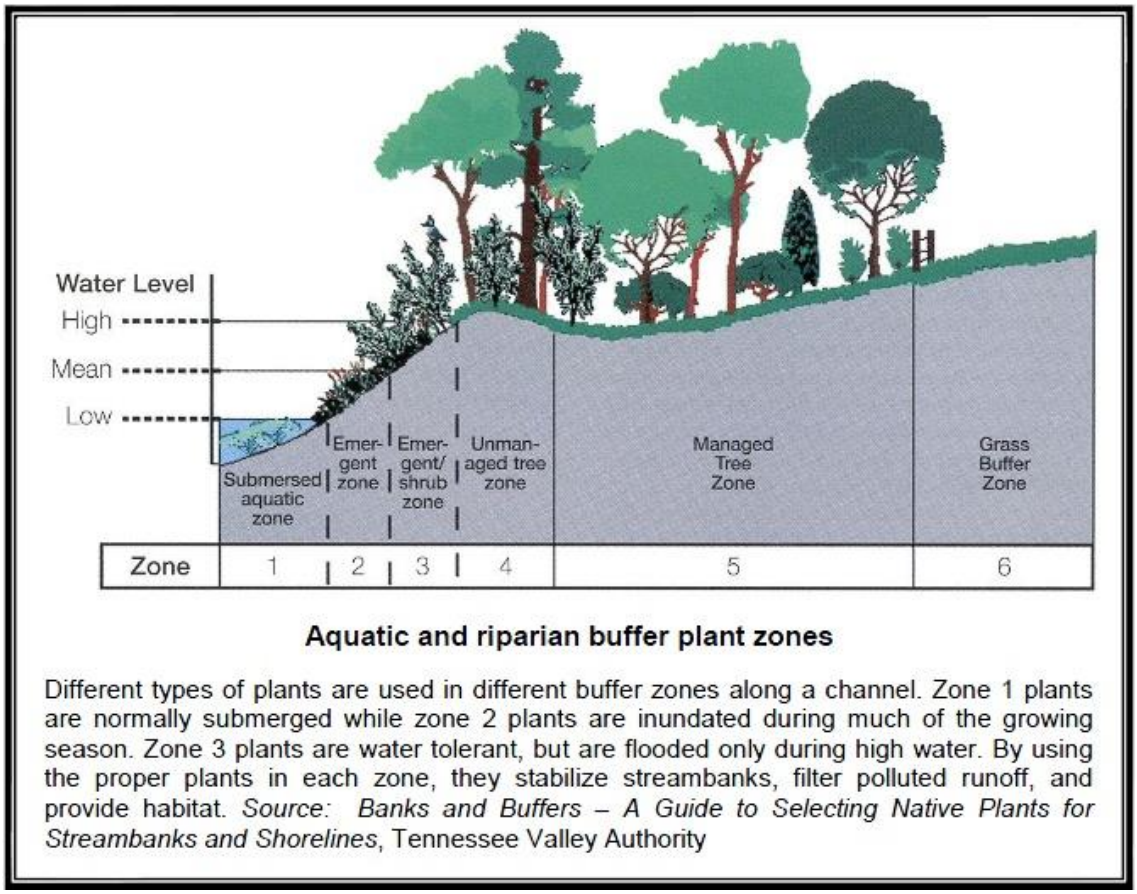
There is a growing movement that has several names, such as "stream conservation," "bioengineering," or "riparian corridor restoration." The objective of these approaches is to return streams, stream banks and adjacent land to a more natural condition, including the natural meanders. Another term is "ecological restoration," which restores native indigenous plants and animals to an area.

A key component of these efforts is to use appropriate native plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants, or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife
- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and its property value
- Prevents property loss due to erosion
- Provides recreational opportunities, such as hunting, fishing and bird watching
- Reduces long-term maintenance costs

Figure C-9 River Restoration Zones



Aquatic and riparian buffer plant zones

Different types of plants are used in different buffer zones along a channel. Zone 1 plants are normally submerged while zone 2 plants are inundated during much of the growing season. Zone 3 plants are water tolerant, but are flooded only during high water. By using the proper plants in each zone, they stabilize streambanks, filter polluted runoff, and provide habitat. *Source: Banks and Buffers – A Guide to Selecting Native Plants for Streambanks and Shorelines*, Tennessee Valley Authority

Local Implementation

Sacramento County and the City of Sacramento implement a variety of these activities for water quality and floodplain management purposes under many of their existing programs.

CRS Credit

The CRS provides credits for preserving open space in its natural condition or restored to a state approximating its natural condition. There are also credits for channel setbacks, buffers and protecting shorelines. Sacramento County and the City of Sacramento currently receive some credit for open space conservation. Credit is also provided for open space land that is deed restricted

Best Management Practices

Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the US EPA and the California Department of Water Resources. Nonpoint source pollutants come from non-specific locations and harder to regulate. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, other chemicals, animal wastes, oils from street surfaces and industrial areas,

and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams.

The term "best management practices" (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of stormwater runoff rates and volumes, prevent erosion, protect natural resources and capture nonpoint source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of stormwater. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple usages of drainage and storage facilities.

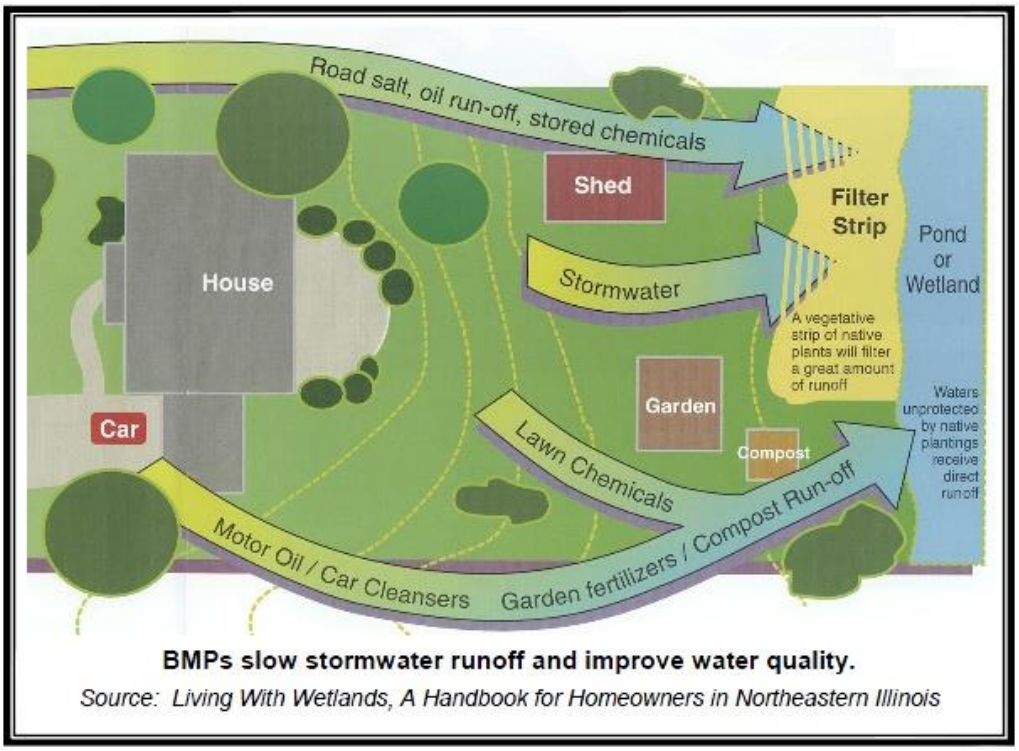
Local Implementation

Sacramento County and the City of Sacramento participate in the National Pollutant Discharge Elimination System permitting program and require BMPs to minimize stormwater impacts.

CRS Credit

A community can receive CRS points if regulations require new developments to include in the design of their permanent stormwater management facilities appropriate BMPs that will improve the quality of surface waters.

Figure C-10 Stormwater Best Management Practices



Dumping Regulations

BMPs usually address pollutants that are liquids or are suspended in water that are washed into a lake or stream. Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' abilities to convey or clean stormwater.

Many communities have nuisance ordinances that prohibit dumping garbage or other "objectionable waste" on public or private property. Waterway dumping regulations need to also apply to "non-objectionable" materials, such as grass clippings or tree branches, which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

Many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard without realizing that is needed to drain street runoff. They may not understand how regarding their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

Local Implementation

Sacramento County ordinances makes it unlawful for anyone to deposit waste, trash, or debris into a waterway. Ordinances also prohibits the placing of any obstruction in a floodway, including buildings, fill, or fencing. It is also illegal to dump or discharge hazardous materials, trash, or other pollutants into the storm drains. Even grass, leaves and yard clippings that are repeatedly swept into catch basins can clog the drain, causing flooding and the potential for becoming a breeding ground for rodents and insects. Additionally, when grass and leaves decompose they encourage excessive growth of algae which can deprive fish of adequate oxygen.

The City of Sacramento has regulations that make it illegal for anyone to accumulate, store, keep, throw, place, deposit, or dump refuse in any water or waterway, or upon the levees or banks adjacent thereto. The City also has regulations prohibiting the discharge of trash and pollutants into storm drains.

Both the City and County publicize this information on their local websites and through other outreach mechanisms.

CRS Credit

The CRS provides credit for enforcing and publicizing a regulation that prohibits dumping in the drainage system.

Farmland Protection

Farmland protection is quickly becoming an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime,

unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads and other infrastructure. Urban sprawl occurs, which can lead to additional stormwater runoff and emergency management difficulties.

Figure C-11 Floodplain Damages to Farmland

Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers because their marginal farm operations cannot afford to be taxed as urban land. The Farmland Protection Program in the United States Department of Agriculture's 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, and local governments as well as nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land. Eligible land includes cropland, rangeland, grassland, pastureland, or forest land that is part of an agricultural operation. Certain lands within historical or archaeological resources are also included.

The hazard mitigation benefits of farmland protection are similar to those of open space preservation:

- Farmland is preserved for future generations,
- Farmland in the floodplain keeps damageable structures out of harm's way,
- Farmland keeps more stormwater on site and lets less stormwater runoff downstream,
- Rural economic stability and development is sustained,
- Ecosystems are maintain, restored or enhanced, and
- The rural character and scenic beauty of the area is maintained.

Local Implementation

Sacramento County currently implements the Williamson Land Conservation Act. This Act was passed by the California legislature to preserve agricultural and other open space lands. It was originally drafted to slow the loss of prime agricultural land, regardless of soil quality. In addition, it now provides protection

for wild life habitats, marshlands, salt flats and certain scenic highways. The Act authorizes local governments and property owners to commit land to specified uses of twenty years or more under a binding contract. Once committed, the land is to be valued as open space land pursuant to open space valuation laws (Revenue & Taxation Code Sections 421, et seq.) enacted pursuant to the Open Space Amendment of the California Constitution.

The City of Sacramento has a similar Urban Agriculture Incentive Zone, intended to promote urban agriculture by providing property tax incentives.

CRS Credit

Credit is given for preserving open space in the floodplain, regardless of why it is being preserved. Credit is also provided for density zoning of floodprone areas.

Conclusions and Recommendations

- A hazard mitigation program can use resource protection programs to support protecting areas and natural features that can mitigate the impacts of natural hazards.
- Sacramento County and the City of Sacramento enforce regulations that prohibit illicit discharges into public sewers or onto public or private property.
- Preserving farmland in the floodplain will maintain open space and prevent damage to homes, businesses, and other development.
- The public and decision makers should be informed about the hazard mitigation benefits of restoring rivers, wetlands and other natural areas. Restoration and protection techniques should be explained.
- Sacramento County and the City of Sacramento may consider publicizing their illicit discharge rules more widely.
- Public outreach activities should include informing the public about the need to protect streams and wetlands from dumping and inappropriate development and the relevant codes and regulations.

C.3.4. Emergency Services Measures

Emergency services measures protect people during and after a disaster. A good emergency management program addresses all hazards, and it involves all local government departments. At the state level, emergency services programs are coordinated by the California Office of Emergency Services (Cal OES). Locally, emergency services are coordinated by the Sacramento County Office of Emergency Services and the City of Sacramento Office of Emergency Services.

This section reviews emergency services measures following a chronological order of responding to an emergency. It starts with identifying an impending problem (threat recognition) and continues through post-disaster activities.

Threat Recognition

The first step in responding to a flood, storm, or other natural hazard is to know when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

Routine Monitoring for Alerts, Watches and Warnings

Emergency officials constantly monitor events and the environment to identify specific threats that may affect their jurisdiction and increase awareness levels of emergency personnel and the community when a threat is approaching or imminent.

The National Weather Service (NWS) is the prime agency for detecting meteorological threats, such as tornadoes, thunderstorms and winter storms. Severe weather warnings are transmitted through NOAA's Weather Radio System. Federal agencies can only look at the large scale, e.g., whether conditions are appropriate for the formation of a thunderstorm. Local emergency managers can provide more site-specific and timely recognition by sending out NWS trained spotters to watch the skies when the Weather Service issues a watch or a warning. The NWS page for Sacramento County is accessible through the Sacramento County website and at the following: http://forecast.weather.gov/MapClick.php?zoneid=CAZ017.

A flood threat recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On larger rivers, this measuring and calculating is performed by the NWS, a part of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Support for NOAA's efforts is provided by cooperating partners from state and local agencies. Forecasts of expected river stages are made through the Advanced Hydrologic Prediction Service (AHPS) of the National Weather Service. Flood threat predictions are disseminated on the NOAA Weather Wire or NOAA Weather Radio. NOAA Weather Radio is considered by the federal government as the official source for weather information.

On smaller rivers, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide advance notice of potential local or flash flooding.

Local Implementation

Sacramento County and City of Sacramento Emergency Operations Plan's (EOP), include procedures for threat identification. The City and County work closely with the NWS for issuing an Emergency Alert System (EAS). Additional Sacramento County's threat identification mechanisms include:

California Data Exchange Center (CDEC). The CDEC provides information for flood forecasting information at http://cdec.water.ca.gov/. The CDEC installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gages for the Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting.

Automated Local Evaluation in Real Time (ALERT) System. ALERT was created by the NWS to provide continuous and automatic reports from river levels and rainfall gauges detect impending high water levels. ALERT information includes:

- Rainfall Summary
- Stage Summary
- Storm Ready
- Sandbag Information
- Detailed Forecast
- Quantitative Precipitation Forecasts (QPF)
- NWS River Forecasts

The Sacramento County's ALERT system consists of 2 base stations, and 50 gaging stations. The purpose of the County's ALERT website is to provide real time monitoring information to stage and rainfall information during storm events, which assist in informing the activation of additional warning and potential evacuation of affected areas. This information which can be accessed through the Sacramento County website includes information for: Stream Level Summaries and Maps; and Rainfall Summaries and Maps. See https://www.sacflood.org/home.php.

Dam Protocols. Should an event trigger the activation of an Emergency Action Plan (EAP) for a potential dam failure, County OES receives this information via direct phone calls from the originating source/agency or from PCSO Dispatch and/or Cal OES. County OES then follows the notification and evacuation procedures called for in the EAP.

Increased Readiness & Pre-Impact

Early threat identification and sufficient warning provides the opportunity for response agencies to increase readiness, which are actions designed to increase an agency's ability to effectively respond once the emergency occurs. This includes steps to brief key officials, disseminating information to the community, and through activation of EOCs, as necessary.

Community Preparedness and Awareness

Emergency public information is a priority during emergencies and disasters. County and City governments have a primary responsibility to provide accurate and timely information to the public regarding conditions, threats, and protective measures. Emergency information is best communicated when centralized and coordinated among all involved jurisdictions, agencies, and organizations.

The public's response to any emergency is based on an understanding of the nature of the emergency, the potential hazards, the likely response of emergency services, and knowledge of what individuals and groups should do to increase their chances of survival and recovery. Effective public awareness and education prior to an emergency or a disaster will directly affect the Sacramento County/City's emergency operations response and recovery efforts.

CRS Credit

Credit can be received for using river flood stage predictions for the NWS's gages. The actual score is based on how much of the community's floodplain is affected by these systems. Potential CRS credit is possible under Activity 610 - Flood Warning Program and Response.

Notifications and Warning Systems

Once a disaster is imminent, action is taken to control the situation, save lives, protect property, and minimize the effects of the disaster. During this phase, warning systems are activated; resources and first responders notified and mobilized; and evacuations begin.

After a threat recognition system tells the emergency services office that a flood, severe weather or other hazard is coming, the next step is to notify the public and staff of other agencies and critical facilities. Providing adequate and timely notification to the public is the greatest challenge, especially with sudden or no-notice events. The earlier and more specific the warning, the greater the number of people that can implement protection measures.

As previously described, the NWS issues notices to the public using two levels of notification:

- **Watch.** Conditions are right for flooding, thunderstorms, or other hazard event.
- **Warning**. A flood or other event has started or been observed.

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- Email notifications

Multiple or redundant systems are most effective - if people do not hear one warning, they may still get the message from another part of the system. Each has advantages and disadvantages:

- Radio and television provide a lot of information, but people have to know when to turn them on. They are most appropriate for hazards that that develop over more than a day, such as a tropical storm, hurricane, or winter storm.
- NOAA Weather Radio can provide short messages of any impending weather hazard or emergency and advise people to turn on their televisions for more information, but not everyone has a Weather Radio.
- Outdoor warning sirens can reach many people quickly as long as they are outdoors. They do not reach people in tightly-insulated buildings or those around loud noise, such as at a factory, during a

thunderstorm, or in air conditioned homes. They do not explain what hazard is coming, but people should know to turn on a radio or television when they hear the siren.

- Automated telephone notification services are also fast, but can be expensive and do not work when phone lines are down. Nor do they work for unlisted numbers, call screening services, or cellular service, unless people sign up for notifications.
- Where a threat has a longer lead time, going door-to-door and manual telephone trees can be effective.

Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should have a public information aspect. Citizens should know the difference between a tornado warning (when they should seek shelter in a low spot), a flood warning (when they should stay out of low areas), and other appropriate warnings and responses.

StormReady

The National Weather Service established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center,
- Have more than one way to receive severe weather warnings and forecasts and to alert the public,
- Create a system that monitors weather conditions locally,
- Promote the importance of public readiness through community seminars, and
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Being designated a StormReady community by the National Weather Service is a good measure of a community's emergency warning program for weather hazards. It is also credited by the CRS.

Local Implementation

In coordination with established public safety warning protocols, the activated EOCs for Sacramento County and the City of Sacramento will manage the dissemination of timely and adequate warnings to threatened populations in the most direct and effective means possible. Depending upon the threat and time availability, the County and City EOCs will initiate alerts and warnings utilizing any of the following methods:

- Activation of the Emergency Alert System (EAS)
- Activation of the Telephonic Alert and Warning System (Everbridge and Reverse 911)
- Activation of the Emergency Digital Information System (EDIS)
- Activation of the California Law Enforcement Mutual Aid Radio System (CLEMARS)
- Media broadcast alerts.
- Commercial or public radio or TV stations
  - ✓ Radio: KFBK 1530 am, KSTE 650, KGBY, 92.5 FM
  - ✓ TV: KCRA Channel 3, www.KCRA.com; KXTV Channel 10; KOVR Channel 13; KTXL Channel 40
- NOAA Weather Radio
- www.saccounty.net; SacramentoReady.org websites
- 211/311 Sacramento

- CalTrans 511
- Telephone trees/mass telephone notifications
- Tone activated receivers in key facilities
- Fire and Law enforcement loudspeakers
- Outdoor warning sirens
- Mobile public address sirens/systems
- Door-to-door contact
- Vulnerable population databases
- Email notifications

Sacramento ALERT

The Sacramento County OES, in partnership with Yolo and Placer emergency agencies, use a state-of-the-art emergency alert system known as Sacramento Alert. The system provides information to residents about emergency events quickly and through a variety of communication methods.

The alert system currently includes all listed and unlisted landline telephone numbers in Yolo, Placer, and Sacramento counties that are serviced by AT&T and Verizon.

To ensure emergency notices are received quickly both at work and home, residents are encouraged to log onto the Sacramento Alert Self- Registration Portal and provide phone numbers for both home and work, including land and cell phone numbers, email addresses, TTY device information and instant messaging information.

Residents will only receive alerts that are critical and time-sensitive, including: flooding, levee failures, severe weather, disaster events, unexpected road closures, missing persons, and evacuations of buildings or neighborhoods in specific geographic locations.

The system, which uses Everbridge Alert and Notifications System, was made possible for all three counties by a grant from CAL OES and supported by CA Department of Water Resources, Flood Operations Center through the Sacramento County OES.

In addition, both Sacramento County and the City of Sacramento are StormReady certified.

CRS Credit

Community Rating System points are based on the number and types of warning media that can reach the community's flood prone population. Depending on the location, communities can receive credit for the telephone calling system and more points if there are additional measures, like telephone trees. Being designated as a StormReady community can provide additional points. These credits are in Activity 610 - Flood Warning Program and Response.

Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (emergency preparedness),
- Closing streets or bridges (police or public works),
- Shutting off power to threatened areas (utility company),
- Passing out sand and sandbags (public works),
- Holding children at school or releasing children from school (school superintendent),
- Opening evacuation shelters (the American Red Cross),
- Monitoring water levels (public works), and
- Establishing security and other protection measures (police).

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

A flood stage forecast map shows areas that will be under water at various flood stages. Different flood levels are shown as color coded areas, so the emergency manager can quickly see what will be affected. Emergency management staff can identify the number of properties flooded, which roads will be under water, which critical facilities will be affected, and who to warn. With this information, an advance plan can be prepared that shows problem sites and determines what resources will be needed to respond to the predicted flood level.

Emergency response plans should be updated annually to keep contact names and telephone numbers current and to ensure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and of changing conditions. The end result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner possible.

Local Implementation

Sacramento County and City of Sacramento OES have established response protocols to be followed for any given event. Response is provided cooperation with the County Sherriff, city police, and fire departments. The County and City EOPs address the planned response to emergency situations associated with natural disasters and emergencies in or affecting the area. The EOPs are intended to facilitate multi-agency and multi-jurisdictional coordination in emergency operations. They seek to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system to return the County the local jurisdictions to their normal state of affairs.

CRS Credit

The CRS program provides credit under Activity 610- Flood Warning for a warning system that effectively notifies residents of a flood and has procedures for testing and monitoring the system.

Evacuation and Shelter

According to Emergency Management: Principles and Practice, the principle of evacuation is to move citizens from a place of relative danger to a place of relative safety, via a route that does not pose significant danger. There are six key components to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., the handicapped, prisoners, hospital patients, and schoolchildren)

Those who cannot get out of harm's way need shelter. Typically, the American Red Cross will staff a shelter and ensure that there is adequate food, bedding, and wash facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring in their pets, and the potential for an overcrowded facility.

Local Implementation

The County and City both maintain Evacuation Plans that outline strategies and protocols for medium to high-level (catastrophic) evacuation events in the County. These plans also include procedures for sheltering to provide people affected by a disaster with a safe, temporary place to be housed during or immediately after a disaster until they can either return to their homes or be relocated to other housing facilities. Highlights of these County/City plans are detailed below.

Sacramento County

Sacramento County's Evacuation Plan, 2008, is an annex to the County EOP. An update to the 2008 Evacuation Plan is scheduled for 2016. The purpose of the Evacuation Plan is to document agreed upon strategy for the County's response to emergencies that involve the evacuation of persons from an impacted area to a safe area. This involves coordination and support for the safe and effective evacuation of the general population and for those who need additional support to evacuate, such as health care facilities and schools. This plan also includes considerations for shelter-in-place options, in circumstances where evacuation may be a higher risk option. All evacuation and sheltering-in-place for medium and high level catastrophic incidents will be coordinated through Sacramento County EOC. Low level incidents will be handled at a more local level, such as through local fire departments. Care and sheltering of evacuees will be handled through Sacramento County's Department of Human Assistance (DHA), with support from Red Cross. The County's Evacuation Plan identifies criteria and triggers for determining what level of evacuation is warranted; information on transportation and evacuation movement control; and roles and responsibilities of agencies/organizations supporting the evacuation.

City of Sacramento

The City EOP identifies roles and responsibilities for coordinating evacuation in the City. Evacuation routes are established for 20 areas within the City. The City Law Enforcement Branch has the responsibility to coordinate area evacuations. Wide-spread evacuations are coordinated with County OES and other local and regional agencies.

Rescue and Evacuation Planning

The City has also established guidelines that focus on public safety during a flood event as an amendment (Appendix K) to its floodplain ordinance. This includes City guidelines for public refuge areas and evacuation locations for rescue areas are based on potential flood depths from the time of levee failure.

Rescue and evacuation planning analysis and maps have been developed based on several levee break scenarios and are being used to support these public safety measures during a levee failure event and include development guidelines to address:

- Refuge and staging locations with exits (e.g., second floor areas with windows or balconies
- Exit locations when the way out is in an extraordinary location for persons with disabilities (e.g., a roof hatch)
- Evacuation points/routes for transport to safety

CRS Credit

Because it is primarily concerned with protecting insurable buildings, the CRS does not provide any special credit for evacuation or sheltering of people (minimal credit is given in Activity 510 - Floodplain Management for evacuation policies and procedures). It is assumed that the emergency response plan would include all necessary actions in response to a flood.

Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrolling evacuated areas to prevent looting,
- Providing safe drinking water,
- Monitoring for diseases,
- Vaccinating residents for tetanus and other diseases,
- Clearing streets, and
- Cleaning up debris and garbage.

Throughout the recovery phase, everyone wants to get "back to normal." The problem is that "normal" means the way they were before the disaster, exposed to repeated damage from future disasters. There should be an effort to help prepare people and property for the next disaster. Such an effort would include:

- Public information activities to advise residents about mitigation measures they can incorporate into their reconstruction work,
- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs,
- Identifying other mitigation measures that can lessen the impact of the next disaster,
- Acquiring substantially or repeatedly damaged properties from willing sellers,
- Planning for long-term mitigation activities, and
- Applying for post-disaster mitigation funds.

Regulating Reconstruction

Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. There is a special requirement to do this in floodplains, regardless of the type of disaster or the cause of damage. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

This requirement can be very difficult for understaffed and overworked offices following a disaster. However, if these activities are not carried out properly, not only does the community miss a tremendous opportunity to redevelop or clear out a hazardous area, it may be violating its obligations under the NFIP. In some areas, mutual aid agreements have been established so building inspectors from a community not affected by the disaster can work in the communities that were hit the hardest.

Local Implementation

Sacramento County and City of Sacramento EOPs hav post-disaster recovery policies in place for the communities. The EOPs are intended to facilitate multi-agency and multi-jurisdictional coordination during emergencies including hazard events. Through it policies and procedures it seeks to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system in order to return the community to their normal state of affairs. The County and City are in the process of updating their EOPs in 2016. Post disaster recovery procedures for all hazards, including flood, are addressed the EOPs and are detailed further in Section 4.4 of the base plan and the City's Annex to this LHMP.

CRS Credit

The CRS does credit post-disaster mitigation procedures if the policies and procedures are incorporated into a flood mitigation or multi-hazard plan through Activity 510 - Floodplain Management Planning.

Conclusions and Recommendations

- There are several threat recognitions systems that can provide the County and City with advance notice of an impending emergency.
- Sacramento County and the City of Sacramento depend on local media outlets, sirens, telephones and door-to-door notices to warn residents. These media should reach most people who need to know of a threat. Consideration should be given to reach special populations that may require additional or different methods.
- Emergency management guidance could be very helpful when things happen quickly and for hazards that have predictable impacts, such as flooding.
- Sacramento County and the City of Sacramento should update and exercise their EOPs on a regular basis.
- Sacramento County, the City of Sacramento, and County jurisdictions should continue to work together to protect people before and after a disaster including an outreach program to promote each community's warning system.

C.3.5. Flood Control Measures

Four general types of flood control projects are reviewed here: levees, reservoirs, diversions, and dredging. These projects have three advantages not provided by other mitigation measures:

- They can stop most flooding, protecting streets and landscaping in addition to buildings,
- Many projects can be built without disrupting citizens' homes and businesses, and
- They are constructed and maintained by a government agency, a more dependable long-term management arrangement than depending on many individual private property owners.

However, as shown below, structural measures can have shortcomings. The appropriateness of using flood control depends on individual project area circumstances.

Pros and Cons of Structural Flood Control Projects

- Advantages
  - ✓ They may provide the greatest amount of protection for land area used.
  - ✓ Because of land limitations, they may be the only practical solution in some circumstances.
  - ✓ They can incorporate other benefits into structural project design, such as water supply and recreational uses.
  - ✓ Regional detention may be more cost-efficient and effective than requiring numerous small detention basins.

- Disadvantages
  - ✓ They can disturb the land and disrupt the natural water flows, often destroying wildlife habitat.
  - ✓ They require regular maintenance, which if neglected can have disastrous consequences.
  - ✓ They are built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage.
  - ✓ They can create a false sense of security, as people protected by a project often believe no flood can ever reach them.
  - ✓ Although it may be unintended, in many circumstances they promote more intensive land use and development in the floodplain.

Levees and Floodwalls

Probably the best known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour. Key considerations when evaluating the use of a levee include:

- Design and permitting costs,
- Right of way acquisition,
- Removal of fill to compensate for the floodwater storage that will be displaced by the levee,
- Internal drainage of surface flows from the area inside the levee,
- Cost of construction,
- Cost of maintenance,

- Mitigation of adverse impacts to wetlands and other habitats,
- Loss of river access and views, and
- Creating a false sense of security, because while levees may reduce flood damage for smaller more frequent rain events, they may also overtop or breach in extreme flood events and subsequently create more flood damage than would have occurred without the levee.

Levees placed along the river or stream edge can degrade the aquatic habitat and water quality of the stream. They also are more likely to push floodwater onto other properties upstream or downstream. To reduce environmental impacts and provide multiple use benefits, a setback levee is often the best project design. The area inside a setback levee can provide open space for recreational purposes and provide access sites to the river or stream.

Floodwalls perform like levees except they are vertical-sided structures that require less surface area for construction. Floodwalls are constructed of steel sheet pile or reinforced concrete, which makes the expense of installation cost prohibitive in many circumstances. Floodwalls also can degrade adjacent habitat and can displace erosive energy to unprotected areas of shoreline downstream.

Reservoirs and Detention

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it can flow downstream. Flood waters are detained until the flood has subsided, and then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could also help mitigate a drought).

Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the stormwater runoff impacts of new development.

Figure C-12 Retention Pond

Retention pond

Regardless of size, reservoirs protect the development that is downstream from the reservoir site. Unlike levees and channel modifications, they do not have to be built close to or disrupt the area to be protected. Reservoirs are most efficient in deeper valleys where there is more room to store water, or on smaller rivers where there is less water to be stored.

In urban areas, some reservoirs are simply manmade holes, excavated to store floodwaters. Reservoirs in urban areas are typically constructed adjacent to streams (though usually outside of the floodplain). When built in the ground, there is no dam for these retention and detention basins and no dam failure hazard. Wet or dry basins can also serve multiple uses by doubling as parks or other open space uses.

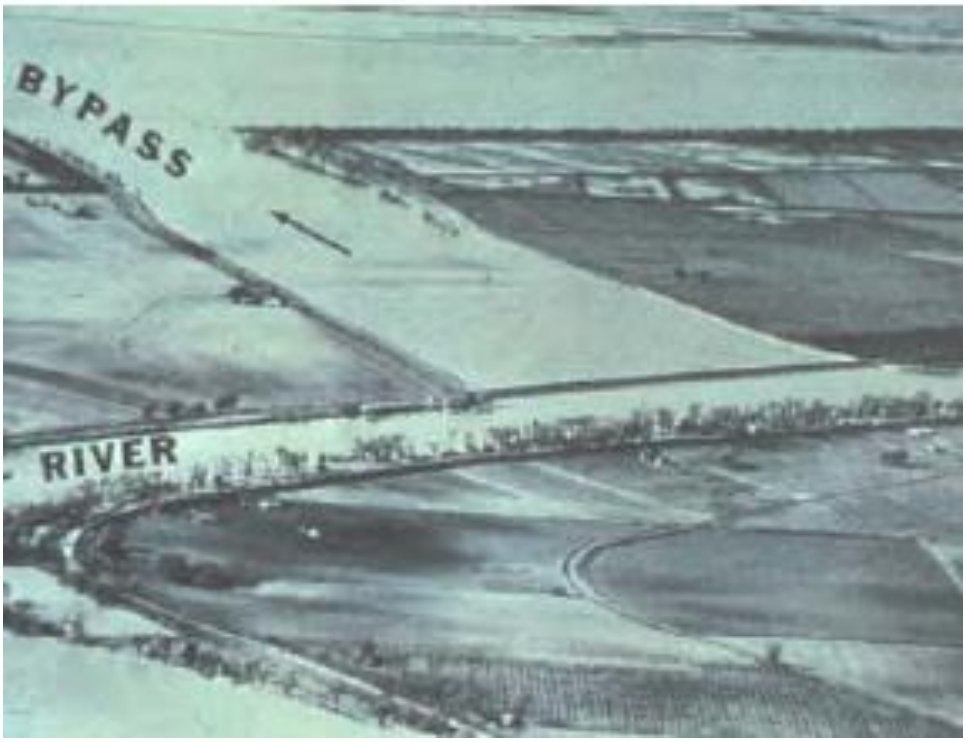
There are several considerations when evaluating the use of reservoirs and detention:

- There is the threat of flooding the protected area should the reservoir's dam fail,
- There is a constant expense for the management and maintenance of the facility,
- They may fail to prevent floods that exceed their design levels,
- Sediment deposition may occur and reduce the storage capacity over time,
- They can impact water quality as they are known to affect temperature, dissolved oxygen and nitrogen, and nutrient levels, and
- If not designed correctly, in-stream reservoirs may cause backwater flooding problems upstream

Diversion

A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During floods, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Figure C-13 Diversion



Diversions are limited by topography; they will not work in some areas. Unless the receiving water body is relatively close to the floodprone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive.

Dredging

Dredging is often viewed as a form of conveyance improvement. However, it has the following problems:

- Given the large volume of water that comes downstream during a flood, removing a foot or two from the bottom of the channel will have little effect on flood heights.
- Dredging is often cost prohibitive because the dredged material must be disposed of somewhere.
- Unless in-stream or tributary erosion is corrected upstream, the dredged areas usually fill back in within a few years, and the process and the expense have to be repeated.
- If the channel has not been disturbed for many years, dredging will destroy the habitat that has developed.

Figure C-14 Dredging Activity

To protect the natural values of the stream, federal law requires a U.S. Army Corps of Engineers permit before dredging can proceed. This can be a lengthy process that requires a lot of advance planning and many safeguards to protect habitats, which adds to the cost of the project.

CRS Credit

Structural flood control projects that provide 100-year flood protection and that result in revisions to the Flood Insurance Rate Map are not credited by the CRS in order to avoid duplicating the larger premium reduction provided by removing properties from the mapped floodplain.

The CRS credits smaller flood control projects that meet the following criteria:

- They must provide protection to at least the 25-year flood,
- They must meet certain environmental protection criteria,
- They must meet federal, state and local regulations, such as the Corps of Engineers' 404 permit and California Division of Dam Safety for dam safety rules, and
- They must meet certain maintenance requirements.

These criteria ensure that credited projects are well-planned and permitted. Any of the measures reviewed in this section would be recognized under Activity 530 - Flood Protection, although it would be very hard to qualify a dredging project. Credit points are based on the type of project, how many buildings are protected, and the level of flood protection provided.

Local Implementation

Much of the City of Sacramento and areas of Sacramento County are dependent on levees and other flood control structures to prevent flooding as previously described in this LHMP. In the aftermath of the 1986

floods, several flood control projects were identified to address the flood risks in the Sacramento area. Some of these projects were designed to correct structural deficiencies observed during the flood, while other projects were added once the water had receded and revealed levee conditions. The 1997 flood event also highlighted additional deficiencies that are now being corrected to increase the level of community flood protection.

Conclusions and Recommendations

- In coordination with California Department of Water Resources and the Sacramento Area Flood Control District (SAFCA), flood control and drainage facilities are being brought to current standards of flood protection and prevention.
- Sacramento County, the City of Sacramento, other cities, and special districts should continue to evaluate and implement countywide flood control and drainage improvement projects to reduce the potential from future flooding.

C.3.6. Public Information Measures

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, and businesses about hazards and ways to protect people and property from these hazards. These activities can motivate people to take the steps necessary to protect themselves and others.

Information can bring about voluntary mitigation activities at little or no cost to the government. Property owners mitigated their flooding problems long before government funding programs existed. The typical approach to delivering information involves two levels of activity. The first is to broadcast a short and simple version of the message to everyone potentially affected. The second level provides more detailed information to those who respond and want to learn more.

This section starts with activities that reach out to people and tell them to be advised of the hazards and some of the things they can do. It then covers additional sources of information for those who want to learn more. It ends with a general public information strategy.

Outreach Projects

Outreach projects are the first step in the process of orienting property owners to the hazards they face and to the concept of property protection. They are designed to encourage people to seek out more information in order to take steps to protect themselves and their properties.

Research has shown that outreach projects work. However, awareness of the hazard is not enough; people need to be told what they can do about the hazard. Thus, projects should include information on safety, health and property protection measures. Research has also shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

Community newsletters/direct mailings: One of the more effective types of outreach projects include mailings or distributions to everyone in the community. In the case of floods, they may be sent only to floodplain property owners.

News media: Local newspapers can be strong allies in efforts to inform the public. Press releases and story ideas may be all that's needed to gain their interest. After a flood in another community, people and the media become interested in their flood hazard and how to protect themselves and their property. Local radio stations and cable TV channels can also help. These media offer interview formats and cable TV may be willing to broadcast videos on the hazards.

Other approaches: Examples of other outreach projects include:

- Presentations at meetings of neighborhood, civic or business groups,
- Displays in public buildings or shopping malls,
- Signs in parks, along trails and on waterfronts that explain the natural features (such as the river) and their relation to the hazards (such as floods),
- Social Media broadcasts,
- Brochures available in municipal buildings and libraries, and
- Special meetings, workshops and seminars.

Local Implementation

Sacramento County and the City of Sacramento maintain websites that provides in-depth flood protection information. The County and City also provide direct mailings annually to residents, with a focus on repetitive loss areas, which include flyers on flood protection and property protection measures. The County and City also provides direct mailings on flood protection information to insurance brokers and realtors located throughout the community. In addition, the County's water resources and stormwater groups and the City's utility department also conduct and participate in a variety of public community events throughout the year such as community fairs, river cleanups, etc. and provide information to the public on stormwater management and flood protection measures. The County and City also have a variety of flood materials placed in public locations.

In addition, both the County and City have established Programs for Public Information (PPI) that are being implemented and contain a variety of focused flood outreach efforts as described further in Section 4.4 of the Base plan and the City's Annex to this LHMP.

CRS Credit

The Community Rating System provides credit for outreach projects which cover six flood-related topics. Credit is also available for producing flood response materials. Another way to achieve credit for outreach is for producing a PPI. A 40% bonus is applied to outreach credits which are included in a PPI.

Real Estate Disclosure

Many times after a flood or other natural disaster, people say they would have taken steps to protect themselves if they had known they had purchased a property exposed to a hazard. There are some federal and state requirements about such disclosures, but they have their limits.

Federal law: Federally regulated lending institutions must advise applicants for a mortgage or other loan that is to be secured by an insurable building whether the property is in a floodplain as shown on the Flood Insurance Rate Map. If so, flood insurance is required for buildings located within the floodplain if the mortgage or loan is federally insured. However, because this requirement has to be met only 10 days before closing, the applicant is often already committed to purchasing the property when he or she first learns of the flood hazard.

State law: State laws set standards for real estate sales and licensing of agents and brokers.

Local Implementation

Sacramento County and the City of Sacramento receive credit for providing for the local real estate agents disclosure of flood hazards to prospective buyers. Credit is also provided for state and community regulations requiring disclosure of flood hazards.

CRS Credit

Communities in areas that have additional disclosure requirements are eligible for five points under the "Other disclosure requirements" as well as 10 points for the "Disclosure of other hazards."

Libraries and Websites

The two previous activities tell people that they are exposed to a hazard. The next step is to provide information to those who want to know more. The community library and local websites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources.

Books and pamphlets on hazard mitigation can be given to libraries, and many of these can be obtained for free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures and other projects, which can augment the activities of the local government. Today, websites are commonly used as research tools. They provide fast access to a wealth of public and private sites for information. Through links to other websites, there is almost no limit to the amount of up to date information that can be accessed on the Internet.

In addition to online floodplain maps, websites can link to information for homeowners on how to retrofit for tornadoes and floods or a website about floods for children. The "FEMA for Kids" website teaches children how to protect their home and what to have in a family disaster kit.

Local Implementation

Sacramento County and the City of Sacramento provide a variety of flood materials placed in public locations, including public buildings and public libraries. The County also has an extensive flood protection websites at: http://www.waterresources.saccounty.net/stormready/Pages/default.aspx. The City maintains a similar website at: http://www.cityofsacramento.org/Utilities/Education/Flood-Ready/.

CRS Credit

The Community Rating System provides credit for having a variety of flood references in the local public library and additional credits for similar material included on municipal websites (Activity 350 - Flood Protection Information).

Technical Assistance

Hazard Information

Many benefits stem from providing map information to inquirers. Residents and business owners that are aware of the potential hazards can take steps to avoid problems or reduce their exposure to flooding. Real estate agents and house hunters can find out if a property is floodprone and whether flood insurance may be required.

Communities can easily provide map information from FEMA's DFIRMs and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is located outside the mapped floodplain.

Some communities supplement what is shown on the DFIRM with information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never get wet.

Property Protection Assistance

While general information provided by outreach projects or the library is beneficial, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track:

- Building or public works department staffs can provide the following types of assistance:
- Visit properties and offer protection suggestions,
- Recommend or identify qualified or licensed contractors,
- Inspect homes for anchoring of roofing and the home to the foundation,
- Provide advice on protecting windows and garage doors from high winds, and
- Explain when building permits are needed for home improvements.

There is a concern that a local official might provide the wrong information and the community would be sued if a project failed. To counter this, there are guidelines for local programs and training on how to identify the right measures. FEMA conducts a free week-long course at its Emergency Management Institute on property protection measures for flooding. FEMA and the Corps of Engineers periodically conduct one- or two-day retrofitting workshops.

Local Implementation

FEMA floodplain maps are available on local websites for both Sacramento County and the City of Sacramento. The County and City also respond to requests on whether a property is located in a Special Flood Hazard Area. The County and City also maintain elevation certificates for many existing home within or near the SFHA.

CRS Credit

The Community Rating System provides points for providing map information to inquirers. Points are available for providing one-on-one flood protection assistance to residents and businesses and for making site visits. Both services must be publicized.

Public Information Program Strategy

A public information program strategy is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended plan of activities. A strategy consists of the following parts, which are incorporated into this plan:

- The local flood hazard (discussed in Chapter 4)
- The property protection measures appropriate for the flood hazard (discussed in Chapters 4 and 5)
- Flood safety measures appropriate for the local situation (discussed in Chapters 4 and 5)
- The public information activities currently being implemented within the community, including those being carried out by non-government agencies (discussed in Chapter 4 and jurisdictional annexes)
- Goals for the community's public information program (discussed in Chapters 4 and 5)
- The outreach projects that will be done each year to reach the goals (discussed in Chapters 4 and 5)
- The process that will be followed to monitor and evaluate the projects (discussed in Chapter 7)

Figure C-15 illustrates several flood safety tips that can be used in an outreach campaign to better inform the public of the hazards associated with flooding.

Figure C-15 Flood Safety Tips for Outreach Campaign

Flood Safety

Pay attention to evacuation orders. Listen to local radio or TV stations for forecasts and emergency warnings. Know about evacuation routes and nearby shelters and have plans for all family members on how to evacuate and where to meet if you're split up during an emergency.

Do not drive through a flooded area. During a flood, more people drown in their cars than anywhere else. Don't drive around road barriers; the road or bridge may be washed out.

Do not walk through flowing water. Flash flooding is the leading cause of weather-related deaths in the U.S. Currents can be deceptive; 6 inches of moving water can knock you off your feet in a strong current. If you walk in standing water, use a stick to help you locate the ground.

Stay away from power lines and electrical wires. Electrical currents can travel through water. Report downed power lines to the police or sheriff by calling 911.

Have the power company turn off your electricity. Some appliances, like TV sets, keep electrical charges even after they've been unplugged. Don't use appliances or motors that have gotten wet unless they have been taken apart, cleaned and dried.

Look before you step. After a flood, the ground and floors are covered with debris like broken bottles and nails. Floors and stairs that are covered with mud can also be slippery.

Be alert for gas leaks. Use a flashlight to inspect damage. Don't smoke or use candles, lanterns, or open flames unless you know the gas has been shut off and the area has been ventilated.

Look out for animals that may have been flooded out of their homes and who may seek shelter in yours. Use a pole or stick to turn things over and scare away small animals.

Look before you step. After a flood, the ground and floors are covered with debris. Floors and stairs that have been covered with mud will be very slippery.

Carbon monoxide exhaust kills. Use a generator or other gasoline-powered machine outdoors. The same goes for camping stoves. Charcoal fumes are especially deadly – cook with charcoal outdoors.

Clean everything that got wet in the flood. Floodwaters have picked up sewage and chemicals from roads, farms, factories, and storage buildings. Spoiled food, and flooded cosmetics and medicines can be health hazards. When in doubt, throw it out.

Take care of yourself. Recovering from a flood is a big job. It is tough on both the body and the spirit and the effects a disaster has on you and your family may last a long time.

CRS Credit

The CRS provides up to 350 points for a Program for Public Information (PPI).

Conclusions and Recommendations

- There are many ways that public information can be used so that people and businesses will be more aware of the hazards they face and how they can protect themselves.
- Libraries and websites are currently being used as public information tools in Sacramento County and the City of Sacramento.
- The most important topics to cover in public information activities are:
  - ✓ Safety precautions for all types of hazards, but especially floods, earthquakes, thunder storms, winter storms, wildfires, and tornadoes.
  - ✓ Knowing where emergency evacuation shelters are in town.

- ✓ Flood protection measures, including rules for new construction and insurance.
- ✓ Keeping drainage ways clear and protection from local drainage problems.
- ✓ Family and emergency preparedness measures.
- ✓ What the County and cities are doing and sources of assistance.
- ✓ Protecting water quality and wetlands and the benefits of open space.

- The most appropriate ways to spread this information are:
  - ✓ Websites and social media
  - ✓ Mailings to everyone, in utility bills or otherwise
  - ✓ News releases or newspaper articles
  - ✓ Newsletters
  - ✓ Displays, particularly at special events
  - ✓ Handouts, flyers and other materials, which can be distributed at special events and presentations
- County and City staff should continue to reach out to residents, civic organizations and other organizations to help spread the word about flood hazards, flood protection, and safety measures.

Sacramento County Local Hazard Mitigation Plan Update

Mitigation Strategy Meetings: Mitigation Actions v/1, July 12 & 13, 2016

Responsible Jurisdiction/Department	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
County, Cities	Public outreach: Education and Preparedness for all Hazards and all populations	Multi-hazard	28
County, Cities (FM)	Incorporate LHMP Update by reference through board adoption into the safety element of the General Plan Update	Multi-hazard	N/A*
County, Cities	Business resiliency education and outreach	Multi-hazard	0
County, Cities	Update and maintain countywide Critical Facilities GIS layer	Emergency Services/Multi-hazard	N/A
County, Cities	Increase enrollment in Everbridge	Emergency Services/Multi-hazard	0
All	Backup Generators/pumps – Critical Facilities	Emergency Services/Multi-hazard	27
All	Critical Facility evaluation/mitigation	Emergency Services/Multi-hazard	11
All	Increased data capacity of emergency frequencies	Emergency Services/Multi-hazard	5
County, Cities	Conduct evacuation and shelter planning for all communities and populations (to include all critical hazards, at risk populations, medical, ADA, and an outreach component)	Emergency Services/Multi-hazard	11
County, Cities	Conduct emergency, multi-agency exercises	Emergency Services/Multi-hazard	10
All	Update, maintain, and enhance Emergency Operations Plans	Emergency Services/Multi-hazard	0
County, Cities	Storm Weather radio distribution	Emergency Services/Multi-hazard	3
County Ag Dept.	To be determined (flood, drought, pests)	Agricultural	N/A
County, Cities	Climate Action/Adaptation planning and adaptation strategy development (including new construction)	Climate Change	38
RDs	Levee Crown raising projects	Climate Change/Levee Failure	2
???	Dam O & M	Dam Failure	0

Responsible Jurisdiction/Department	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
County/RD 800	Consumnes Dam	Dam Failure	0
County	Rancho Marietta improvements?	Dam Failure	0
County	Alder Dam stabilization/removal (mercury issues)	Dam Failure	1
All	Provide repairs/enhancements to water conveyance infrastructure	Drought & Water Supply	N/A
All	Maintain and enhance conservation measures	Drought & Water Supply	17
County, Cities	Develop/Implement metering and tiered rate structures	Drought & Water Supply	1
All	Drought contingency planning	Drought & Water Supply	1
County, Cities	Landscape and irrigation requirements and retrofits	Drought & Water Supply	5
County, Cities	Grey water use/recycled water programs	Drought & Water Supply	13
All	Water Quality studies	Drought & Water Supply	0
County, Cities	Surface and groundwater management planning/studies	Drought & Water Supply	0
All	Block the governor's tunnel project	Drought & Water Supply	8
County, Cities	Implement mandatory green building code	Drought & Water Supply	3
All	Inventory and evaluate options for vulnerable critical facilities (e.g., demolish, retrofit), including URMs	Earthquake	1
All	Bank and levee erosion projects	Erosion/Levee Failure	10
County and City of Sacramento	Continued enhancement of CRS Program	Flood	0
Other Cities	Consider joining CRS	Flood	0
County	RV Park mitigation (near Citrus Heights)	Flood	6
County/Cities	Stockpiling/locating flood fighting materials	Flood	10
County/Cities	Implement LID and hydromodification standards	Flood	7
County	Ring Levees	Flood	6
County, Cities	SB 5 compliance projects	Flood	31
County, Cities	Rep Loss property mitigation	Flood	8
County, Cities	Elevation projects	Flood	21
County, Cities	Acquisition projects	Flood	5
County, Cities	Floodproofing Projects	Flood	5
County, Cities	Insurance promotion	Flood	5

Responsible Jurisdiction/Department	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
County, Cities	Well protection	Flood	0
All	Information technology and management improvements	Flood	10
All	Channel lining rehab projects	Flood	6
All	Develop/Implement localized stormwater plans/projects (including those to provide for 200-year level of protection)	Flood	21
All	Dry Wells	Flood	24
City of Sac	Implement projects from CFMP (1 worksheet/chap)	Flood	0
All	Utilize green infrastructure	Flood	10
All	Update depth grid data	Flood	5
All	Update and implement regional watershed management plan	Flood	8
County, Cities	FEMA risk map project	Flood	22
County Open Space and Parks	Flood Safety in American River Parkway (evac planning, pre-flood preparations, post-flood cleanup and repairs)	Flood	N/A
County DOT	Bridge replacement on Elk Grove-Florin Road at Elder Creek (will raise bridge several feet)	Flood	N/A
County DOT	Michigan Bar Bridge replacement at Consumnes River (will raise bridge about a foot)	Flood	N/A
County DOT	El Camino Avenue - Second phase road improvements (storm drain pipes and extended drain inlets)	Flood	N/A
All	Implement projects from the Regional Flood Management Plan – Lower Sacramento/Delta North	Flood/Levee Failure	N/A
County, Cities	Develop/update heat contingency plans	Heat	10
County, Cities	Evaluate systematic, multiagency, public-private approach to regional cooling centers	Heat	5
County, Cities	Increase tree planting/canopy preservation/enhancement	Heat/Climate Change	11
County, Cities	Cool Roofs (voluntary green code to mandatory)	Heat/Climate Change	10
County, Cities, RDs	Encroachment: outreach, education, enforcement	Levee Failure	18
County, Cities, RDs	Urban levee design criteria	Levee Failure	3
County, Cities, RDs	Levee Improvement Projects (200-year+, 100-year)	Levee Failure	16
County, Cities, RDs	Operations and Maintenance	Levee Failure	10
County, RDs	Relief cuts	Levee Failure	5
County, RDs	Implement security improvements to facilities	Levee Failure	3
County, Cities, RDs	Widen floodplain (levee setback)	Levee Failure	5
County	Construct weir between Consumnes and Deer Creek	Levee Failure	6
County	Small communities grant implementation	Levee Failure	12

Responsible Jurisdiction/Department	Mitigation Action Title	Hazards Addressed	Points/ Worksheet Status
RDs	Levee splash guards	Wind/Tornado	0
All	Undergrounding of utilities	Wind/Tornado	3
All	Tree trimming and debris removal	Wind/Tornado	2
All	Roofing projects (tie downs/foaming)	Wind/Tornado	0
Metro Fire	Update and maintain American River CWPP	Wildfire	N/A
Metro Fire	Implement Projects from CWPP -Fuels mitigation	Wildfire	5
Metro Fire	Implement Projects from CWPP -Defensible Space0	Wildfire	0
Metro Fire	Implement Projects from CWPP -Public Outreach	Wildfire	0
Metro Fire	Implement Projects from CWPP -Plant restoration and stabilization (native plants)	Wildfire	0
All fire	Develop additional CWPPs	Wildfire	1
All fire	Fuels mitigation	Wildfire	N/A
All fire	Defensible space	Wildfire	N/A
All fire	Public outreach	Wildfire	N/A
All fire	Plant restoration and stabilization (native plants)	Wildfire	N/A
All fire	Hazardous Vegetation Mitigation	Wildfire	0
All fire	Weed abatement code enforcement	Wildfire	2
All fire	WUI Fire code development and implementation	Wildfire	0
County Open Space and Parks	Fire hazard reduction in Parks/Open Space (hand crews, grazing, prescribed burns, mechanical removal, invasive species removal, County Ordinance/policy change to minimize fire ignition hazards)	Wildfire	N/A
County and Cities	Continue grazing programs	Wildfire	N/A
County Open Space and Parks	Wildfire fighting improvements (maintain clearance for fire access, signage for access routes, maintain fuel breaks, technology updates, training burns, maintain fire hydrants/access gates)	Wildfire	N/A

Appendix D Adoption Resolution

Note to Reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region IX, the adoption resolutions will be signed by the participating jurisdictions and added to this appendix. Two model resolutions are provided below. The first resolution should be used by the County and all incorporated communities as it also includes language to adopt the 2016 LHMP Update into the Safety Element of the General Plan. The second resolution should be used by all participating Districts to this LHMP Update.

Sample Resolution for Sacramento County and Incorporated Communities

Resolution # _____

Adopting the Sacramento County Local Hazard Mitigation Plan

Whereas, (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

Whereas, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, (Name of Government/District/Organization) fully participated in the FEMA-prescribed mitigation planning process to prepare this local hazard mitigation plan; and

Whereas, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the Sacramento County Local Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body;

Whereas, the (Name of Government/District/Organization) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Sacramento County Local Hazard Mitigation Plan;

Whereas, adoption by the governing body for the (Name of Government/District/Organization), demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this Local Hazard Mitigation Plan.

Whereas, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

Now, therefore, be it resolved, that the (Name of Government/District/Organization) adopts the Sacramento County Local Hazard Mitigation Plan as an official plan; and

Be it resolved, that the (Name of Government/District/Organization) adopts the Sacramento County Local Hazard Mitigation Plan by reference into the safety element of their general plan in accordance with the requirements of AB 2140, and

Be it further resolved, (Name of Government/District/Organization) will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000 and to establish conformance with the requirements of AB 2140.

Passed:_____
(date)

_____
Certifying Official

Sample Resolution for Participating Districts

Resolution # _____

Adopting the Sacramento County Local Hazard Mitigation Plan

Whereas, (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) recognizes the threat that natural hazards pose to people and property within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

Whereas, the U.S. Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards;

Whereas, the Disaster Mitigation Act made available hazard mitigation grants to state and local governments;

Whereas, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, (Name of Government/District/Organization) fully participated in the FEMA-prescribed mitigation planning process to prepare this local hazard mitigation plan; and

Whereas, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the Sacramento County Local Hazard Mitigation Plan and approved it contingent upon this official adoption of the participating governing body;

Whereas, the (Name of Government/District/Organization) desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the Sacramento County Local Hazard Mitigation Plan;

Whereas, adoption by the governing body for the (Name of Government/District/Organization), demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this Local Hazard Mitigation Plan.

Whereas, adoption of this legitimizes the plan and authorizes responsible agencies to carry out their responsibilities under the plan.

Now, therefore, be it resolved, that the (Name of Government/District/Organization) adopts the Sacramento County Local Hazard Mitigation Plan as an official plan; and

Be it further resolved, (Name of Government/District/Organization) will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000.

Passed:_____

(date)

Certifying Official

Appendix E Critical Facilities Inventory

Jurisdiction	CF Definition	Type	Address	Name	Flood Zone	Dam Inundation	Fire Threat Class
Citrus Heights	At Risk Population Facilities	Adult Day Care	8089 MADISON AVENUE, STE 4	ACE-IT II	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Education School	7322 Sunrise Blvd.	Sunrise Tech Center	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Residential	5831 TREE HILL COURT	CHARIBEL JOSE'S CARE HOME	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Adult Residential	7716 CLAYPOOL WAY	DONNIE & CECILIA PESTRANA FAMILY HOME #3	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Residential	8212 CONOVER DRIVE,	DONNIE AND CECILIA PESTRANA FAMILY HOME # 2	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Adult Residential	7804 JANA MARIE COURT	HETA FINAU	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Residential	5447 BARTIG WAY	JASMINE-HALL VII	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Adult Residential	8442 SUNRISE BLVD.	JOWELLA CHICO'S CARE HOME	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Residential	7744 GUENIVERE WAY	MARLYNN NELSON CARE HOME	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Residential	7880 VISTA RIDGE DRIVE	MAYE DICKEY CARE HOME	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Residential	8139 WACHTEL WAY	MAYE DICKEY CARE HOME II	X	YES	Little or No Threat

Citrus Heights	At Risk Population Facilities	Adult Residential	7601 VAN MAREN LANE	MAYE DICKEY CARE HOME III	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Residential	8264 HOLLY OAK STREET	NELSON FAMILY HOME	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Adult Residential	6871 CASTLEBERRY CIRCLE	PATRICIA SALOMON CARE HOME	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Adult Residential	7820 SUNGARDEN DRIVE	RICE HOMES	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Adult Residential	7118 BONITA WAY	SEGOVIA'S CARE HOME #1	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Residential	7931 OAK AVE	SEGOVIA'S CARE HOME #2	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Adult Residential	7586 COMMUNITY DRIVE	SHANDY COMMUNITY CARE HOME	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	7998 OLD AUBURN RD.	ANGELS IN ACTION LEARNING CENTER	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	7607 GARDEN GATE DRIVE	ASCENSION PRESCHOOL	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Day Care Center	7312 ANTELOPE RD.	CHILDREN'S CHOICE LEARNING CENTER	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	7048 SUNRISE BLVD.	CHILDREN'S WORLD LEARNING CENTER - CITRUS HEIGHTS	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	7085 AUBURN BLVD.	CITRUS HEIGHTS HEAD START & STATE P.S.	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	7555 OLD AUBURN	CITRUS HEIGHTS PRESCHOOL, INC.	X	NO	Moderate

Citrus Heights	At Risk Population Facilities	Day Care Center	7416 NORTHLEA WAY	COUNTRYSIDE MONTESSORI SCHOOL	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	6446 SYLVAN ROAD	CREATIVE FRONTIERS PRE-SCHOOL	AE	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	7545 TAD LANE	DISCOVERY TREE SCHOOL-TAD LANE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	7901 ROSSWOOD DR	GRAND OAKS HEAD START STATE PRESCHOOL	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Day Care Center	7817 OLD AUBURN ROAD	HOLY FAMILY PRESCHOOL / DAYCARE CENTER	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	5448 SAN JUAN AVE.	KINDERCARE LEARNING CENTER, INC.	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	6825 PURSLANE WAY	KINDERCARE LEARNING CENTER, INC.	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Day Care Center	5700 PRIMROSE DRIVE	KINGSWOOD ELEMENTARY	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Day Care Center	8008 OLD AUBURN ROAD	LA PETITE ACADEMY - CITRUS HEIGHTS	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	8319 LICHEN DRIVE	LICHEN HEAD START PRESCHOOL	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Day Care Center	7070 WOODMORE OAKS DR	LITTLE FRIENDS LEARNING CENTER	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	7940 MARIPOSA AVENUE	MARIPOSA HEAD START PRESCHOOL	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Day Care Center	8200 SUNRISE BLVD	O'BRIEN CHILD DEVELOPMENT	X	NO	Moderate

Citrus Heights	At Risk Population Facilities	Day Care Center	8089 MADISON AVE.	PHOENIX SCHOOL, THE	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Day Care Center	7413 WISCONSIN DRIVE	SAN JUAN PRESCHOOL AND DAYCARE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	5641 MARIPOSA AVENUE	SKYCREST STATE PRESCHOOL	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	8085 OAK AVENUE	SUNRISE CHRISTIAN SCHOOL	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Day Care Center	7322 SUNRISE BLVD.	SUNRISE STATE PRESCHOOL	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Group Home	7639 OLD AUBURN ROAD	ATKINSON GROUP HOME V	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Group Home	8208 OLIVINE AVENUE	CROSSROADS-OLIVINE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Group Home	6832 ROSA VISTA AVE.	CROSSROADS-ROSA VISTA	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Group Home	7605 GINGERBLOSSOM HOUSE	GATEWAY RESIDENTIAL PROGRAMS-GINGER BLOSSOM HOUSE	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Group Home	12009 FAIR OAKS BLVD.	MARTINS' ACHIEVEMENT PLACE, INC.	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Group Home	7301 MARIPOSA AVE.	PARADISE OAKS - OLD AUBURN	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Group Home	7730 ANTELOPE RD	PARADISE OAKS YOUTH SERVICES - ANTELOPE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Group Home	7697 MADISON AVENUE	PARADISE OAKS YOUTH SERVICES - MADISON	X	NO	Little or No Threat

Citrus Heights	At Risk Population Facilities	Group Home	5428 MARIPOSA AVE.	PARADISE OAKS YOUTH SERVICES - MARIPOSA	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Infant Center	8008 OLD AUBURN RD.	LA PETITE ACADEMY CITRUS HEIGHTS	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Infant Center	7551 GREENBACK LANE	SAN JUAN EARLY HEAD START	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Private Elementary School	7412 Hollyhock Court	American Christian Academy-Ext	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Private Elementary School	7723 Old Auburn Road	Carden Christian Academy	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Private Elementary School	8085 Oak Avenue	Carden Sunrise Christian School	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Private Elementary School	7416 Northlea Way	Countryside Montessori	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Private Elementary School	6446 Sylvan Road	Creative Frontiers School, Inc.	0.2% ANNUAL CHANCE	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Private Elementary School	7737 Highland Avenue	Faith Christian Academy	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Private Elementary School	7004 Gumwood Circle	Gillette Home	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Private Elementary School	7817 Old Auburn Road	Holy Family	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Private Elementary School	7869 Kingswood Drive	St. Mark's Lutheran Elementary	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Private Elementary School	301 West Whyte Avenue	Valley Christian Academy	X	YES	Moderate

Citrus Heights	At Risk Population Facilities	Private High School	7730 Antelope Road	Valley Oak Academy-Antelope	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Private High School	7697 Madison Avenue	Valley Oak Academy-Madison	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Private High School	5428 Mariposa Avenue	Valley Oak Academy-Mariposa	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Private K-12 School	6060 Sunrise Vista Drive, Sui*	Lane Educational and Resource Center	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Private K-12 School	8070 Camstock Court	Tree of Life Learning Academy	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Private K-12 School	6441 Matheny Way, Suite B	Wings Learning Resources	0.2% ANNUAL CHANCE	YES	Moderate
Citrus Heights	At Risk Population Facilities	Public Continuation High School	7501 Carriage Dr.	Palos Verde Continuation	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Public Elementary School	6401 Trenton Way	Arlington Heights Elementary	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Public Elementary School	5555 Fleetwood Dr.	Cambridge Heights Elementary	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Public Elementary School	7519 Carriage Dr.	Carriage Drive Elementary	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Public Elementary School	7085 Auburn Blvd.	Citrus Heights Elementary	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Public Elementary School	7901 Rosswood Dr.	Grand Oaks Elementary	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Public Elementary School	5700 Primrose Dr.	Kingswood Elementary	X	NO	Moderate

Citrus Heights	At Risk Population Facilities	Public Elementary School	8319 Lichen Dr.	Lichen Elementary	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Public Elementary School	7940 Mariposa Ave.	Mariposa Avenue Elementary	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Public Elementary School	5641 Mariposa Ave.	Skycrest Elementary	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Public Elementary School	8248 Villa Oak Dr.	Woodside Elementary	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Public High School	7600 Lauppe Ln.	Mesa Verde High	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Public High School	7551 Greenback Ln.	San Juan High	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Public Middle School	7137 Auburn Blvd.	Sylvan Middle	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7338 CROSS DRIVE	A TLC HOME	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7551 STONERIDGE WAY	AGAPE HOME CARE	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8259 TWIN OAKS AVENUE	ARBOR, THE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7791 LOLETA AVENUE	AURELIA'S HOME CARE	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8312 BRAMBLE TREE WAY	BETHESDA	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7036 BONITA WAY	BONITA BOARD AND CARE	X	NO	Moderate

Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7224 CANDLELIGHT WAY	CANDLELIGHT HOME CARE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8440 EDGE CLIFF COURT	CARE A LOT	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6901 FRANELA WAY	CHENKO'S CARE HOME	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	5648 TIMMERMAN WAY	CITRUS GARDEN CARE HOME	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7952 OLD AUBURN ROAD	CITRUS HEIGHTS TERRACE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7595 LINDEN AVENUE	COUNTRY OAKS MANOR	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7375 STOCK RANCH ROAD	CYPRESS GARDENS AT CITRUS HEIGHTS	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8044 DANA BUTTE WAY	DANA BUTTE HOME CARE #1	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7430 WELLS AVENUE	DAY AND NIGHT FACILITIES CARE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8045 MESA OAK WAY	E & E, TLC.	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8500 ROBIE WAY	E. J. CARE	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7915 ALMA MESA WAY	ELDERLY CARE HOME	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7437 KANAI AVENUE	EMILY'S GUEST HOME	X	NO	Moderate

Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8220 CATALPA DRIVE	EVA'S CARE HOME	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8329 KEYESPORT WAY	FILIP CARE HOME	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6849 LARKSPUR AVENUE	FLORA'S HOME CARE	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7573 WALNUT DRIVE	FOUNTAIN OF FLOWERS	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8361 CANYON OAK DRIVE	GENTLE CARE HOME	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8113 GLEN CREEK WAY	GLEN CREEK VILLA-RES. CARE FOR THE ELDERLY	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7921 ALMA MESA WAY	GOLDEN AGE HOME CARE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8120 PATTON AVENUE	GOLDEN CREST CARE CENTER	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8223 TWIN OAKS AVENUE	GRANDMA'S HOME	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7717 DEANTON COURT	GRANNY'S COTTAGE	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7715 LOLETA AVENUE	GREEN WOOD ELDERLY FACILITY, INC.	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7655 PRINCE STREET	HELPING HANDS	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7092 CANE VALLEY CIR.	HOME PLACE I	X	YES	Moderate

Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7088 CANE VALLEY CIRCLE	HOME PLACE THREE	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7084 CANE VALLEY CIRCLE	HOME PLACE TWO	X	YES	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6536 NORDIC COURT	HOMEVILLE CARE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7709 CHIPMUNK WAY	IN LOVING HANDS CARE HOME	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8236 HOLLY OAK STREET	INFINITY CARE HOME	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6730 SKYLANE DRIVE	JUCA'S HOME CARE	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7540 SOQUEL WAY	LIVING HEALTHY HOME CARE	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7612 SOQUEL WAY	LIVING HEALTHY HOME CARE 2	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6613 TRILBY COURT	LOVE YOU DAD	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8254 MOSS OAK AVENUE	LUCIAN'S HOME	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8225 EVA RETTA COURT	LYNNE'S CARE HOME II	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6813 MARINVALE DRIVE	MACKELLAH HOME	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7456 MAR VISTA WAY	MAR VISTA RESIDENTIAL CARE HOME	X	NO	Little or No Threat

Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6556 MARIPOSA AVE	MARIPOSA ELDER VILLA	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7418 STOCK RANCH ROAD	MERRILL GARDENS AT CITRUS HEIGHTS	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7448 MINNESOTA DRIVE	MINNESOTA HOME CARE	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7327 SOVEREIGN COURT	NAVARRO RESIDENTIAL CARE	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6924 LE HAVRE WAY	PHYLLIS' CARE HOME	X	NO	Moderate
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8134 ROBERT CREEK COURT	ROBERT CREEK VILLA	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	8138 ROBERT CREEK COURT	ROBERT CREEK VILLA II	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7209 CROSS DRIVE	SHADY OAKS CARE HOME	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7021 DOLAN WAY	SIERRA ANNA RESIDENTIAL CARE	X	YES	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6737 SUGAR MAPLE WAY	SUGAR MAPLE CARE HOME	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7241 CANELO HILLS DRIVE	SUN OAK ASSISTED LIVING	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6905 LE HAVRE WAY	SUNSHINE HOMECARE	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	7544 SOQUEL WAY	TENDER LOVING CARE I	X	NO	Little or No Threat

Citrus Heights	At Risk Population Facilities	Residential Care/Elderly	6729 SUGAR MAPLE WAY	TLC OF M & M	X	NO	Little or No Threat
Citrus Heights	At Risk Population Facilities	Social Rehabilitation Facility	7515 WILLOW WAY	CASA WILLOW-KAISER SACRAMENTO	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Bus Terminal	SUNRISE MALL	BUS TRANSIT CENTER	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Emergency Evacuation Shelter	6520 Van Maren Lane	Christ The King Retreat Center (CHME03)	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Emergency Evacuation Shelter	7405 Mariposa Ave.	Citrus Heights Community Church (CHSM05)	X	NO	Little or No Threat
Citrus Heights	Essential Services Facilities	Emergency Evacuation Shelter	7070 Woodmore Oaks Dr.	Friends Church (CHSM12)	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Emergency Evacuation Shelter	7817 Old Auburn	Holy Family Catholic Church (CHME10)	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Emergency Evacuation Shelter	7501 Carriage Drive	Mesa Verde HS (SCLG08)	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Emergency Evacuation Shelter	7801 Auburn Blvd.	Rusch Community Center (CCME15)	0.2% ANNUAL CHANCE	YES	Moderate
Citrus Heights	Essential Services Facilities	Emergency Evacuation Shelter	7551 Greenback Lane	San Juan HS (SCME06)	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Emergency Evacuation Shelter	7137 Auburn Blvd.	Sylvan Middle School (SCME20)	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Emergency Evacuation Shelter	6540 Sylvan Road	Sylvan Oaks Christian Church (CHLG04)	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Fire Station	7641 GREENBACK LN	SAC COUNTY STATION 21	X	NO	Little or No Threat

Citrus Heights	Essential Services Facilities	Fire Station	6421 GREENBACK LN	SAC COUNTY STATION 23	X	NO	Little or No Threat
Citrus Heights	Essential Services Facilities	Fire Station	7474 GRAND OAKS BLVD	SAC COUNTY STATION 27	X	YES	Moderate
Citrus Heights	Essential Services Facilities	Fire Station	8189 OAK AVE	SAC COUNTY STATION 28	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Government Facilities		CITRUS HEIGHTS CITY HALL	X	NO	Little or No Threat
Citrus Heights	Essential Services Facilities	Government Facilities		CITRUS HEIGHTS POST OFFICE	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Medical Health Facility	6406 TUPELO DRIVE, NO.A	ANTELOPE DIALYSIS CENTER	X	NO	Little or No Threat
Citrus Heights	Essential Services Facilities	Medical Health Facility	5959 GREENBACK LANE, STE 300	EYE SURGERY CENTER OF NORTHERN CALIFORNIA, THE	X	YES	Little or No Threat
Citrus Heights	Essential Services Facilities	Medical Health Facility	7807 UPLANDS WAY	MANORCARE HEALTH SERVICES - CITRUS HEIGHTS	X	NO	Little or No Threat
Citrus Heights	Essential Services Facilities	Medical Health Facility	7447 Antelope Road, Suite 101	New Dawn Recovery Center	AE	YES	Moderate
Citrus Heights	Essential Services Facilities	Medical Health Facility	7987 Oak Avenue	Oak House I	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Medical Health Facility	7919 Oak Avenue	Oak House Treatment Program II	X	NO	Moderate
Citrus Heights	Essential Services Facilities	Police	6315 Fountain Square Dr	CHPD	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Adult Day Care	8810 ELK GROVE BLVD.	ELK GROVE ADULT COMMUNITY TRAINING, INC.	X	NO	Little or No Threat

Elk Grove	At Risk Population Facilities	Adult Day Care	9484 ELK GROVE-FLORIN ROAD	ELK GROVE ADULT COMMUNITY TRAINING,INC. ACT II	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Day Care	2204 KAUSEN DRIVE # 120	SOCIAL VOCATIONAL SERVICES, ELK GROVE	X Protected by Levee	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	10320 CANADEO CIR	ALEGRE LOVELACE CARE HOME	AE	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	8801 WILLIAMSON DRIVE	CORINA CARE HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	8744 SUPERB CIRCLE	CORINA CARE HOME 2	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	9489 BRADSHAW ROAD	COUNTRY ELEGANCE INC.	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	6405 LIVORNO WAY	DORES JOSOL DIVINE CARE HOME II	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	5317 LOTUS POND WAY	ELK GROVE ADULT HOME CARE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	8720 SECKEL CT.	ELK GROVE SPRING HOMES INC.	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	2405 RENWICK AVE.	EMBASSY FOUNTAIN, INC.	X Protected by Levee	YES	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	8936 MEADOWSPRING DRIVE	F & A ASTORGA CARE HOME, LLC.	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	8607 ELK RIDGE WAY	JO BIGORNIA HOME II	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	8656 CHERRINGTON LANE	KOKKOS FAMILY CARE HOME	X	NO	Little or No Threat

Elk Grove	At Risk Population Facilities	Adult Residential	8921 SHADY VISTA COURT	LAGUNA STREAM FAMILY HOME,INC.	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	9867 FALCON MEADOW DR	LIGHTHOUSE CARE HOME, LLC	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	8908 CLANCYS COURT	LUZ APOSTOL CARE HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	4137 MARSEILLE CT	MARSEILLE BOARD AND CARE	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	9497 ELK GROVE-FLORIN	MEADOW CREST FAMILY HOME INC.	0.2% ANNUAL CHANCE	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	9038 RICHBOROUGH WAY	RICHBOROUGH FOUNTAIN, INC.	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	5669 LILYVIEW WAY	RIEGO CARE FACILITY	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	8186 LAGUNA BROOK WAY	S.R.WILLIAMS RESIDENTIAL	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	9000 BRAMBLEWOOD WAY	ST. PHILOMENIA HOME CARE	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Adult Residential	9424 TIMBER RIVER WAY	VERGIE RAMOS HOME II, THE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	6604 RABBIT HOLLOW WAY	VERGIE RAMOS HOME, THE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Adult Residential	9460 WHITE HORSE WAY	ZENCAR HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8989 PANAMINT CT	ABARIENTOS SMALL FAMILY HOME	X	NO	Moderate

Elk Grove	At Risk Population Facilities	Assisted Living Centers	6813 ELVORA WAY	ALEXANDER'S RESIDENCE FOR SENIORS, INC	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	6901 RIO TEJO WAY	ALEXANDER'S RESIDENCE FOR SENIORS, INC. # 2	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	5901 WITT WAY	ALLCARE, LLC	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	10313 CHAVES COURT	ALVIN DAVIS PICKETTAY'S CARE HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8472 VISTA BROOK DRIVE	ANCHETA HOME CARE	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9524 SWANBROOK CT	ANGELIC ELDERCARE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9035 PEMBRIDGE DRIVE	ANGEL'S CARE HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8528 SUN SPRITE WY	ANGELS MANOR	0.2% ANNUAL CHANCE	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	5327 MOONLIGHT WAY	BRENDA TINDAL SMALL FAMILY HOME	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8624 DIAMOND OAK WY	BRILLO HOME #2	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8528 SUN SPRITE WY	BRILLO HOMES	0.2% ANNUAL CHANCE	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8604 BANFF VISTA DR	CAMELOT CARE HOME #3	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9308 ELK GROVE-FLORIN RD	CARING FAMILIES, EGF	X	NO	Little or No Threat

Elk Grove	At Risk Population Facilities	Assisted Living Centers	8716 BRAY VISTA WY	CARING FAMILIES-BV2	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9460 WHITE HORSE	CARIZEN SEVICES, LLC # 2 / DBA ZENCAR HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8454 MOUNTIAN BELL DRIVE	CHERRY MADAMBA'S RES. FACILITY, INC.#2	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8429 ENZO WAY	CHERRY MADAMBA'S RESIDENTIAL FACILITY INC. III	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9708 LITTLE HARBOR WAY	COMFORT LIVING, INC.	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9823 GAVIRATE WY	COMFORTS OF HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8841 WILLIAMSON DRIVE STE. 50	CONNECTIONS	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	2812 W PINTAIL WAY	DEVERS CARE HOME	X Protected by Levee	YES	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8810 ELK GROVE BLVD.	ELK GROVE ADULT	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9484 ELK GROVE-FLORIN ROAD	ELK GROVE ADULT	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	5317 LOTUS POND WAY	ELK GROVE ADULT CARE HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8720 SECKEL CT.	ELK GROVE ADULT CARE HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9520 CHICORY FIELD WY	ELK GROVE HOME FOR CHILDREN	X	NO	Little or No Threat

Elk Grove	At Risk Population Facilities	Assisted Living Centers	9485 CHICORY FIELD WY	ELK GROVE HOME FOR CHILDREN #2	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9155 QUAIL COVE DRIVE	EVANGELINE CAYABYAB CARE HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	5958 LEONARDO CT	GOLDEN MEADOW HOME:ASSISTED LIVING FACILITY	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8516 FOXBERRY CT	GOLDEN YEARS CARE HOME I	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8786 SILVERBERRY AVE	GOLDEN YEARS CARE HOME II	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9004 MOSELY CT	HOME SWEET HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8679 BLUE MAIDEN WY	HYLTON CHATEAU, INC.	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9005 PLAZA PARK DR	JORZANDER	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	4510 CAREYBACK AVE	LADIORAY HOME	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	10035 PIANELLA WY	LAGUNA WOODS, RCFE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9374 LOS TORRES DR	LP NUNEZ CARE FACILITY #2	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9649 SEA CLIFF WY	MARINE RESIDENTIAL CARE HOME	X Protected by Levee	YES	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8649 BANGOR CT	MATHIOT GROUP HOMES-BANGOR	X	NO	Little or No Threat

Elk Grove	At Risk Population Facilities	Assisted Living Centers	10374 JILLSON WAY	MEADOWS GUEST HOME, THE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8376 DANDELION DRIVE	MIRALEX ELDERLY CARE HOME	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9053 DEVON CREST WAY	OVD CARE FACILITY	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	10108 SCHULER RANCH RD	PACIFIC CARE HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8983 RICHBOROUGH WAY	PRECIOUS ANGELS CARE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8525 BLACKBERRY WY	REBECCA'S GUEST HOME 2	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	4504 COPPOLA CIRCLE	RESIDENCES AT ELK GROVE, THE	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	10192 VESPAS WAY	RO'S BOARD AND CARE I	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8609 BANFF VISTA DR	ROSE COURT GUEST HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	10326 MACHICO WAY	S.R. WILLIAMS RESIDENTIAL #2	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9086 PIAZZA CT	SERENITY FAMILY CARE HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	9315 LESNAR WAY	SIMON GUEST HOME	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	2204 KAUSEN DRIVE # 120	SOCIAL VOCATION	X Protected by Levee	YES	Little or No Threat

Elk Grove	At Risk Population Facilities	Assisted Living Centers	8667 SUMERLIN CT	SUMERLIN HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	5409 CLAUDIED WAY	SUNRIDGE MEADOWS CARE HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Assisted Living Centers	6624 GALLOWAY WAY	SUNSHINE HEALTHCARE INC.	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Assisted Living Centers	8321 WINDSWEPT CT	WINDSWEPT MATERNITY HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	8699 ELK GROVE BOULEVARD	CHILDREN'S WORLD LEARNING CENTER - ELK GROVE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	8701 HALVERSON DR.	CHILDREN'S WORLD LEARNING CENTER - ELK GROVE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	7901 LAGUNA BLVD.	CHILDTIME CHILDREN'S CENTER	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	8515 ELK GROVE-FLORIN	EARLY BEGINNINGS	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	9500 ELKGROVE FLORIN ROAD	EARLY BEGINNINGS LEARNING CENTER	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	8842 WILLIAMSON DR.	ELK GROVE MONTESSORI SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	8939 E. STOCKTON BLVD.	FIRST BAPTIST CHURCH PRESCHOOL	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	9759 TRALEE WAY	FLORENCE MARKOFER ELEMENTARY	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	5275 TEGAN ROAD	HANSEN'S EARLY LEARNING CENTER	X	YES	Moderate

Elk Grove	At Risk Population Facilities	Day Care Center	9150 PEETS ST	KINDER CARE LEARNING CENTER SCHOOL	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	9394 BRUCEVILLE RD	KINDERCARE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	9394 BRUCEVILLE ROAD	KINDERCARE LEARNING CENTER, INC.	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	9150 PEETS STREET	KINDERCARE LEARNING CENTER, INC.	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	9209 TRENHOLM DRIVE	LITTLE LONDON MONTESSORI	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	9209 TRENHOLM DR	LITTLE LONDON MONTESSORI SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	9624 MELROSE AVE	MELROSE CHRISTIAN PRESCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	9561 HARBOUR POINT DR	MERRYHILL COUNTRY SCHOOL	X Protected by Levee	YES	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	6613A LAGUNA PARK DRIVE	MERRYHILL COUNTRY SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	9036 CALVINE ROAD	MERRYHILL COUNTRY SCHOOL- CALVINE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	9560 HARBOUR PT. DR.	MERRYHILL SCHOOL-HARBOUR PT.	X Protected by Levee	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	8930 SIERRA ST	MONTESSORI COUNTRY ACADEMY SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	9145 FRANKLIN BLVD	PEACE PRESCHOOL	X	YES	Little or No Threat

Elk Grove	At Risk Population Facilities	Day Care Center	9441 ELK GROVE BLVD.	PHOENIX SCHOOL, THE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	3050 BABSON DRIVE	PHOENIX SCHOOL, THE	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	9271 ELK GROVE BLVD.	RADCLIFFE ACADEMY	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	8565 SHASTA LILY DRIVE	RAYMOND CASE CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	10393 PLEASANT GROVE SCHOOL RD	SHELDON ACRES	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Day Care Center	8701 ELK GROVE-FLORIN ROAD	ST. PETER'S LUTHERAN SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	8986 ELK GROVE BLVD.	ST. STEPHEN'S PRESCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	4811 LAGUNA BLVD, SUITE 120	STEPPING STONE LEARNING ACADEMY, INC.	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	7218 LAGUNA BLVD.	TREEHOUSE LEARNING CENTER	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Day Care Center	9441 ELK GROVE BLVD	WEE CARE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Group Home	8757 VALLEY OAK LANE	ELK GROVE RANCH-VALLEY OAK	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Group Home	8813 LA PRADA CT.	LA PRADA YOUTH CARE CENTER	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Group Home	8777 CHEER COURT	MATHIOT - CHEER COURT	X	NO	Little or No Threat

Elk Grove	At Risk Population Facilities	Group Home	8406 SERAFINO COURT	MATHIOT-SERAFINO COURT	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Group Home	9320 TROUT WAY	TRI-POG	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Group Home	8788 LOGANBERRY PLACE	TRI-POG - LOGANBERRY	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Hotel	2201 LONGPORT CT	EXTENDED STAY HOTELS	X Protected by Levee	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Hotel	2305 LONGPORT CT	HAMPTON INN	X Protected by Levee	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Hotel	9241 LAGUNA SPRINGS DR	HILTON GARDEN INN	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Hotel	2460 MARITIME DR	HOLIDAY INN EXPRESS	X Protected by Levee	YES	Moderate
Elk Grove	At Risk Population Facilities	Hotel	9175 W STOCKTON BLVD	HOLIDAY INN EXPRESS	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Infant Center	8515 ELK GROVE FLORIN ROAD	EARLY BEGINNINGS PRESCHOOL DAY CARE CENTER	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Private Elementary School	9539 Racquet Court	St. Elizabeth Ann Seton Catholic	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Private Elementary School	2124 Galen Drive	Vasquez Homeschool	X Protected by Levee	YES	Moderate
Elk Grove	At Risk Population Facilities	Private High School	3155 Dwight Road	Keystone Laguna	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Private High School	9270 Bruceville Road	Lutheran High	X	NO	Little or No Threat

Elk Grove	At Risk Population Facilities	Private K-12 School	4128 Woodwillow Lane	Full House	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Public Continuation High School	9800 Elk Grove-Florin Rd.	Transition High (Continuation)	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	6820 Bellaterra Dr.	Arlene Hein Elementary	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	9180 Brown Rd.	Arthur C. Butler Elementary	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	10325 Strathos Dr.	Carroll Elementary	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	9421 Stonebrook Dr.	Edna Batey Elementary	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	9461 Soaring Oaks Dr.	Elitha Donner Elementary	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	9373 Crowell Dr.	Elk Grove Elementary	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Public Elementary School	9351 Feickert Dr.	Ellen Feickert Elementary	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Public Elementary School	10000 East Taron Dr.	Elliott Ranch Elementary	X Protected by Levee	YES	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	9759 Tralee Way	Florence Markofer Elementary	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Public Elementary School	6211 Laguna Park Dr.	Foulks Ranch Elementary	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Public Elementary School	9850 Fire Poppy Dr.	Helen Carr Castello Elementary	X	NO	Moderate

Elk Grove	At Risk Population Facilities	Public Elementary School	8701 Halverson Dr.	James A. McKee Elementary	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Public Elementary School	8900 Old Creek Dr.	John Ehrhardt Elementary	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Public Elementary School	3033 Buckminster Dr.	Joseph Sims Elementary	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	10160 Pleasant Grove School R*	Pleasant Grove Elementary	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Public Elementary School	8565 Shasta Lily Dr.	Raymond Case Elementary	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	8670 Maranello Dr.	Roy Herburger Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	At Risk Population Facilities	Public Elementary School	9673 Lakepoint Dr.	Stone Lake Elementary	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Public High School	9800 Elk Grove-Florin Rd.	Elk Grove High	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public High School	6400 Poppy Ridge Rd.	Franklin High	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Public High School	9050 Vicino Dr.	Laguna Creek High	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Public High School	8661 Power Inn Rd.	Monterey Trail High	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	At Risk Population Facilities	Public High School	9531 Bond Rd.	Pleasant Grove High	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Middle School	8691 Power Inn Rd.	Edward Harris, Jr. Middle	0.2% ANNUAL CHANCE	YES	Moderate

Elk Grove	At Risk Population Facilities	Public Middle School	9329 Soaring Oaks Dr.	Harriet G. Eddy Middle	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Middle School	8865 Elk Grove Blvd.	Joseph Kerr Middle	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Public Middle School	9140 Bradshaw Rd.	Katherine L. Albiani Middle	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Public Middle School	10099 Franklin High Rd.	Toby Johnson Middle	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9237 CROSSCOURT WAY	CAMELOT CARE HOME # 2	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8604 BANFF VISTA DRIVE	CAMELOT CARE HOME 3	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8712 BRAY VISTA WAY	CARING FAMILIES-BV1	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8716 BRAY VISTA WAY	CARING FAMILIES-BV2	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8840 KELSEY DRIVE	CORINA ELDERLY HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9411 SKYDOME COURT	CORINA ELDERLY HOME #2	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8632 DIAMOND OAK WAY	DIAMOND OAK GUEST HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8636 DIAMOND OAK WAY	DIAMOND OAK GUEST HOME II	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9063 WHARTON WAY	EAGLE'S WINGS GUEST HOME	X	NO	Moderate

Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8700 SECKEL COURT	ELK GROVE GUEST HOME #1	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8708 SECKEL CT.	ELK GROVE GUEST HOME #II	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8769 VALLEY OAK LANE	ELK GROVE MANOR	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	6512 STAR BIRD COURT	FIVE STAR RCFE INC.	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9150 FOUR SEASONS DRIVE	FOUR SEASONS HOME CARE	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	4506 CORNFIELD WAY	GOLDEN TOUCH HOME CARE, THE	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8661 GRIMSBY COURT	GOLDEN VALLEY SENIORS GRIMSBY	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8516 FOXBERRY COURT	GOLDEN YEARS GUEST HOME	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8786 SILVERBERRY AVE	GOLDEN YEARS GUEST HOME II	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8866 SHARKEY AVENUE	GOOD SHEPHERD RESIDENTIAL CARE FACILITY	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	10172 BRENNA WAY	IMC-1 ELK GROVE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9410 HOSPENTHAL WAY	JD PARAN GUEST HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9458 NEWINGTON WAY	JD PARAN GUEST HOME II	X	NO	Moderate

Elk Grove	At Risk Population Facilities	Residential Care/Elderly	6508 LENNOX WAY	JD PARAN GUEST HOME III	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9559 LAZY SADDLE WAY	JONES CARE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9189 GROVE STREET	JONES CARE INC. I	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8657 BANGOR COURT	JONES CARE INC. II	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9490 PORTLAW WAY	LAGUNA CREEK ELDERLY CARE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	5721 LAGUNA PARK DRIVE	LAGUNA PARK RCFE	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	4524 BIRDSEYE WAY	LAGUNA VILLAGE, RCFE	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8616 BANFF VISTA DRIVE	LEMARI GUEST HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8774 KELSEY DRIVE	LOVE & CARE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8551 NARCISSUS COURT	MARY'S ELDERLY CARE HOME II	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9325 EAST STOCKTON BLVD.	MEADOWS SENIOR LIVING, THE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	5120 MOON LILY WAY	MOON LILY ESTATES	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9456 BLUE DIAMOND WAY	OAKS FAMILY CARE	X	NO	Moderate

Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9279 ORANGE CREST COURT	ORANGE CREST GUEST HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8701 MILO COURT	PALM VALLEY CARE #2	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8700 MILO COURT	PALM VALLEY CARE FACILITY	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8725 THETFORD COURT	PALM VALLEY CARE III	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8956 PLAZA PARK DRIVE	PLAZA PARK HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8724 ELK RIDGE WAY	PROVIDENCE CARE HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9458 HOSPENTHAL WAY	REBECCA'S GUEST HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8609 BANFF VISTA	ROSE COURT	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8525 BLACKBERRY WAY	SACRAMENTO RESIDENTIAL FACILITIES II	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8956 WARMSPRINGS STREET	SHANTI RESIDENTIAL CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9525 SOARING OAKS DRIVE	SOARING OAKS, RCFE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9440 STONE SPRINGS DRIVE	SUMMIT CARE HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	6726 LAGUNA PARK DRIVE	SUNRISE AT LAGUNA CREEK	X	NO	Moderate

Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8705 GREAT COURT	SUNRISE GUEST HOME	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	8818 SHARKEY AVENUE	SUNRISE GUEST HOME II	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9356 SOARING OAKS DRIVE	TABITHA HOME CARE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	9513 WADENA WAY	TRINITY CARE HOME	X	NO	Moderate
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	6716 WALBRIDGE WAY	URBANO RESIDENTIAL FACILITY 3	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	Residential Care/Elderly	2308 DINWIDDIE WAY	W. V. HOME CARE FOR THE ELDERLY	X Protected by Levee	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	School	6820 BELLATERRA DR	ARLENE HEIN ELEMENTARY SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	9180 BROWN DR	ARTHUR BUTLER ELEMENTARY SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	10325 STATHOS DR	CARROLL ELEMENTARY SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	8350 LOTZ PKWY	COSUMNES OAKS HIGH SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	9421 STONEBROOK DR	EDNA BATEY ELEMENTARY SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	8691 POWER INN RD	EDWARD HARRIS MIDDLE SCHOOL	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	At Risk Population Facilities	School	9461 SOARING OAKS DR	ELITHA DONNER ELEMENTARY SCHOOL	X	NO	Moderate

Elk Grove	At Risk Population Facilities	School	9850 LOTZ PKWY	ELIZABETH PINKERTON MIDDLE SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	9373 CROWELL DR	ELK GROVE ELEMENTARY SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	9800 ELK GROVE FLORIN RD	ELK GROVE HIGH SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	9510 ELK GROVE FLORIN RD	ELK GROVE UNIFIED SCHOOL DIST OFFICE	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	9351 FEICKERT DR	ELLEN FEICKERT ELEMENTARY SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	10000 E TARON DR	ELLIOTT RANCH ELEMENTARY SCHOOL	X Protected by Levee	YES	Moderate
Elk Grove	At Risk Population Facilities	School	9759 TRALEE WAY	FLORENCE MARKOFER ELEMENTARY SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	6211 LAGUNA PARK DR	FOULKS RANCH ELEMENTARY SCHOOL	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	School	6400 WHITELOCK PKWY	FRANKLIN HIGH SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	8434 BRADSHAW RD	GOLDEN WEST ACADEMY SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	9329 SOARING OAKS DR	HARRIETT EDDY MIDDLE SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	9850 FIRE POPPY DR	HELEN CARR CASTELLO ELEMENTARY SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	8701 HALVERSON DR	JAMES MCKEE ELEMENTARY SCHOOL	X	NO	Little or No Threat

Elk Grove	At Risk Population Facilities	School	8850 SOUTHSIDE AVE	JESSIE BAKER ELEMENTARY SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	8900 OLD CREEK DR	JOHN EHRHARDT ELEMENTARY SCHOOL	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	School	8865 ELK GROVE BLVD	JOSEPH KERR MIDDLE SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	3033 BUCKMINSTER DR	JOSEPH SIMS ELEMENTARY SCHOOL	X	YES	Moderate
Elk Grove	At Risk Population Facilities	School	9140 BRADSHAW RD	KATHERINE ALBIANI MIDDLE SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	9050 VICINO DR	LAGUNA CREEK HIGH SCHOOL	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	School	9209 TRENHOLM DR	LITTLE LONDON MONTESSORI SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	6613 LAGUNA PARK DR	MERRYHILL COUNTRY SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	8661 POWER INN RD	MONTEREY TRAILS HIGH SCHOOL	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	At Risk Population Facilities	School	10160 PLEASANT GROVE SCHOOL RD	PLEASANT GROVE ELEMENTARY SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School	9531 BOND RD	PLEASANT GROVE HIGH SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	8565 SHASTA LILY DR	RAYMOND CASE ELEMENTARY SCHOOL	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	School	8670 MARANELLO DR	ROY HERBURGER ELEMENTARY SCHOOL	0.2% ANNUAL CHANCE	YES	Moderate

Elk Grove	At Risk Population Facilities	School	9545 RACQUET CT	ST ELIZABETH ANN SETON SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	8701 ELK GROVE FLORIN RD	ST PETERS LUTHERAN CHURCH AND SCHOOL	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School	9673 LAKEPOINT DR	STONE LAKE ELEMENTARY SCHOOL	X	YES	Moderate
Elk Grove	At Risk Population Facilities	School	10099 FRANKLIN HIGH RD	TOBY JOHNSON MIDDLE SCHOOL	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	9180 BROWN ROAD	ARTHUR BUTLER CDC	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	9004 ROAN RANCH CIRCLE	CHILDREN'S WORLD LEARNING CENTER - ELK GROVE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	6820 BELLATERRA DR.	CHILDREN'S WORLD LEARNING CENTER - ELK GROVE	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	8670 MARANELLO DR.	CHILDREN'S WORLD LEARNING CENTER - ELK GROVE	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	9461 SOARING OAKS DRIVE	ELITHA DONNER SCHOOL AGE CDC	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	9373 CROWELL DRIVE	ELK GROVE SCHOOL AGE CDC	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	9351 FEICKERT DRIVE	ELLEN FEICKERT SCHOOL AGE CDC	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	10,000 EAST TARON DR.	ELLIOTT RANCH CHILD DEVELOPMENT CENTER	X Protected by Levee	YES	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	6211 LAGUNA PARK DRIVE	FOULKS RANCH SCHOOL-AGE CHILD DEVELOPMENT CENTER	X	YES	Little or No Threat

Elk Grove	At Risk Population Facilities	School-Age Day Care Center	9302 GRANT LINE ROAD	HAPPY TRAILS BEFORE & AFTER SCHOOL PROGRAM	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	8900 OLD CREEK DRIVE	JOHN EHRHARDT SCHOOL-AGE CHILD DEVELOPMENT CENTER	X	YES	Little or No Threat
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	3033 BUCKMINSTER DRIVE	JOSEPH SIMS SCHOOL AGE, CDC	X	YES	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	9850 FIRE POPPY DRIVE	K. L. C. - CHAMPIONS AT HELEN CASTELLO ELEMENTARY	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	10325 STATHOS DRIVE	KNOWLEDGE LEARNING CORPORATION	X	NO	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	10160 PLEASANT GROVE SCHOOL RD	PLEASANT GROVE SCHOOL AGE CDI	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	8565 SHASTA LILY DRIVE	RAYMOND CASE SCHOOL-AGE CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	At Risk Population Facilities	School-Age Day Care Center	9673 LAKEPOINT	STONE LAKE SCHOOL AGE CHILD DEVELOPMENT CENTER	X	YES	Moderate
Elk Grove	At Risk Population Facilities	Senior Center	8830 SHARKEY AVE	ELK GROVE SENIOR CENTER	X	NO	Little or No Threat
Elk Grove	At Risk Population Facilities	Special Education School	8850 Southside Ave.	Jessie Baker	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Corporation Yard	10250 IRON ROCK WAY	ELK GROVE CITY CORP YARD	X	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	S/O ALLISTER CTR LFT OF 4	ALLISTER BOND	X	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	W/O BAISLEY	BAISLEY	AH	YES	Moderate

Elk Grove	Essential Services Facilities	Detention Basin	LAGUNA CT	BARTHOLOMEW PARK	X	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	W/O BERHAMSTED	BERHAMSTED	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	N/W BERTONLANI	BERTOLANI	A	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	ALLISTER & BOND CNTR OF 4	BOND RD	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	4 SEASONS DR KERSH CT	BROWN RD	A	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	MENDORA DR MTN BELL DR	CALVINE RD MTN BELL	AE	YES	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	E/O CAMPELL N/O BOND	CAMPBELL	0.2% ANNUAL CHANCE	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	WHISPERING HOLLOW CT	DET POND LOT A	X	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	E/O EAMES	EAMES	A	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	BLACKSWAN DR HEATHER GAT	EG CRK EG BL WTRMN	X	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	W/O LOCKFORD	EG CRK EG WTRMN	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	FLYING HAWK CT	FLYING HAWK STRAWBE	0.2% ANNUAL CHANCE	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	GRANT LINE	GRANT LINE RAIL ROAD	X	NO	Moderate

Elk Grove	Essential Services Facilities	Detention Basin	W/O ESHINGER & 99	GRANTLINE DEER CRK	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	S/O HANDDON FIELD	HANDDON FIELD	A	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	ROBINSON CRK, HARBOUR PNT	HARBOUR POINT	A	YES	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	W/O HAWLEY E/O 99	HAWLEY	X	YES	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	S/E HINTON	HINTON	A	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	WTRMN & KENT	HUDSON RANCH WTRMN	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	S/O ISLAND	ISLAND	A	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	STONEBROOK HOLLOW CRK WY	LAGNA CRK STONEBROOK	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	BRUCEVILLE CTR PRKWY	LAGNA CRK,BRUCEVILLE	AE	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	W/O HIGH TECH CT	LAGNA W DRAIN. CHANN	A	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	LEWIS STEIN	LAGUNA CREEK	AE	YES	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	W STOCKTON LEWIS STEIN	LAGUNA CREEK WSTOCKT	AE	YES	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	LAGUNA LAKE	LAGUNA LAKE	X	NO	Little or No Threat

Elk Grove	Essential Services Facilities	Detention Basin	BOBBELL DR	LAGUNA STONELAKE	A	YES	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	LAGUNA	LAGUNA WEST OUTFALL	X	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	AUBERRY & LILLYPAD	LILLYPAD	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	MAINLINE DR BLACK SWAN D	MAINLINE DR	X	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	HARBOUR SHORE	PORT PACIFIC	A	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	W/O PROMENADE & BILBY	PROMENADE	X	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	S/O SAN BADGER	SAN BADGER	AE	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	W/O ALEXIA	SHELDON PACIFIC	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	N/O SHELDON PLACE	SHELDON PLACE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	N/O SHELTER COVE	SHELTER COVE	A	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	SHORTLINE	SHORTLINE	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Detention Basin	BLCK KITE,BOYSENBERRY WY	STRWBRY CK BLCK KITE	A	NO	Moderate
Elk Grove	Essential Services Facilities	Detention Basin	HARBOUR POINT	WETLAND HARBOUR	A	YES	Moderate

Elk Grove	Essential Services Facilities	Dispatch Center	8400 LAGUNA PALMS WAY	ELK GROVE POLICE DEPARTMENT DISPATCH CENTER	X	NO	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	9850 Lotz Parkway	Cosumnes Oaks High School (SCLG23)	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	8661 Power Inn Road	Ed Harris Middle School (SCME11)	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	8365 Whitelock Parkway	Elizabeth Pinkerton Middle School (SCLG24)	X	NO	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	9800 Elk Grove- Florin Rd.	Elk Grove High School (SCLG32)	X	NO	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	8939 Stockton Blvd.	First Baptist Church (CHME07)	AE	NO	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	6400 Poppy Ridge Rd.	Franklin HS (SCLG14)	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	9539 Racguet Court	Good Shepard Catholic Church (CHME23)	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	9329 Soaring Oaks Drive	Harriet Eddy Middle School (SCLG22)	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	8865 Elk Grove Blvd.	Joseph Kerr Middle School (SCLG21)	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	3033 Buckminster Dr.	Joseph Sims Elementary School (SCSM12)	X	YES	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	9140 Bradshaw	Katherine Albiani Middle School (SCLG20)	X	NO	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	9531 Bond Rd.	Kathryn Albiani Middle School (SCME10)	X	NO	Moderate

Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	9050 Vicino Drive	Laguna Creek High School (SCLG26)	X	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	8661 Power Inn Rd.	Monterey Trail HS (SCLG10)	0.2% ANNUAL CHANCE	YES	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	9531 Bond Rd.	Pleasant Grove HS (SCLG11)	X	NO	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	8701 Elk Grove - Florin Rd.	St. Peter's Lutheran Church (CHME15)	X	NO	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	9673 Lakepoint Dr.	Stone Lake Elementary School (SCSM11)	X	YES	Moderate
Elk Grove	Essential Services Facilities	Emergency Evacuation Shelter	6400 Poppy Ridge Road	Toby Johnson Middle School (SCME09)	X	NO	Moderate
Elk Grove	Essential Services Facilities	EOC	8400 LAGUNA PALMS WAY	ELK GROVE EMERGENCY OPERATION CENTER	X	NO	Moderate
Elk Grove	Essential Services Facilities	Fire Station	8760 ELK GROVE BLVD	COSUMNES STATION 71	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Fire Station	10035 ATKINS DR	COSUMNES STATION 72	X	NO	Moderate
Elk Grove	Essential Services Facilities	Fire Station	9607 BOND RD	COSUMNES STATION 73	X	NO	Moderate
Elk Grove	Essential Services Facilities	Fire Station	6501 LAGUNA PARK DR	COSUMNES STATION 74	X	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Fire Station	2300 MARITIME DR	COSUMNES STATION 75	X	YES	Moderate
Elk Grove	Essential Services Facilities	Fire Station	8545 SHELDON RD	COSUMNES STATION 76	0.2% ANNUAL CHANCE	YES	Little or No Threat

Elk Grove	Essential Services Facilities	Fire Station	8350 POPPY RIDGE RD	COSUMNES STATION 77	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Fire Station	10573 E STOCKTON BLVD	COSUMNES STATION 78	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Government Facilities	8401 LAGUNA PALMS WAY	CITY HALL DEVELOPMENT SERVICES	X	NO	Moderate
Elk Grove	Essential Services Facilities	Government Facilities		ELK GROVE CITY HALL	X	NO	Moderate
Elk Grove	Essential Services Facilities	Government Facilities	8380 LAGUNA PALMS WAY	ELK GROVE PD ADMIN	X	NO	Moderate
Elk Grove	Essential Services Facilities	Government Facilities	8400 LAGUNA PALMS WAY	ELK GROVE POLICE DEPARTMENT	X	NO	Moderate
Elk Grove	Essential Services Facilities	Government Facilities	3020 RENWICK AVE	LAGUNA TOWN HALL	X	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Government Facilities	8631 BOND RD	SACRAMENTO YOLO MOSQUITO AND VECTOR CONTROL	0.2% ANNUAL CHANCE	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Government Facilities	9250 BOND RD	SAS	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Medical Health Facility	9045 Meadowsweet Way	A Second Chance Recovery Home	X	NO	Moderate
Elk Grove	Essential Services Facilities	Medical Health Facility	9370 WEST STOCKTON BLVD. NO.13	COUNTRY HOME CARE	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Medical Health Facility	9461 BATEY AVENUE	ELK GROVE CARE AND REHABILITATION CENTER	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Medical Health Facility	9281 OFFICE PARK CIRCLE	ELK GROVE DIALYSIS CENTER	X	NO	Little or No Threat

Elk Grove	Essential Services Facilities	Medical Health Facility	9201 BIG HORN BLVD	KAISER ELK GROVE	X	NO	Moderate
Elk Grove	Essential Services Facilities	Medical Health Facility	8170 LAGUNA BLVD	SUTTER MEDICAL PLAZA	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Police	8380 Laguna Palms Way	EGPD	X	NO	Moderate
Elk Grove	Essential Services Facilities	Sand Bag	10250 IRON ROCK WAY	S-1	X	NO	Moderate
Elk Grove	Essential Services Facilities	Sand Bag	KLAGGE CT	S-2	X Protected by Levee	YES	Little or No Threat
Elk Grove	Essential Services Facilities	Sand Bag	8820 ELK GROVE BLVD	S-3	X	NO	Little or No Threat
Elk Grove	Essential Services Facilities	Sand Bag	PLEASENT GROVE SCHOOL RD	S-4	X	NO	Moderate
Elk Grove	Essential Services Facilities	Sand Bag	10050 E TARON DR	S-5	X Protected by Levee	YES	Moderate
Elk Grove	Essential Services Facilities	State and Fed Facilities	8930 BIG HORN BLVD	STATE OF CALIFORNIA BUILDING	X	NO	Moderate
Elk Grove	Essential Services Facilities	Urgent Care Facilities	9045 BRUCEVILLE RD	ELK GROVE URGENT CARE	X	NO	Moderate
Elk Grove	Essential Services Facilities	Urgent Care Facilities	9261 LAGUNA SPRINGS DR	URGENT CARE	X	NO	Moderate
Elk Grove	Hazardous Materials Facilities	Oil Collection Center	6624 Laguna Blvd	Kragen Auto Parts #1715	X	NO	Little or No Threat
Elk Grove	Hazardous Materials Facilities	Oil Collection Center	9050 Elkmont	Profleet	X	NO	Moderate

Elk Grove	Hazardous Materials Facilities	Propane Storage	10450 GRANT LINE RD	SUBURBAN PROPANE	X	NO	Little or No Threat
Folsom	At Risk Population Facilities	Adult Residential	130 PERRAND DRIVE	CHARAN ADULT RESIDENTIAL CARE FACILITY	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Charter School	101 Dean Way	Folsom Community Charter	X	YES	Moderate
Folsom	At Risk Population Facilities	College/University		Folsom Lake Community College	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	400 STAFFORD STREET	ACTION DAY LEARNING CENTER	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Day Care Center	101 DEAN WAY ROOM #19	BLANCHE SPRENTZ ELEMENTARY SCHOOL	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	450 BLUE RAVINE RD.	BRIGHT BEGINNINGS PRESCHOOL - A PARENT COOPERATIVE	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	13407 FOLSOM BLVD.	CHILDRENS' CREATIVE LEARNING CENTERS	0.2% ANNUAL CHANCE	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	10 COLLEGE PARKWAY	FOLSOM LAKE COLLEGE CHILD DEVELOPMENT CENTER	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	777 LEVY ROAD	FOLSOM LEARNING CENTER	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	502 RILEY STREET	FOLSOM MONTESSORI SCHOOL	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	412 NATOMA STREET	JOY OF CHILDREN, THE	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	330 PLAZA DRIVE	KIDS KOUNT AT GATHERING PLACE	X	YES	Moderate

Folsom	At Risk Population Facilities	Day Care Center	705-4 EAST BIDWELL	KIDSPARK	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	295 S. LEXINGTON DRIVE	KINDERCARE LEARNING CENTER, INC.	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	420 NATOMA STATION DR.	KINDERCARE LEARNING CENTER-NATOMA	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	410 GLENN DRIVE	LA PETITE ACADEMY - FOLSOM	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Day Care Center	801 SIBLEY ST	LITTLE FOLKS UNIVERSITY	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	101 HAZELMERE DRIVE	MERRYHILL COUNTRY SCHOOL - HAZELMERE	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	320 MONTROSE DRIVE	MOUNT OLIVE LUTHERAN PRESCHOOL	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	405 NATOMA STATION DRIVE	NATOMA STATION LEARNING CENTER	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	640 WILLARD DR.	PHOENIX SCHOOL, THE	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	76 CLARKSVILLE RD.	PHOENIX SCHOOL, THE	X	YES	Moderate
Folsom	At Risk Population Facilities	Day Care Center	216 NATOMA STREET	SUNDANCE MONTESSORI	X	YES	Moderate
Folsom	At Risk Population Facilities	Hotel		INN AT LAKE NATOMA	0.2% ANNUAL CHANCE	YES	Little or No Threat
Folsom	At Risk Population Facilities	Infant Center	777 LEVY ROAD	FOLSOM LEARNING CENTER (INFANTS)	X	YES	Moderate

Folsom	At Risk Population Facilities	Infant Center	101 HAZELMERE DRIVE	MERRYHILL COUNTRY SCHOOL	X	YES	Moderate
Folsom	At Risk Population Facilities	Prison		FOLSOM STATE PRISON	X	YES	Moderate
Folsom	At Risk Population Facilities	Private Elementary School	13405 Folsom Boulevard, Unit *	Folsom Crescent School	0.2% ANNUAL CHANCE	YES	Moderate
Folsom	At Risk Population Facilities	Private Elementary School	502 Riley Street	Folsom Montessori School	X	YES	Moderate
Folsom	At Risk Population Facilities	Private Elementary School	330 Plaza Drive	Kids Kount Kindergarten	X	YES	Moderate
Folsom	At Risk Population Facilities	Private Elementary School	650 Willard Drive	Phoenix Elementary	X	YES	Moderate
Folsom	At Risk Population Facilities	Private Elementary School	309 Montrose Drive	St. John Notre Dame	X	YES	Moderate
Folsom	At Risk Population Facilities	Private Elementary School	216 Natoma Street	Sundance Montessori	X	YES	Moderate
Folsom	At Risk Population Facilities	Private High School	116 Coralie	Folsom Private	X	YES	Moderate
Folsom	At Risk Population Facilities	Public Continuation High School	715A Riley St.	Folsom Lake High	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Public Elementary School	249 Flower Dr.	Blanche Sprentz Elementary	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Public Elementary School	9932 Inwood Rd.	Carl H. Sundahl Elementary	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Public Elementary School	1830 Bonhill Dr.	Empire Oaks Elementary	X	YES	Moderate

Folsom	At Risk Population Facilities	Public Elementary School	106 Manseau Dr.	Folsom Hills Elementary	X	YES	Moderate
Folsom	At Risk Population Facilities	Public Elementary School	735 Halidon Way	Gold Ridge Elementary	X	YES	Moderate
Folsom	At Risk Population Facilities	Public Elementary School	500 Turnpike Dr.	Natoma Station Elementary	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Public Elementary School	101 Prewett Dr.	Oak Chan Elementary	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Public Elementary School	775 Russi Rd.	Sandra J. Gallardo Elementary	X	YES	Moderate
Folsom	At Risk Population Facilities	Public Elementary School	101 Dean Way	Theodore Judah Elementary	X	YES	Moderate
Folsom	At Risk Population Facilities	Public High School	1655 Iron Point Rd.	Folsom High	X	YES	High
Folsom	At Risk Population Facilities	Public Middle School	500 Blue Ravine Rd.	Folsom Middle	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Public Middle School	715 Riley St.	Sutter Middle	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Residential Care/Elderly	260 BAURER CIRCLE	ADINA HOME CARE	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	124 HILLSWOOD DRIVE	AMERICAN RIVER HOME CARE	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	255 CIMMARON CIRCLE	AMERICAN RIVER HOME CARE II	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Residential Care/Elderly	914 DENSMORE WAY	ARCELY J. PUA HOME CARE	X	YES	Moderate

Folsom	At Risk Population Facilities	Residential Care/Elderly	2136 MAYALL COURT	BROADSTONE HOME CARE	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	1035 ELSWORTH WAY	BU-WON CARE HOME	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	137 YANKTON STREET	DIAMOND HOME CARE	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	124 RAEANNE LANE	ELIM OAKS	X	YES	Very High
Folsom	At Risk Population Facilities	Residential Care/Elderly	148 STONEY HILL DRIVE	FOLSOM CARE	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Residential Care/Elderly	336 SPRIG CIRCLE	FOLSOM COMFORT CARE	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	807 RUMSEY WAY	FOLSOM GUEST HOME	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	639 FLOWER DRIVE	FOLSOM HOME SWEET HOME	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	108 REMINGTON DRIVE	GOLDIN CARE 1	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	780 HARRINGTON WAY	LOYALTON OF FOLSOM	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	7213 PINE GROVE WAY	PINE GROVE RESIDENTIAL HOME CARE FOR THE ELDERLY	X	YES	Moderate
Folsom	At Risk Population Facilities	Residential Care/Elderly	809 WILLOW CREEK DRIVE	WILLOW CREEK HOME CARE	X	YES	Little or No Threat
Folsom	At Risk Population Facilities	Residential Care/Elderly	120 WOODVIEW DRIVE	WOODVIEW HOME	X	YES	Moderate

Folsom	Essential Services Facilities	Emergency Evacuation Shelter	70 Clarksville	Folsom City Sports Center (CCLG01)	X	YES	Moderate
Folsom	Essential Services Facilities	Emergency Evacuation Shelter	1155 Iron Point Rd	Folsom High School (SCLG13)	X	YES	Moderate
Folsom	Essential Services Facilities	Emergency Evacuation Shelter	10 College Parkway	Folsom Lake College (SCLG59)	X	YES	Moderate
Folsom	Essential Services Facilities	Emergency Evacuation Shelter	500 Blue Ravine Road	Folsom Middle School (SCLG36)	X	YES	Moderate
Folsom	Essential Services Facilities	Emergency Evacuation Shelter	745 Oak Avenue Parkway	Lakeside Church (CHLG07)	X	YES	Moderate
Folsom	Essential Services Facilities	Emergency Evacuation Shelter	1100 Blue Ravine	Oak Hills Church (CHLG03)	X	YES	Very High
Folsom	Essential Services Facilities	Emergency Evacuation Shelter	715 Riley	Sutter Middle School - Folsom (SCLG38)	X	YES	Little or No Threat
Folsom	Essential Services Facilities	Emergency Evacuation Shelter	3 Auto Plaza Drive	The Gathering Place (CHME20)	X	YES	Moderate
Folsom	Essential Services Facilities	Emergency Evacuation Shelter	1970 Broadstone Parkway	Vista Del Lago High School (SCLG39)	X	NO	Moderate
Folsom	Essential Services Facilities	Fire Station	535 GLENN DR	CITY OF FOLSOM STATION 35	X	YES	Moderate
Folsom	Essential Services Facilities	Fire Station	9700 OAK AVE PKWY	CITY OF FOLSOM STATION 36	X	YES	Moderate
Folsom	Essential Services Facilities	Fire Station	70 CLARKSVILLE RD	CITY OF FOLSOM STATION 37	X	YES	Moderate
Folsom	Essential Services Facilities	Fire Station	1300 BLUE RAVINE RD	CITY OF FOLSOM STATION 38	X	YES	Moderate

Folsom	Essential Services Facilities	General Acute Care Hospital	223 Fargo Way	KINDRED HOSPITAL SACRAMENTO	X	YES	Moderate
Folsom	Essential Services Facilities	General Acute Care Hospital	1650 Creekside Drive	MERCY HOSPITAL OF FOLSOM	X	YES	High
Folsom	Essential Services Facilities	Government Facilities		DEPARTMENT OF MOTOR VEHICLES	X	YES	Moderate
Folsom	Essential Services Facilities	Government Facilities		FOLSOM CITY HALL	X	YES	Little or No Threat
Folsom	Essential Services Facilities	Government Facilities		FOLSOM POST OFFICE	X	YES	Moderate
Folsom	Essential Services Facilities	Light Rail Stop	Glenn	Glenn	0.2% ANNUAL CHANCE	YES	Moderate
Folsom	Essential Services Facilities	Light Rail Stop	Historic Folsom	Historic	X	YES	Little or No Threat
Folsom	Essential Services Facilities	Light Rail Stop	Iron Point	Iron Poin	X	YES	Little or No Threat
Folsom	Essential Services Facilities	Medical Health Facility	510 MILL STREET	FOLSOM CONVALESCENT HOSPITAL	X	YES	Moderate
Folsom	Essential Services Facilities	Medical Health Facility	1600 CREEKSIDE DR., STE. 1600	FOLSOM SIERRA ENDOSCOPY CENTER L.P.	0.2% ANNUAL CHANCE	YES	Moderate
Folsom	Essential Services Facilities	Medical Health Facility	1651 CREEKSIDE DR., STE. 100	FOLSOM SURGERY CENTER	X	YES	Moderate
Folsom	Essential Services Facilities	Medical Health Facility	223 FARGO WAY	KINDRED HOSPITAL - SACRAMENTO	X	YES	Moderate
Folsom	Essential Services Facilities	Medical Health Facility	1650 CREEKSIDE DRIVE	MERCY HOSPITAL - FOLSOM	X	YES	High

Folsom	Essential Services Facilities	Police		FOLSOM POLICE	X	YES	Little or No Threat
Folsom	Essential Services Facilities	Water Treatment Plant		FOLSOM WATER TREATMENT PLANT	X	YES	Moderate
Galt	At Risk Population Facilities	Adult Day Care	1067 C STREET, SUITE 116	ELK GROVE ADULT COMMUNITY TRAINING/GALT	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Adult Education School	150 Camellia Way	Galt Adult Education	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Adult Residential	172 BRODIE DR	D. SMITH'S CARE HOME, LLC	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Adult Residential	167 DANNY DRIVE	GERALD AND PAM GOODE BOARD AND CARE HOME	X	NO	Moderate
Galt	At Risk Population Facilities	Adult Residential	511 G STREET	HUMPHREY'S GUEST HOME	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Adult Residential	635 MYRTLE AVENUE	MYRTLE AVENUE CARE HOME	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Adult Residential	10898 BOESSOW ROAD	SUNRISE HOME	X	NO	Moderate
Galt	At Risk Population Facilities	Day Care Center	902 CAROLINE STREET	FAIRSITE PRESCHOOL	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Day Care Center	805 ELK HILLS DRIVE	GRIZZLY HOLLOW HEAD START	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Day Care Center	200 NEW HOPE ROAD	NEW HOPE PRESCHOOL	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Day Care Center	600 A STREET	NHDF CHILD DEVELOPMENT CENTER	X	NO	Little or No Threat

Galt	At Risk Population Facilities	Day Care Center	615 2ND ST.	SETA- GALT HEAD START	X	NO	Moderate
Galt	At Risk Population Facilities	Private Elementary School	619 Myrtle Avenue	Galt Adventist Christian	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Private Elementary School	801 Church Street	Galt Christian	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Private K-12 School	628 Myrtle Avenue	Mayflower Academy	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Private K-12 School	501 B Street	Valley Christian School of Galt	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Public Continuation High School	150 Camellia Way	Estrellita Continuation High	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Public Elementary School	902 Caroline St.	Fairsite Elementary	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Public Elementary School	800 Lake Canyon Ave.	Lake Canyon Elementary	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Public Elementary School	1000 Elk Hills Dr.	Marengo Ranch Elementary	X	NO	Moderate
Galt	At Risk Population Facilities	Public Elementary School	905 Vintage Oak Ave.	River Oaks Elementary	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Public Elementary School	21 C St.	Valley Oaks Elementary	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Public High School	145 North Lincoln Way	Galt High	X	NO	Little or No Threat
Galt	At Risk Population Facilities	Public Middle School	997 Park Terr.	McCaffrey Middle	X	NO	Moderate

Galt	At Risk Population Facilities	Public Middle School	248 West A St.	Vernon E. Greer Middle	X	NO	Moderate
Galt	At Risk Population Facilities	Residential Care/Elderly	407 MAPLE STREET	AGNES GUEST HOME	X	NO	Little or No Threat
Galt	At Risk Population Facilities	School-Age Day Care Center	905 VINTAGE OAK AVE.	CHILDREN'S WORLD LEARNING CENTER - GALT	X	NO	Little or No Threat
Galt	At Risk Population Facilities	School-Age Day Care Center	1000 ELK HILLS DR.	CHILDREN'S WORLD LEARNING CENTER - GALT	X	NO	Moderate
Galt	At Risk Population Facilities	School-Age Day Care Center	800 LAKE CANYON AVENUE	KNOWLEDGE LEARNING CORPORATION	X	NO	Little or No Threat
Galt	At Risk Population Facilities	School-Age Day Care Center	200 NEW HOPE ROAD	NEW HOPE DAY CARE	X	NO	Little or No Threat
Galt	Essential Services Facilities	Emergency Evacuation Shelter	610 Chabolla Ave.	Chabolla Center (CCME01)	X	NO	Little or No Threat
Galt	Essential Services Facilities	Emergency Evacuation Shelter	415 "C" Street	Estrellita Ballroom (BUME01)	X	NO	Little or No Threat
Galt	Essential Services Facilities	Emergency Evacuation Shelter	145 N. Lincoln Way	Galt High School (SCLG06)	X	NO	Little or No Threat
Galt	Essential Services Facilities	Emergency Evacuation Shelter	800 Lake Canyon Ave.	Lake Canyon Elementary School (SCSM10)	X	NO	Little or No Threat
Galt	Essential Services Facilities	Emergency Evacuation Shelter	410 Civic Drive	Littleton Community Center (CCME02)	X	NO	Little or No Threat
Galt	Essential Services Facilities	Emergency Evacuation Shelter	1000 Elk Hills Dr.	Marengo Ranch Elementary School (SCSM07)	X	NO	Moderate
Galt	Essential Services Facilities	Emergency Evacuation Shelter	997 Park Terrace Dr.	McCaffrey Middle School (SCME36)	X	NO	Moderate

Galt	Essential Services Facilities	Emergency Evacuation Shelter	604 "E" Street	Shepard of the Valley Lutheran Church (CHME13)	X	NO	Little or No Threat
Galt	Essential Services Facilities	Fire Station	205 GUILD ST	COSUMNES STATION 44	X	NO	Little or No Threat
Galt	Essential Services Facilities	Fire Station	229 5TH ST	COSUMNES STATION 45	X	NO	Little or No Threat
Galt	Essential Services Facilities	Fire Station	1050 WALNUT AVE	COSUMNES STATION 46	X	NO	Moderate
Galt	Essential Services Facilities	Government Facilities		GALT CITY HALL	X	NO	Little or No Threat
Galt	Essential Services Facilities	Government Facilities		GALT POST OFFICE	X	NO	Little or No Threat
Galt	Essential Services Facilities	Medical Health Facility	144 F STREET	ROYAL OAKS CONVALESCENT HOSPITAL	X	NO	Little or No Threat
Galt	Essential Services Facilities	Police		GALT POLICE STATION	X	NO	Little or No Threat
Galt	Hazardous Materials Facilities	Sewer Treatment Plant		GALT WASTEWATER TREATMENT PLANT	X	NO	Little or No Threat
Isleton	At Risk Population Facilities	Public Elementary School	412 Union St.	Isleton Elementary	AE	NO	Little or No Threat
Isleton	Essential Services Facilities	Emergency Evacuation Shelter	210 Jackson Blvd.	Isleton Community Center (CCSM06)	AE	NO	Moderate
Isleton	Essential Services Facilities	Emergency Evacuation Shelter	412 Union St.	Isleton Elementary School (SCME03)	AE	NO	Little or No Threat
Isleton	Essential Services Facilities	Government Facilities		ISLETON CITY HALL	AE	NO	Little or No Threat

Isleton	Essential Services Facilities	Government Facilities		ISLETON POST OFFICE	AE	NO	Little or No Threat
Isleton	Essential Services Facilities	Police		ISLETON POLICE STATION	AE	NO	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Adult Education School	10850 Gadsten Way	Folsom-Cordova Adult	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Adult Residential	10104 MONTE VALLO COURT	CENDANA CARE HOME	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Adult Residential	10233 COUNTRY WAY	CENDANA'S CARE HOME II	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Adult Residential	10090 LINCOLN VILLAGE DRIVE	DEBORAH FILPULA ADULT HOME	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Adult Residential	3400 VIKING DRIVE	ESTEVES & MANUEL GUEST HOME	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Adult Residential	3653 GOLDSBORO COURT	GOLDSBORO BOARD & CARE	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Adult Residential	10100 COUNTRYSIDE WAY	KIMBERLY & BEVERLY'S GUEST HOME	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Adult Residential	10514 MILLS TOWER DRIVE	KIMBERLY'S RESIDENTIAL CARE HOME	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Adult Residential	3309 HOGARTH DRIVE	RANCH HOUSE, INC.	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Adult Residential	2310 MCGREGOR DRIVE	TWIN HEARTS A.R.F.	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Adult Residential	9809 HEARTWOOD WAY	ZENAIDA B. PILAR CARE HOME	X	YES	Little or No Threat

Rancho Cordova	At Risk Population Facilities	College/University		Folsom Lake College	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	3351 EXPLORER DR ROOM 1	A.M. WINN PRESCHOOL	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	3324 GLENMOORE DRIVE	ABRAHAM LINCOLN PRESCHOOL	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	2897 KILGORE ROAD	BUSINESS PARK CHILD CARE CENTER	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	2052 W. LA LOMA DRIVE	CAROUSEL SCHOOL	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	11100 COLOMA RD	CCHAT CENTER	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	10527 COLOMA ROAD	CORDOVA BAPTIST PRESCHOOL	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	2451 ZINFANDEL DRIVE	CORDOVA COMMUNITY PRE-SCHOOL NURSERY	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	2550 LA LOMA DRIVE	CORDOVA MEADOWS ELEMENTARY SCHOOL	X Protected by Levee	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	10460 REYMOUTH AVENUE	CORDOVA VILLA ELEMENTARY SCHOOL	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	10933 PROGRESS COURT	FIRST COVENANT PRESCHOOL	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	2800 LA LOMA DRIVE	KIDS' WORLD LEARNING CENTER	X Protected by Levee	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	2740 LA LOMA DRIVE	KIDS' WORLD LEARNING CENTER	X Protected by Levee	YES	Moderate

Rancho Cordova	At Risk Population Facilities	Day Care Center	2329 VEHICLE DRIVE	KINDERCARE LEARNING CENTER, INC.	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	10434 GEORGETOWN DRIVE	PETER J. SHIELDS ELEMENTARY SCHOOL	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	2560 CHASSELLA WAY	RANCHO CORDOVA ELEMENTARY SCHOOL	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	10700 AMBASSADOR DRIVE	RIVERVIEW STATE PRESCHOOL	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	2201 BENITA DRIVE	SETA - GRACE LUTHERAN HEADSTART	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	10487 WHITE ROCK ROAD	SETA - WHITE ROCK HEADSTART	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	10546 PETER A. MCQUEN RD.	SETA- MATHER HEAD START	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	10455 INVESTMENT CIRCLE	SETA-CENTER OF PRAISE HEAD START	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Day Care Center	2312 SIERRA MADRE CT	SIERRA MADRE PRESCHOOL PROGRAMS	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	10710 BEAR HOLLOW DR	THE GODDARD SCHOOL	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Day Care Center	2276 BENITA WAY	WILLIAMSON ELEMENTARY SCHOOL	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Group Home	3313 UNION SPRINGS WAY	Group Home	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Group Home	10812 GLENHAVEN WAY	ROYAL GARDENS ELDER CARE	X	YES	Little or No Threat

Rancho Cordova	At Risk Population Facilities	Group Home	3356 JUPITER DR	SHARON JACKSON'S SUNSHINE CARE HOME	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Group Home	10605 LAMBRUSCA DR.	TABULA RASA TREATMENT HOMES INC.	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Group Home	9848 BEXLEY	TRINITY-BEXLEY	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Group Home	10087 TERRA LOMA DR.	TRINITY-RANCHO CORDOVA	X Protected by Levee	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel		BEST WESTERN HERITAGE INN	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel		COMFORT INN	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel	10701 FOLSOM BLVD	CORDOVA INN	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel		COURTYARD BY MARRIOTT	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel		COURTYARD BY MARRIOTT- RANCHO CORDOVA	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel		ECONOMY INNS OF AMERICA	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Hotel	10721 WHITE ROCK RD	EXTENDED STAY AMERICA	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel	11299 POINT EAST DR	EXTENDED STAY AMERICA	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel	10745 GOLD CENTER DR	FAIRFIELD INN	X	YES	Little or No Threat

Rancho Cordova	At Risk Population Facilities	Hotel		FAIRFIELD INN BY MARRIOTT	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Hotel	10755 GOLD CENTER DR	HAMPTON INN	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Hotel	11230 POINT EAST DR	HOLIDAY INN	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel	10744 GOLD CENTER DR	HYATT PLACE	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel	10694 OLSON DR	MOTEL 6	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel		QUALITY SUITES HOTEL	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel	10800 OLSON DR	RED ROOF INN	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel	2779 PROSPECT PARK DR	RESIDENCE INN	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel		SHERATON RANCHO CORDOVA HOTEL	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Hotel		STAGGER INN	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Independent Study School	10850 Gadsten Way	Walnutwood High (Independent Study)	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Private Elementary School	10527 Coloma Road	Cordova Baptist Preschool & Kindergarten	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Private Elementary School	10499 Coloma Road	St. John Vianney	X	YES	Little or No Threat

Rancho Cordova	At Risk Population Facilities	Private High School	2485 Sunrise Boulevard	Rancho Learning Center	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Private High School	10541 NORDEN AVE	REGIONAL OCCUPATIONAL PROGRAM	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Private K-12 School	11111 Morgan River Court	IHS Christian	0.2% ANNUAL CHANCE	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Public Continuation High School	2710 Kilgore Rd.	Kinney High (Continuation)	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Public Elementary School	3351 Explorer Dr.	A. M. Winn Elementary	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Public Elementary School	3324 Glenmoor Dr.	Abraham Lincoln Elementary	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Public Elementary School	2400 Dawes St.	Cordova Gardens Elementary	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Public Elementary School	2460 Cordova Ln.	Cordova Lane Elementary	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Public Elementary School	2550 la Loma Dr.	Cordova Meadows Elementary	X Protected by Levee	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Public Elementary School	10359 South White Rock Rd.	Cordova Villa Elementary	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Public Elementary School	10434 Georgetown Dr.	Peter J. Shields Elementary	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Public Elementary School	2562 Chasella Way	Rancho Cordova Elementary	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Public Elementary School	10700 Ambassador Dr.	Riverview Elementary	X	YES	Moderate

Rancho Cordova	At Risk Population Facilities	Public Elementary School	10487 White Rock Rd.	White Rock Elementary	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Public Elementary School	2275 Benita Way	Williamson Elementary	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Public High School	2239 Chase Dr.	Cordova High	0.2% ANNUAL CHANCE	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Public Middle School	10439 Coloma Rd.	Mills Middle	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Public Middle School	2100 Zinfandel Dr.	W. E. Mitchell Middle	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	10108 MONTE VALLO COURT	CINDY CENDANA CARE HOME	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	3339 GLENMOOR DRIVE	GOLDEN DOVE RCFE	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	3629 ASTRAL DRIVE	HARMONY CARE HOME	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	10216 GOINYOUR WAY	JENNY'S HOME CARE	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	9847 LINCOLN VILLAGE DRIVE	MARINAS MANOR II	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	2112 MCGREGOR DRIVE	MCGREGOR HOME	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	10105 CASIMER COURT	R. C. CAREHOME	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	10609 CHARBONO WAY	RANCHO CORDOVA HOME CARE	X	YES	Little or No Threat

Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	10961 ALANDALE WAY	RANCHO HOME CARE	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	3217 SAGEWOOD COURT	SAINT ANNE'S CARE HOME	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Residential Care/Elderly	2686 LOS AMIGOS	ST. FRANCIS HOME CARE	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	School	10679 BEAR HOLLOW DR	NAVIGATOR ELEMENTARY	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	School-Age Day Care Center	10600 COLOMA ROAD	BIG KIDS CLUB NEIGHBORHOOD	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	School-Age Day Care Center	2451 ZINFANDEL DRIVE	CORDOVA COMMUNITY PRESCHOOL-SCHOOL AGE	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Special Education School	10474 Mather Blvd.	County Special Education	X	YES	Little or No Threat
Rancho Cordova	At Risk Population Facilities	Special Education School	10700 Ambassador Dr.	Reymouth Special Education Center	X	YES	Moderate
Rancho Cordova	At Risk Population Facilities	Special Education School	10474 Mather Blvd.	Sacramento County ED Special Education	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Dispatch Center	10240 SYSTEMS PKWY	SACRAMENTO REGIONAL FIRE DISPATCH	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Drainage	ROUTIER RD	SACRAMENTO COUNTY DRAINAGE PUMP STATION	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Drainage	N MATHER BLVD	SACRAMENTO COUNTY DRAINAGE PUMP STATION	X	YES	Moderate
Rancho Cordova	Essential Services Facilities	Drainage	ROD BEAUDRY DR	SACRAMENTO COUNTY DRAINAGE PUMP STATION	X Protected by Levee	YES	Moderate

Rancho Cordova	Essential Services Facilities	Drainage	MILLS TOWER DR	SACRAMENTO COUNTY DRAINAGE PUMP STATION	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Drainage	CITURS RD	SACRAMENTO COUNTY DRAINAGE PUMP STATION	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Drainage	YUKON RIVER WAY	SACRAMENTO COUNTY DRAINAGE PUMP STATION	0.2% ANNUAL CHANCE	YES	Moderate
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	10101 Systems Parkway	America's Choice High School (SCSM18)	X	YES	Moderate
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	10455 Investment Circle	Center of Praise Ministries (CHME01)	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	10577 Coloma Rd.	Cordova Church of Christ (CHSM07)	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	2197 Chase Drive	Cordova Community Center (CCSM13)	AE	YES	Moderate
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	3480 Routier Road	Cordova Community Center (CCSM14)	X	YES	Moderate
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	10600 Coloma Rd	Cordova Neighborhood Church (CHSM09)	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	10933 Progress Ct.	First Covenant Church (CHLG02)	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	10439 Coloma Road	Mills Middle School (CHME29)	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	2100 Zinfandel Drive	Mitchell Middle School (SCME17)	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	10679 Bear Hollow Dr.	Navigator Elementary School (SCSM13)	X	YES	Moderate

Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	2239 Chase Drive	Rancho Cordova High School (SCME08)	X	YES	Moderate
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	11223 Trinity River Drive	Sun River Church (CHSM17)	0.2% ANNUAL CHANCE	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Emergency Evacuation Shelter	11821 Cobble Brook Dr.	Sunrise Elementary School (SCSM14)	X	NO	Moderate
Rancho Cordova	Essential Services Facilities	Emergency Rooms	10725 INTERNATIONAL DR	KAISER PERMANENTE	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	EOC		STATE EMA	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Fire Station	10595 FOLSOM BLVD	SAC COUNTY STATION 61	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Fire Station	12395 FOLSOM BLVD	SAC COUNTY STATION 63	X	YES	Moderate
Rancho Cordova	Essential Services Facilities	Fire Station	3180 KILGORE RD	SAC COUNTY STATION 66	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Fire Station	4381 ANATOLIA DR	SAC COUNTY STATION 68	X	NO	Moderate
Rancho Cordova	Essential Services Facilities	Gas Storage		GASOLINE STORAGE AND DISTRIBUTION	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Government Facilities	2729 PROSPECT PARK DR	RANCHO CORDOVA CITY HALL	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Government Facilities		RANCHO CORDOVA POST OFFICE	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Government Facilities		SACRAMENTO CO OFFICE OF EDUCATION	X	YES	Moderate

Rancho Cordova	Essential Services Facilities	Government Facilities		SACRAMENTO COUNTY ENVIRONMENTAL MGT	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Hospitals		VA HOSPITAL	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Light Rail Stop	Cordova Town Center	Cordova T	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Light Rail Stop	Mather Field/Mills	Mather Fi	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Light Rail Stop		MATHER FIELD/MILLS LIGHT RAIL STATION	X	YES	Moderate
Rancho Cordova	Essential Services Facilities	Light Rail Stop	Sunrise	Sunrise	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Light Rail Stop		SUNRISE LIGHT RAIL STATION	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Light Rail Stop	Zinfandel	Zinfandel	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Light Rail Stop		ZINFANDEL LIGHT RAIL STATION	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	2880 SUNRISE BLVD., STE. 218	ALLCARE HOME HEALTH SERVICES	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	2801 Aramon Drive	Another Choice, Another Chance	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	10410 COLOMA ROAD	CASA COLOMA HEALTH CARE CENTER	X	YES	Moderate
Rancho Cordova	Essential Services Facilities	Medical Health Facility	2721 Barbera Way	D & A Detox Center	X	YES	Little or No Threat

Rancho Cordova	Essential Services Facilities	Medical Health Facility	10157 la Allergria	D & A Treatment Center	X Protected by Levee	YES	Moderate
Rancho Cordova	Essential Services Facilities	Medical Health Facility	9719 Lincoln Village Drive, Su	Diogenes Youth Services	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	9852 BUSINESS PARK DR., STE. I	FIRST CALL HOME CARE	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	2001 ZINFANDEL DRIVE	HEALTH AND HAPPINESS HOME CARE AGENCY INC.	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	11216 TRINITY RIVER DRIVE	MARTEL EYE INSTITUTE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	3400 DATA DRIVE	MERCY HOME HEALTH - SACRAMENTO	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	3353 Bradshaw Road, Suite 103	Panacea, Inc. -Comprehensive Drug & Alcohol Treatment	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	10086 Mills Station Road	Rancho Cordova Adult Day Health Center	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	10294 ROCKINGHAM DRIVE	RANCHO DIALYSIS CLINIC	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	2737 WOODBERRY WAY, SUITE 103	SACRAMENTO FAMILY MEDICAL CLINIC	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Medical Health Facility	2951 SUNRISE BOULEVARD, NO.145	SUNRISE COMMUNITY DIALYSIS CLINIC	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Police	10361 Rockingham Dr	EAST DIVISION & RCPD	X	YES	Little or No Threat
Rancho Cordova	Essential Services Facilities	Police		VALLEY DIVISION CHP	X	YES	Little or No Threat

Rancho Cordova	Essential Services Facilities	State Facility	3101 GOLD CAMP DR	TEALE DATA CENTER	X	YES	Moderate
Rancho Cordova	Hazardous Materials Facilities	Oil Collection Center	10791 Folsom Blvd	Auto Zone #3336	X	YES	Little or No Threat
Rancho Cordova	Hazardous Materials Facilities	Oil Collection Center	2265 Sunrise Blvd	Brake Masters #135	X	YES	Little or No Threat
Rancho Cordova	Hazardous Materials Facilities	Oil Collection Center	10407 Folsom Blvd	Firestone Store #3541	X	YES	Little or No Threat
Rancho Cordova	Hazardous Materials Facilities	Oil Collection Center	10796 Olson Dr	Jiffy Lube #1138	X	YES	Little or No Threat
Rancho Cordova	Hazardous Materials Facilities	Oil Collection Center	10265 Folsom Blvd	Jiffy Lube #2226	X	YES	Little or No Threat
Rancho Cordova	Hazardous Materials Facilities	Oil Collection Center	10117 Folsom Blvd	Kragen Auto Parts #1218	X	YES	Little or No Threat
Rancho Cordova	Hazardous Materials Facilities	Oil Collection Center	10899 Folsom Blvd	Pep Boys #712	X	YES	Little or No Threat
Rancho Cordova	Hazardous Materials Facilities	Oil Collection Center	3445 Sunrise Blvd	Pick-N-Pull/Rancho Cordova	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	7395 GREENHAVEN DRIVE	A FAMILY AFFAIR BRIDGES	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	2531 RIO LINDA BLVD.	CALIFORNIA COMMUNITY HEALTH CARE, INC.	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	2701 CAPITOL AVENUE	CHATEAU AT CAPITOL AVENUE (ADC), THE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	1250 SUTTERVILLE ROAD	DEVELOPMENTAL DISABILITIES SERV.,ORGANIZATION,INC.	X	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Adult Day Care	191 LATHROP WAY, SUITE N	DISCOVERING OPTIONS	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	5141 80TH STREET	JUST LIKE HOME ADULT DAY CARE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	7707 RUSH RIVER DRIVE	PRIMROSE SACRAMENTO DAY CLUB	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	3340 MARYSVILLE BLVD.	REESE ALAN WILSON CENTER, INC. II	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	201 LATHROP WAY, SUITE H	SACRAMENTO ADULT GROWTH EXPERIENCE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	8583 ELDER CREEK ROAD	SOUTHSIDE ART CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Day Care	915 27TH STREET	TRIPLE "R" ADULT DAY PROGRAM	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Education School	2420 N St.	Fremont Adult Education	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Education School	577 Las Palmas Ave.	Grant District Skills and Employment Preparation A	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Education School	2718 G St.	Old Marshall Adult Education Center	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Education School	5241 J St.	Warren A. McClaskey Adult Center	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	5150 EULER WAY	A & R EBUEN CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	8252 ANTON WAY	A & R EBUEN CARE HOME #2	0.2% ANNUAL CHANCE	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Adult Residential	6635 S. LAND PARK DRIVE	A FAMILY AFFAIR CARE III	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	8013 43RD AVENUE	A FAMILY AFFAIR CARE VI	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1342 PALOMAR CIRCLE	A FAMILY AFFAIR IV	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	7950 CENTER PARKWAY	ABELLON RESIDENTIAL CARE FACILITY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7633 DAMASCAS DRIVE	ABELLON RESIDENTIAL CARE FACILITY II	X	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	3701 KNIGHTLINGER STREET	ALLEN'S CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1304 MAIN AVENUE	ALLEN'S CARE HOME #2	X	NO	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7561 COLLINGWOOD STREET	ANNE GAYLES CARE HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7805 ROCK CREEK WAY	ANTIPORDA-CEREZO HOME II	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	4210 MCNAMARA WAY	APOLONIO & FLORENDA TUMAMAO'S CARE HOME #2	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	6150 LOGAN STREET	ARELLANO ADULT RESIDENTIAL	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	6900 13TH STREET	BARRIENTOS CARE HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7358 GLORIA DR	BARRIENTOS CARE HOME 2	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Adult Residential	8581 GIBBS WAY	BENIE LUNGAN CARE HOME II	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	8552 CHARENTE WAY	BERHANE HUMBLE CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7721 TEEKAY WAY	BETTY'S CARE HOME FOR ADULTS.	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	7512 HANDLY WAY	BROOKINS HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	3801 SPARROWOOD WAY	C & Z ABRIAM HOME II	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	6331 SUNRISE SOUTH DRIVE	CALIFORNIA ADULT GROUP HOME	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	8519 LA RIVIERA DRIVE	CAMPBELL'S CARE HOME III	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7412 MANDY DRIVE	CARIZEN SERVICES, LLC	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	3350 MABEL STREET	CELESTIAL HOME II	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	3211 DIGGS PARK DR.	CHARLES SHERMAN'S HOME II	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	415 15TH STREET	CICHE'S BOARDING HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	7636 TIERRA LAWN COURT	COZY HOME 4 YOU	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	8414 CENTER PARKWAY	DE VENECIA GUEST HOME III	X	YES	Moderate

Sacramento	At Risk Population Facilities	Adult Residential	7272 17TH STREET	DEBBS' FAMILY HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	5290 VILLAGE WOOD DR.	DKA RIGONAN'S CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	2041 50TH AVE	DOSTY'S PRIVATE IN CARE SERVICE III	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	2175 56TH AVENUE	DOSTY'S PRIVATE IN CARE SERVICES IV	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7093 CROMWELL WAY	DOSTY'S PRIVATE INCARE SERVICE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	6924 SOUTH LAND PARK DR.	DOSTY'S PRIVATE INCARE SEVICES II	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	14 FLAUM COURT	EDLENA'S CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	8359 LANGTREE WAY	EMERITO GASPAR'S CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	3981 8TH AVENUE	ETHEL'S DAUGHTER CARE HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1532 ROSALIND STREET	EUCALYPTUS TREE LODGE	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	15 BENOIT CT	FELIX GROUP HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	7480 HENRIETTA DRIVE	FERMINA ABAYA HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	7741 FRANKLIN BLVD.	FRANKLIN CARE	AH	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Adult Residential	95 TUNDRA WAY	FULGENCIO'S FAMILY HOME	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	2930 MARYSVILLE BOULEVARD	G & C REST HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	1700 G STREET	G STREET HOUSE BOARD & CARE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	7158 CLEARBROOK WAY	GOLD CARE INC	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	6948 RIVERSIDE BOULEVARD	GREENHAVEN NEW START HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	4940 MC GLASHAN	HASKINS GROUP HOME	X	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	7170 REICHMUTH WAY	HAVEN VALLEY CARE AT GREENHAVEN	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	2158 JOHN STILL DRIVE	HAVEN VALLEY CARE AT THE MEADOWS	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	7175 ELDER CREEK ROAD	HERJEMA CARE #1	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7116 ELDER CREEK ROAD	HERJEMA CARE #3	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	5732 HOLLYHURST WAY	HERMAN & DORES ADULT RESIDENTIAL FACILITY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	8390 CARLIN WAY	HERMINIA'S HAPPY HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	501 REGENCY PARK CIRCLE	HILL'S FAMILY CARE HOME	A99	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Adult Residential	NO. 1 BRENTIFORD CIRCLE	HOWARD RESIDENTIAL CARE HOME	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	6351 GLENHILLS WAY	J.A.C. CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	139 SWALE COURT	J.J. MOLINA ADULT RESIDENTIAL FACILITY	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	637 WILSON AVENUE	JACKSON'S FACILITY	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7471 HAINESPORT WAY	JARD GUEST HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	5 PASTURE COURT	JASMINE-HALL #4	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	3965 MARTIN LUTHER KING BLVD.	JASMINE-HALL II	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1601 FERRAN AVENUE	JASMINE-HALL III	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1 GOFF COURT	JASMINE-HALL VI	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	4275 ARDWELL WAY	JONES FAMILY HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	8333 HOLLY JILL WAY	KELLY ACACIO'S CARE HOME	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	27 TRISTAN CIRCLE	KIANMAJD CARE II	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1967 66THAVENUE	LAFAYE YUSUF FAMILY CARE HOME	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Adult Residential	7702 QUINBY WAY	LATHEN ASSISTED LIVING	AH	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	5945 LA CASTANA WAY	LAW FAMILY HOME	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	6435 HOGAN DRIVE	LE NOUVEAU GENESIS DE FAMILLE/GREEN	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	1633 68TH AVE	LEE FAMILY HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	8055 DEER LAKE DRIVE	LEGASPI CARE HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	6825 BENDER COURT	LILA & HOWARD COOKE CARE HOME # 1	X	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	8360 NIGHTFALL WAY	LITO GASPAR'S CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	6329 PANTANO DR	LOGAN CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	2208 FLORIN RD.	LOVE'S CARE HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	4125 51ST STREET	LUCILLE WASHINGTON'S CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	470 ALCANTAR CIRCLE	MCLARIN FAMILY HOME #2	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7309 MEADOWGATE	MESA VERDE GUEST HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7940 DEER LAKE DRIVE	MILA LEGASPI CARE HOME	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Adult Residential	6794 MIDDLECOFF WAY	MONROE'S CARE FACILITES INC.	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	2328 66TH AVENUE	MOORE EVANS CARE UNLIMITED	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	3348 V STREET	NASH'S HOME FOR ADULTS #2	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	3732 33RD STREET	NASH'S HOME FOR ADULTS-A	X	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	1570 BAINES AVE	NORWOOD ABUNDANCE OF LOVE CARE HOME	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	8001 35TH AVENUE	NUNEZ CARE HOME #1	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	2780 33RD AVENUE	OCAMPO GACILAN HOME INC.	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	30 TEARPAK CT	PANEN'S HOME II	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	4641 11TH AVENUE	POWERS GUEST HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	3209 WESTERN AVE	PRIDE GATE INC.	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	2 BOCK COURT	QUALITY ADULT CARE HOME COMPANY	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	5701 LERNER WAYY	QUALITY ADULT CARE HOME II	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	5765 WALLACE AVENUE	R. B. RAMOS HOME	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Adult Residential	4925 BAMFORD DRIVE	REYNON BOARD AND CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	5545 VILLAGE WOOD DRIVE	RICK AND NICOLE FORTES CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	5249 JACINTO AVE	RICK AND NICOLE FORTES CARE HOME II	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	2352 MATSON DRIVE	ROLANDO & MARYBEL AGDIGOS CARE HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1444 MATHEWS WAY	ROLANDO & MARYBEL AGDIGOS CARE HOME 2	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7339 SPRINGMAN ST.	ROSBERTA ENTERPRISE, INC.	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	2110 MATSON DRIVE	ROSBERTA ENTERPRISES, INC.	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	5302 TROUTDALE WAY	RUBEN AND SUSAN PAULINO'S HOME #2	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	4906 BANDALIN WAY	SANTOS CARE HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7 VILLAGE GLEN COURT	SANTOS CARE HOME III	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	5235 EHRHART	SOUTH SACRAMENTO CARE FACILITY #2	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1 VELOZ COURT	SOUTH SACRAMENTO FACILITY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	8033 ARROYO VISTA DRIVE	ST. DOMINIC BOARD AND CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Adult Residential	7940 GOLDENFIELD WAY	ST. THERESE'S HAVEN #1	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	6841 21ST STREET	TATE FAMILY CARE INC.	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	5160 VILLAGE WOOD DR	TAVERAS & BENITEZ CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	6735 RIVERSIDE BLVD	THOMAS & LORETTA BARNES HOME FOR ADULTS #1	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	3417 6TH AVENUE	THOMAS & LORETTA BARNES HOME FOR ADULTS #2	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1709 H STREET	TREMBLAY BOARD AND CARE HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	3865 SPARROWOOD WAY	URBANO RESIDENTIAL FACILITY II	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	1951 MATSON DRIVE	VIOLA NANCA HOME CARE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7937 ORENZA WAY	WALL CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	4929 48TH STREET	WASHINGTON'S EXTENDED CARE	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	7927 DEERLEAF DRIVE	WINGWOOD CARE HAVEN	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Adult Residential	6361 LOCHINVAR WAY	WOLFE-RIVERA RESIDENTIAL MANOR	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Adult Residential	2685 19TH AVENUE	WOODSON HOME	X	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Alternative Education School	5151 Banfield Dr.	Heron	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Alternative Education School	5900 Bamford Dr.	Las Flores High (Alternative)	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Assisted Living Centers	8712 STATUE WAY	ST. PHILOMENA HOME CARE II, LLC	X	YES	Moderate
Sacramento	At Risk Population Facilities	Charter School	5241 J St.	America's Choice	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Charter School	2520 33rd St.	Capitol Heights Academy	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Charter School	5900 Bamford Dr.	Elk Grove Charter	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Charter School	3525 Martin Luther King Jr. B*	Father Keith B. Kenny Elementary Charter	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Charter School	4625 44th St.	Fruit Ridge Elementary	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Charter School	5601 47th Ave.	Genesis High	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Charter School	810 V St.	Met Sacramento Charter High	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Charter School	4600 Blackrock Dr.	Natomas Charter #19	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Charter School	1400 Dickson St.	New Technology High	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Charter School	2315 34th St.	Sacramento Charter High	X	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Charter School	2500 New Market Dr.	Sacramento Valley Technical High	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Charter School	3555 Auburn Blvd.	Valley Oaks	X	NO	Little or No Threat
Sacramento	At Risk Population Facilities	Charter School	8376 Fruitridge Rd.	Visual and Performing Arts Charter	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Charter School	1901 Arena Blvd.	Westlake Charter	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Children's Home		CHILDRENS RECEIVNG HOME OF SACRAMENTO	X	NO	Little or No Threat
Sacramento	At Risk Population Facilities	Children's Home		SACRAMENTO CHILDRENS HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	College/University		California State University Sacramento	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	College/University	8401 Center Parkway	Consumnes Community College	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	College/University		McGeorge School of Law	X	YES	Moderate
Sacramento	At Risk Population Facilities	College/University		Sacramento City College	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Community Day School	670 Dixieanne Ave.	Fred K. Robinson Community Day	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Community Day School	4000 Pinell St.	North Area Community	X	NO	Moderate
Sacramento	At Risk Population Facilities	Community Day School	2035 North Ave.	Nova Community Day	X	NO	Moderate

Sacramento	At Risk Population Facilities	Community Day School	810 V St.	Success Academy	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1116 D STREET	ALL ABOUT KIDS ACADEMY	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3801 BROADWAY	AMERICAN LEGION CHILDREN'S CENTER	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	475 FLORIN ROAD	ANGEL'S NEST PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	6000 J STREET	ASSOCIATED STUDENTS CSUS CHILDREN'S CENTER	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	2001 PEBBLEWOOD DRIVE	B.J. JORDAN CHILD CARE PROGRAMS - JEFFERSON	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2800 STONECREEK	B.J. JORDAN CHILD CARE-NATOMAS PRESCHOOL	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2400 COMORANT	BABCOCK STATE PRESCHOOL	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2775 MILLCREEK DRIVE	BANNON CREEK CDC - STATE PRESCHOOL	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5901 BRIDGECROSS DRIVE	BEANSTALK -REGENCY PARK PRESCHOOL	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2800 STONECREEK	BEANSTALK-BJ JORDAN-AMERICAN LAKES ST PRESCHOOLS	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	4700 CREST DR.	BEANSTALK-CREST DRIVE PRESCHOOL	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	6620 GLORIA DRIVE	BEAR FLAG CHILDREN'S CENTER	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Day Care Center	2625 PLOVER ST., RM. #1 &#2	BEN ALI CHILDREN'S CENTER	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2625 PLOVER ST., RM. #4	BEN ALI STATE PRESCHOOL	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2761 9TH AVENUE	BRET HARTE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	1593 WATER WHEEL DRIVE	BRIGHT BEGINNINGS CHILD CARE CENTER	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1618 27TH STREET	BUSY BEE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	5917 26TH STREET	C.P. HUNTINGTON CHILDREN'S CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3201 DEL PASO BLVD.	CALVARY CHRISTIAN SCHOOL	X	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	7220 24TH STREET	CAPITAL CITY CHILD DEVELOPMENT CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	450 N STREET	CAPITOL SQUARE CHILDREN'S CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1801 SOUTH AVE	CASTORI STATE PRESCHOOL	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5401 FREEPORT BLVD.	CENTENNIAL CHRISTIAN PRE-SCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5265 H STREET	CENTRAL NURSERY SCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	4701 BROOKFIELD DRIVE	CHARLES E. MACK PRESCHOOL	0.2% ANNUAL CHANCE	YES	Moderate

Sacramento	At Risk Population Facilities	Day Care Center	2500 NATOMAS PARK DRIVE	CHILDREN'S WORLD LEARNING CENTER - SACRAMENTO	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	2555 MILLCREEK DRIVE	CHILDTIME CHILDREN'S CENTER	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	5917 26TH STREET	COLLIS P. HUNTINGTON HEAD START	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	8401 CENTER PARKWAY	COSUMNES RIVER COLLEGE CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	155 MOREY AVENUE	DEL PASO EARLY CHILDHOOD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	14 BUSINESS PARK WAY	DEPOT CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5613 G STREET	DISCOVERY MONTESSORI	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1020 N STREET, #180	DISCOVERY TREE SCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1001 I STREET	DISCOVERY TREE SCHOOL - I STREET	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1025 P STREET	DISCOVERY TREE SCHOOL - P STREET	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1625 22ND STREET	DISCOVERY TREE SCHOOL-MCCLATCHY CAMPUS	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2415 FIRST AVE	DMV CHILD CARE CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	700 DOS RIOS STREET	DOS RIOS CHILD DEVELOPMENT CENTER	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Day Care Center	1630 12TH STREET	DOT TOT CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5420 LOWELL STREET	EARL WARREN PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2636 LATHAM DR.	EARLY CHILDHOOD ED. CTR OF SAC. COUNTRY DAY SCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	1411 O STREET	EAST END CHILD CARE CENTER	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	7495 29TH STREET, ROOM 25	EDWARD KEMBLE PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	7800 LEMON HILL AVE	ELDER CREEK CHILDREN'S CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	2930 21ST AVENUE	ETHEL PHILLIPS SCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5452 14TH AVE	FAMILY MATTERS CHILD CARE CENTER	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3525 MARTIN LUTHER KING BL. #3	FATHER KEITH B. KENNY PRESCHOOL	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	8551 FOLSOM BLVD.	FIRST STEPS CHILD CARE CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2100 J STREET	FOREVER YOUNG CHILD CARE CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2118 MEADOWVIEW ROAD	FREEPORT PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	5770 CARLSON DRIVE	FREMONT NURSERY SCHOOL	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Day Care Center	2420 N STREET	FREMONT PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	4625 44TH STREET	FRUITRIDGE PRESCHOOL	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3601 LARCHWOOD DRIVE	GARDEN VALLEY SCHOOL	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	7725 SHELDON RD.	GOLDEN VALLEY ACADEMY	X	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	3700 KNIGHTLINGER	GOOD NEIGHBORS	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2791 24TH STREET	GREAT BEGINNINGS CHILD DEVELOPMENT CNTR	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	2147 54TH AVENUE	H.W. HARKNESS PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1418 PALO VERDE AVENUE, RM. 20	HAGGINWOOD STATE PRESCHOOL	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	1614 N STREET	HAND IN HAND CHILD DEVELOPMENT CENTER	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	5540 MARTIN LUTHER KING JR. BL	HAPPY TIME PRESCHOOL	X	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	8101 GRANDSTAFF DR.	HERMAN LEIMBACH ELEMENTARY SCHOOL	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	3535 65TH STREET	HIRAM JOHNSON CENTER	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2929 BELMAR STREET	HUBERT BANCROFT PRESCHOOL	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Day Care Center	401 MCCLATCHY WAY	JEDEDIAH SMITH PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1730 65TH AVENUE	JOHN BIDWELL PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	1141 SEAMAS	JOHN CABRILLO PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5700 13TH AVE.	JOHN PAUL II PRESCHOOL AND CHILDCARE CENTER	X	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	7525 CANDLEWOOD WAY	JOHN SLOAT PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	2591 EDGEWATER	JOHNSON STATE PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	7300 MARIN AVENUE, ROOM 25	JOSEPH BONNHEIM	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1235 H STREET	JUST KIDS AT DISCOVERY TREE SCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2825 TRUXEL ROAD	KELLI'S PALS DAY CARE CENTER	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	6565 BELLEAU WOOD LANE	KINDER WORLD	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	4920 MACK ROAD	KINDERCARE LEARNING CENTER, INC.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5250 RIVERSIDE BLVD.	LAND PARK INFANT CENTER AND PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	5600 GILGUNN WAY	LEARNING TREE PRESCHOOL	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Day Care Center	4840 MARYSVILLE BLVD.	LIBERTY GARDEN	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	6101 S STREET	LIGHTHOUSE	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	400 Q STREET, #1704	LINCOLN PLAZA MONTESSORI	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5700 SOUTH LAND PARK DRIVE	LITTLE BLOSSOM MONTESSORI SCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2075 ARENA BLVD	LITTLE BLOSSOM MONTESSORI SCHOOL, INC.	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	1390 FLORIN ROAD	LIVING STONES CENTER FOR EARLY CHILDHOOD EXPERIENC	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	3200 37TH AVENUE	MAPLE PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	2850 49TH STREET	MARIAN ANDERSON CHILD CARE	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2221 MATSON DRIVE	MARK HOPKINS	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	4914 58TH STREET	MARK TWAIN PRESCHOOL	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3014 H STREET	MC KINLEY MONTESSORI SCHOOL-EAST	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	3008 H STREET	MC KINLEY MONTESSORI SCHOOL-WEST	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	7450 POCKET RD #B	MERRYHILL SCHOOL	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Day Care Center	1901 DANBROOK DR	MERRYHILL SCHOOLS - NATOMAS 1041	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2565 MILLCREEK DRIVE	MILLCREEK MERRYHILL PRIVATE SCHOOL	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	7575 RUSH RIVER DR.	MONTESSORI COUNTRY DAY AT RIVERLAKE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2530 TRACTION AVENUE	MS. BARBARA'S ABC LEARNING CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	477 LAS PALMAS AVENUE, ROOM #7	NORALTO STATE PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	477 LAS PALMAS AVE., ROOM 8	NORALTO TITLE I PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	1281 NORTH AVENUE	NORTH AVENUE SCHOOL	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2630 TAFT STREET	NORTHWOOD CHILD DEVELOPMENT CENTER	X	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	3500 2ND AVENUE	OAK PARK PRESCHOOL	X	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	4501 MARTIN LUTHER KING JR.	OAK RIDGE PRESCHOOL	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1300 SUTTERVILLE RD.	PARK VISTA SCHOOL, INC	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	924 SAN JUAN ROAD	PEACE LUTHERAN EARLY CHILDHOOD EDUCATION CENTER	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	6032 36TH AVE. RM.#3	PETER BURNETT PRESCHOOL	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Day Care Center	7335 PARK CITY DR.	PHOENIX SCHOOL, THE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1820 ALAHAMBRA BLVD.	PHOENIX SCHOOL, THE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	4401 A STREET	PHOENIX SCHOOL, THE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	600 I STREET	PHOENIX SCHOOL, THE	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2001 55TH ST	PLAYHOUSE PRESCHOOL	X	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	3930 8TH AVENUE	PLAYMATE CHILD DEVELOPMENT CENTER	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	5251 VALLEY HI DRIVE	PRAIRIE ELEMENTARY	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	901 P STREET	RAINBOW DAY CARE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	776 DARINA AVE	ROBERTS FAMILY DEVELOPMENT CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	4351 PINELL STREET	ROBLA PRESCHOOL	X	NO	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3835 FREEPORT BLVD	SACRAMENTO CITY COLLEGE CHILD DEVELOPMENT CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	1111-1123 D STREET	SACRAMENTO MONTESSORI SCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2550 ALHAMBRA BLVD.	SALVATION ARMY DAY CARE CENTER	X	YES	Moderate

Sacramento	At Risk Population Facilities	Day Care Center	6000 J STREET	SETA - CSUS HEADSTART	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	510 LOUISE ST	SETA - DOS RIOS HEAD START	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	577 LAS PALMAS AVE	SETA - GRANT SKILLS CENTER HEAD START	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2317 MATSON DRIVE	SETA - HOPKINS PARK HEADSTART	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	6501 ELDERCREEK	SETA - KENNEDY ESTATES	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3265 NORWOOD AVENUE	SETA - NORWOOD AVE HEAD START	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	925 DEL PASO BLVD. #300	SETA - SHARON NEESE EARLY LEARNING CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	7301 29TH STREET	SETA FLORIN MEADOWS	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3100 MEADOWVIEW ROAD	SETA- JOB CORPS HEAD START	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	263 SEAVEY CIR.	SETA-BROADWAY EARLY LEARNING CENTER HEAD START	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5700 MACK ROAD	SETA-COUNTRYWOOD HEAD START	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2775 MILLCREEK DRIVE	SETA-NATOMAS-BANNON CREEK HEADSTART	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	60 NEDRA COURT	SETA-NEDRA COURT EARLY LEARNING CENTER	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Day Care Center	2640 A MUIR WAY	SETA-NEW HELVETIA EARLY HEAD START	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	816 REVERE STREET	SETA-NEW HELVETIA EARLY LEARNING CENTER #2	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	2401 NORTHVIEW AVENUE	SETA-NORTHVIEW HEAD START	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	4400 SHINING STAR DRIVE	SETA-PHOENIX PARK EARLY LEARNING CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	7501 FRANKLIN BLVD.	SETA-SOLID FOUNDATION HEAD START	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	7610 AMHERST STREET	SETA-WHISPERING PINES HEAD START	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5451 LEMON HILL AVE.	SKILLS CHILDREN'S CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5967 14TH AVE.	SMALL WORLD MONTESSORI	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2781 NORTHGATE BLVD., ROOM #1	SMYTHE STATE PRESCHOOL	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	7505 FRANKLIN BOULEVARD	SOLID FOUNDATION HEAD START	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2258 HAWTHORNE STREET	ST. JOSEPH PRESCHOOL AND CHILDCARE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5945 FRANKLIN BLVD	ST. PATRICK'S DAY CARE CENTER - PRESCHOOL	X	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	3141 NORTHSTEAD DR.	STRAUCH CHILD DEVELOPMENT CENTER	A99	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Day Care Center	7864 DETROIT	SUSAN B. ANTHONY PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5520 GILGUNN WAY	SUTTERVILLE PRESCHOOL, INC.	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	5500 EHRHARDT AVE	SWEET DREAMS EDUCATIONAL CARE CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	7020 WYNDHAM DRIVE	SWEET DREAMS EDUCATIONAL CARE CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	2001 10TH STREET	TOT TOWN CHILD DEVELOPMENT CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2201 HARVARD STREET	USAA CHILD DEVELOPMENT CENTER AT WESTRO	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	6300 EHRHARDT AVENUE	VALLEY HIGH PARENT CO-OP PRESCHOOL	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	530 18TH STREET	WASHINGTON CHILDREN'S CENTER	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	520 18TH STREET	WASHINGTON, PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3555 3RD AVENUE	WCIC-PLAYMATE CHILD DEVELOPMENT CENTER II	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	3340B MARYSVILLE BLVD.	WHIZZ KIDZ LEARNING ACADEMY	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	2120 12 STREET	WILLIAM LAND PRESCHOOL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	2500 52ND AVENUE	WOODBINE CHILDREN'S CENTER	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Day Care Center	700 SOUTHGATE ROAD	WOODLAKE STATE PRESCHOOL PORTABLE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Day Care Center	1926 V STREET	YMCA CHILD DEVELOPMENT CENTER - PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Day Care Center	700 N. 10TH STREET	YMCA CHILD DEVELOPMENT CENTER - TOTS ON TENTH	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	5571 79TH STREET	ATKINSON YOUTH SERVICES-VI	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	3940 DEERBROOK DRIVE	BRIGHTER HOPE GROUP HOME #2	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	3794 SHINING STAR DRIVE	BRIGHTER HOPE GROUP HOME, INC.	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Group Home	181 GRAVES AVENUE	CELESTIAL CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	6 MANTECA COURT	CHILDREN'S HOME CONNECTION	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Group Home	9 PEBBLE CT.	CHILDREN'S HOME CONNECTION, INC. II	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	3555 AUBURN BLVD	CHILDREN'S RECEIVING HOME	X	NO	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	744 P STREET MS 19-47	GH CERTIFICATION	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	2820 14TH AVE	HELEN E. COWELL CHILDREN'S CENTER	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	7706 ABALINE WAY	HESBY HOUSE	0.2% ANNUAL CHANCE	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Group Home	2771 GROVE AVENUE	KIDS OF THE KINGDOM	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	22 CAPRICE CT.	LAMERCIE YOUTH HOMES	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	4420 SAN SEBASTIAN WAY	LIGHTHOUSE YOUTH CENTER INC.	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	7337 STOCKDALE ST.	NASZ HOUSE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	6675 RIVERSIDE BOULEVARD	SACRAMENTO CHILDREN'S HOME - RIVERSIDE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	2750 SUTTERVILLE ROAD	SACRAMENTO CHILDREN'S HOME #1	X	YES	Moderate
Sacramento	At Risk Population Facilities	Group Home	6699 S. LAND PARK DRIVE	SACRAMENTO CRISIS NURSERY	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Group Home	1142 FAIRWEATHER DRIVE	SOUTHPOINT HOMES III	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Group Home	3520 DAYTON ST.	WIND YOUTH SHELTER	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		BEST WESTERN PONDEROSA MOTOR INN	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		BEST WESTERN SANDMAN MOTEL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Hotel		BEVERLY GARLAND HOTEL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		CANTERBURY INN	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Hotel		CLARION HOTEL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Hotel		COURTYARD BY MARRIOTT-NATOMAS	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		DISCOVERY INN	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		DOUBLE TREE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		FOUNTAIN SUITES HOTEL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		GOVERNORS INN	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		HOLIDAY INN- CAPITOL PLAZA	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		HYATT REGENCY	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		RADISSON HOTEL SACRAMENTO	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		RED LION	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		RESIDENCE INN BY MARRIOTT SOUTH NATOMAS	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		SACRAMENTO HILTON INN	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Hotel		VAGABOND INN	X	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Independent Study School	7222 24th St.	Capital City Independent Study	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Infant Center	2012 19TH STREET	ALL ABOUT KIDS	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Infant Center	3801 BROADWAY	AMERICAN LEGION INFANT TODDLER HOUSE	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Infant Center	2727 DEL PASO BLVD.	CALVARY CHRISTIAN CENTER (INFANTS/TODDLER)	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Infant Center	1630 12TH STREET	DOT TOT CENTER FOR INFANTS	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Infant Center	5452 14TH AVE.	FAMILY MATTERS CHILD CARE	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Infant Center	1209 "P" STREET	FOREVER YOUNG INFANT CARE CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Infant Center	2791 24TH STREET	GREAT BEGINNINGS CHILD DEVELOPMENT-INFANT	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Infant Center	1390 FLORIN ROAD	LIVING STONES CENTER FOR EARLY CHILDHOOD EXP.	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Infant Center	3441 STOCKTON BLVD.	N.H.D.F. INFANT & TODDLER CENTER	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Infant Center	7000 FRANKLIN BLVD. STE 750	PRECIOUS PEOPLE INFANT CENTER AND PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Infant Center	901 P ST	RAINBOW DAY CARE - INFANTS	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Infant Center	3100 MEADOWVIEW ROAD	SETA-JOB CORPS HEAD START	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Infant Center	5945 FRANKLIN BOULEVARD	ST. PATRICK'S DAY CARE CENTER - INFANTS	X	YES	Moderate
Sacramento	At Risk Population Facilities	Infant Center	1926 V STREET	YMCA CHILD DEVELOPMENT CENTER - INFANTS	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	JAIL		SACRAMENTO COUNTY MAIN JAIL	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	3600 Riverside Boulevard	Brookfield School	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	5701 Freeport Boulevard	Camellia Waldorf	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Private Elementary School	5500 Ehrhardt Avenue	Camini Academy, Inc.	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Private Elementary School	205 24th Street	Courtyard Private	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	3920 West Land Park Drive	Holy Spirit Parish School	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	5700 13th Avenue	John Paul II School	X	YES	Moderate
Sacramento	At Risk Population Facilities	Private Elementary School	2565 Millcreek Drive	Merryhill	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Private Elementary School	7450 Pocket Road	Merryhill Country	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Private Elementary School	1321 North C Street	Mustard Seed	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	2727 Del Paso Boulevard	Nehemiah Christian Academy	0.2% ANNUAL CHANCE	YES	Moderate

Sacramento	At Risk Population Facilities	Private Elementary School	924 San Juan Road	Peace Lutheran Kindergarten	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	3933 I Street	Sacred Heart	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	7720 24th Street	St. Anne's Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	7580 Center Parkway	St. Charles Borromeo	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	2500 K Street	St. Francis of Assisi Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	1351 58th Street	St. Mary	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private Elementary School	5945 Franklin Boulevard	St. Patrick Elementary	X	YES	Moderate
Sacramento	At Risk Population Facilities	Private Elementary School	2251 Irvin Way	St. Robert	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private High School	4315 Martin Luther King Jr. B*	Christian Brothers High School	X	YES	Moderate
Sacramento	At Risk Population Facilities	Private High School	6046 Lemon Hill Avenue	Northern California Preparatory	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Private High School	7164 Calvine Road, Suite 2	Reaching Potentials Educational Institute	X	YES	Moderate
Sacramento	At Risk Population Facilities	Private High School	2636 Latham Drive	Sacramento Country Day	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private High School	3750 Bannister Road	Sacramento Waldorf	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Private High School	5900 Elvas Avenue	St. Francis High	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private High School	2245 Florin Road	Success High School	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private K-12 School	7005 Luther Drive, Suite 7	Children's Home Connection Learning Acade	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private K-12 School	5800 Power Inn Road	Eliezer Christian Academy	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private K-12 School	6400 Freeport Boulevard	Land Park Academy	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private K-12 School	2863 35th Street	New Dimension Learning Academy	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Private K-12 School	3900 Astoria Street	Northern California Christian School, Inc	X	NO	Little or No Threat
Sacramento	At Risk Population Facilities	Private K-12 School	2751 Wilmington Avenue	Pat Anderson Education Center	X	YES	Moderate
Sacramento	At Risk Population Facilities	Private K-12 School	2791 24th Street, Number Nine	Sacramento Valley	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Private K-12 School	4659 Dry Creek Road	Slavic Gospel	X	NO	Little or No Threat
Sacramento	At Risk Population Facilities	Private K-12 School	8008 43rd Avenue	Still Water's Academy	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Continuation High School	3801 Broadway	American Legion High (Continuation)	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Continuation High School	3401 Fong Ranch Rd.	Discovery High	A99	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Public Continuation High School	7825 Grandstaff Dr.	Rio Cazadero High (Continuation)	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Public Continuation High School	2035 North Ave.	Vista Nueva Career and Technology High	X	NO	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	2781 Northgate Blvd.	Alethea B. Smythe Elementary	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	6251 13th St.	Alice Birney Elementary	X	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	2800 Stonecreek Dr.	American Lakes Elementary	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2775 Millcreek Dr.	Bannon Creek Elementary	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	7000 Cranleigh Ave.	Barbara Comstock Morse Elementary	X	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	6620 Gloria Dr.	Bear Flag Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	1900 Bell Ave.	Bell Avenue Elementary	X	NO	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2625 Plover St.	Ben Ali Cheldren's Center	X	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	2751 Ninth Ave.	Bret Harte Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	5457 Carlson Dr.	Caleb Greenwood	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	6600 Cougar Dr.	Camellia Elementary	0.2% ANNUAL CHANCE	YES	Moderate

Sacramento	At Risk Population Facilities	Public Elementary School	6870 Greenhaven Dr.	Caroline Wenzel Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	7500 32nd St.	Cesar Chavez Intermediate	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	4701 Brookfield Dr.	Charles E. Mack Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	5921 26th St.	Collis P. Huntington Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2970 Riverside Blvd.	Crocker/Riverside Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2400 Cormorant Way	D. W. Babcock Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	3535 M St.	David Lubin Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	590 Morey Ave.	Del Paso Heights Elementary	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	700 Dos Rios St.	Dos Rios Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	5420 Lowell St.	Earl Warren Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	7495 29th St.	Edward Kemble Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	7934 Lemon Hill Ave.	Elder Creek Elementary	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2930 21st Ave.	Ethel Phillips Elementary	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Public Elementary School	227 Fairbanks Ave.	Fairbanks Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	2118 Meadowview Rd.	Freeport Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	3601 Larchwood Dr.	Garden Valley Elementary	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	6940 Harmon Dr.	Genevieve Didion	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	201 Jessie Ave.	Glenwood Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	2147 54th Ave.	H. W. Harkness Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	1418 Palo Verde Ave.	Hagginwood Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	2591 Edgewater Rd.	Harmon Johnson Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	3141 Northstead Dr.	Hazel Strauch Elementary	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	8101 Grandstaff Dr.	Herman Leimbach Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	4915 Harte Way	Hollywood Park Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	2929 Belmar St.	Hubert H. Bancroft Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	8625 Serio Way	Irene B. West Elementary	X	YES	Moderate

Sacramento	At Risk Population Facilities	Public Elementary School	401 McClatchy Way	Jedediah Smith Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2001 Pebblewood	Jefferson Elementary	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	1730 65th Ave.	John Bidwell Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	1141 Seamas Ave.	John Cabrillo Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	7525 Candlewood Way	John D. Sloat Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	1901 60th Ave.	John F. Morse	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	2250 John Still Dr.	John H. Still	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	8401 Valley Lark Dr.	John Reith Elementary	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	7300 Marin Ave.	Joseph Bonnheim Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	4701 Joaquin Way	Leonardo Da Vinci	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	7555 South Land Park Dr.	Lisbon Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	1400 Main Ave.	Main Avenue Elementary	X	NO	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	3301 37th Ave.	Maple Elementary	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Public Elementary School	2850 49th St.	Marian Anderson Elementary	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2221 Matson Dr.	Mark Hopkins Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	4914 58th St.	Mark Twain Elementary	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	480 Little River Way	Martin Luther King, Jr.	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	7680 Windbridge Dr.	Matsuyama Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	1801 South Ave.	Michael J. Castori Elementary	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	155 Morey Ave.	Morey Avenue Early Childhood Development	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	4700 Crest Dr.	Natomas Park Elementary	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	477 Las Palmas Ave.	Noralto Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	1281 North Ave.	North Avenue Elementary	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2630 Taft St.	Northwood Elementary	X	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	4501 Martin Luther King Blvd.	Oak Ridge Elementary	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	6032 36th Ave.	Peter Burnett Elementary	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Public Elementary School	1410 60th St.	Phoebe A. Hearst Elementary	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	1250 56th Ave.	Pony Express Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	5251 Valley Hi Dr.	Prairie Elementary	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	5901 Bridgecross Dr.	Regency Park Elementary	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	5200 Marysville Blvd.	Robla Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	5201 Strawberry Ln.	St. HOPE Public School 7 (PS7)	X	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	7864 Detroit Blvd.	Susan B. Anthony Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	4967 Monterey Way	Sutterville Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	3110 60th St.	Tahoe Elementary	X	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	4350 Taylor St.	Taylor Street Elementary	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	4500 Roosevelt Ave.	The Language Academy of Sacramento	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	3919 McKinley Blvd.	Theodore Judah Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2635 Chestnut Hill Dr.	Thomas Jefferson Elementary	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Public Elementary School	3201 West River Dr.	Two Rivers Elementary	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	7850 Deercreek Dr.	Union House Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	520 18th St.	Washington Elementary	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Elementary School	2120 12th St.	William Land Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	3790 Poppy Hill Way	Witter Ranch Elementary	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	2500 52nd Ave.	Woodbine Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Elementary School	700 Southgate Rd.	Woodlake Elementary	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public High School	3066 Freeport Blvd.	C. K. McClatchy High	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public High School	1400 Grand Ave.	Grant Union High	X	YES	Moderate
Sacramento	At Risk Population Facilities	Public High School	1221 SOUTH AVE	GRANT WEST COMPREHENSIVE HIGH	X	YES	Moderate
Sacramento	At Risk Population Facilities	Public High School	451 McClatchy Way	Health Professions High	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public High School	6879 14th Ave.	Hiram W. Johnson High	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public High School	2500 New Market Dr.	Inderkum High	A99	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Public High School	6715 Gloria Dr.	John F. Kennedy High	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public High School	3500 Florin Rd.	Luther Burbank High	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public High School	3301 Rosin Blvd.	Natomas High	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public High School	6300 Ehrhardt Ave.	Valley High	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public High School	5022 58th St.	West Campus	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	1600 Vallejo Way	California Middle	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	2250 68th Ave.	Charles M. Goethe Middle	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	5301 N St.	Kit Carson Middle	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	2950 West River Dr.	Leroy F. Greene Middle	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	3051 Fairfield St.	Martin Luther King Jr. Junior High	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	3700 Del Paso Rd.	Natomas Middle	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	4601 Norwood Ave.	Norwood Junior High	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	3201 Northstead Dr.	Rio Tierra Junior High	A99	YES	Moderate

Sacramento	At Risk Population Facilities	Public Middle School	5301 Elmer Way	Sam Brannan Middle	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Public Middle School	7925 Kentwall Dr.	Samuel Jackman Middle	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Public Middle School	2801 Meadowview Rd.	Sol Aureus College Preparatory	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	3150 I St.	Sutter Middle	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Public Middle School	6201 Lemon Hill Ave.	Will C. Wood Middle	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	2863 WIESE WAY	A COZY HOME	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	1917 O'NEIL WAY	A FAMILY AFFAIR CARE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7526 21ST STREET	A FAMILY AFFAIR CARE II	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	228 GRACE AVENUE	AMAZING GRACE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6200 FENNWOOD COURT	ANGELS CARE MANOR	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7067 AMHERST STREET	ANNA'S HOME CARE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	5420 SHORTWAY DRIVE	BENIE LUNGAN CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	974 PARK RANCH WAY	CAMELOT CARE HOME # 4	X Protected by Levee	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Residential Care/Elderly	2052 CANTERBURY ROAD	CANTERBURY HOUSE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	5392 MEADOW PARKWAY	CARMEN'S CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7556 COSGROVE WAY	CAROLYN MITCHELL'S LOVING CARE HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	625 EL CAMINO AVENUE	CASA DE EL CAMINO	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	2701 CAPITOL AVENUE	CHATEAU ON CAPITOL AVENUE, THE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	1021 ACACIA AVENUE	CJ'S GUEST HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	2181 FERRAN AVENUE	COCADIZ DEL REY HOME CARE, INC.	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	3791 KROY WAY	COLLINGTON MANOR	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	421 SAN JUAN ROAD	COLLINS MANOR	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	1201 SOUTH AVENUE	D.R.'S ELDERLY BOARD & CARE HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	78 DEL VISTA CIRCLE	DEL VISTA RESIDENTIAL CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7475 VILLAJOY WAY	DRE MARE COMMONS	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6025 EHRHARDT AVENUE	EHRHARDT GUEST HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Residential Care/Elderly	7488 RIO MONDEGO DRIVE	GANA'S HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	5711 59TH STREET	GIBSON CARE HOME, LLC	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7012 MILLBORO WAY	GOLDCARE SENIOR HOMES #2	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7723 EL RITO WAY	GOLDEN GIRLS EL RITO	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	760 EL MACERO WAY	GOLDEN GIRLS-EL MACERO	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	1205 GRAND RIVER DRIVE	GOLDEN GIRLS-GRAND RIVER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	5761 55TH STREET	GOLDEN VILLA RCFE	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	4127 RIO LINDA BLVD.	GOLDEN YEARS RESIDENTIAL FACILITY	0.2% ANNUAL CHANCE	NO	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	5314 EHRHARDT AVENUE	GOOD SHEPHERD HOME 1	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7548 GREENHAVEN DRIVE	GREENHAVEN ESTATES	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6357 FALL RIVER WAY	HERJEMA CARE #2	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	141 HIGHFIELD CIRCLE	HIGHFIELD SENIOR CARE, INC.	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	4134 4TH AVENUE	IDALENE'S	X	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Residential Care/Elderly	2030 23RD STREET	IVY RIDGE RETIREMENT HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	8720 LAGUNA STAR DRIVE	LAGUNA STAR HOME	X	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6140 SOUTH LAND PARK DRIVE	LAND PARK PLACE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6431 HOGAN DRIVE	LE NOUVEAU GENESIS DE FAMILLE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	240 HAGGIN AVE	LIDIA'S CARE HOME	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6831 GOLF VIEW DRIVE	LILLIE CARE HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	8000 35TH AVENUE	LP NUNEZ CARE FACILITY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6903 GLORIA DRIVE	MANNA HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7745 MANORSIDE DRIVE	MANORSIDE GUEST HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	2205 MEADOWVIEW ROAD	MEADOWVIEW CARE FACILITY	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6025 EHRHARDT AVENUE	MEDIATRIX HOUSE OF CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	3865 J STREET	MERCY MCMAHON TERRACE	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6350 RIVERSIDE BLVD.	MERRILL GARDENS AT GREENHAVEN	X Protected by Levee	YES	Moderate

Sacramento	At Risk Population Facilities	Residential Care/Elderly	8005 35TH AVENUE	NUNEZ CARE HOME #2	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	8590 TAMBOR WAY	PACIFIC HEIGHTS GUEST HOME	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6940 SIERRA BONITA WAY	PIEARCY'S GUEST HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	415 P STREET	PIONEER HOUSE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	3331 9TH AVENUE	PRECIOUS RESIDENTIAL ELDERLY CARE HOME	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7707 RUSH RIVER DRIVE	PRIMROSE SACRAMENTO	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	NO. 1 TIMBERWOOD COURT	PRISCILLA CARBONELL'S CARE HOME	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	4230 RED DEER WAY	RED DEER GUEST HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	8190 ARROYO VISTA DRIVE	REGENCY PLACE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	2715 G ST.	SACRAMENTO GUEST HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7606 LEMON HILL AVENUE	STERLING SUITES - LEMON HILL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	130 MANITOU STREET	SUMMER'S RESIDENTIAL CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6621 ELDER CREEK ROAD	SUNSHINE GUEST HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat

Sacramento	At Risk Population Facilities	Residential Care/Elderly	341 BOWMAN AVE	SUPER HOME CARE	A99	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	744 P STREET	TEST FACILITY ADULT	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6205 CALVINE ROAD	URBANO RESIDENTIAL FACILITY	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	6160 HESBY WAY	VALLEY CARE HOME	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	540 ALCANTAR CIRCLE	VILLA NATOMAS	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	5764 WALLACE AVE.	WALRIDGE CARE FACILITY	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	966 43RD AVENUE	WATERLEAF AT LAND PARK, THE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	1002 LOCHBRAE ROAD	WOODLAKE GUEST HOME	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7415 HENRIETTA DRIVE	WOODS RETREAT	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	Residential Care/Elderly	7737 FRANKLIN BLVD.	YOUNG ONCE CHALET	AH	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	6251 13TH STREET	4TH "R" - ALICE BIRNEY	X	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	3790 POPPY HILL WAY	4TH "R" - WITTER RANCH	A99	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	5901 BRIDGECROSS DR.	4TH "R"- REGENCY PARK	A99	YES	Little or No Threat

Sacramento	At Risk Population Facilities	School-Age Day Care Center	2929 BELMAR	4TH "R", THE - BANCROFT	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	6620 GLORIA DRIVE	4TH "R", THE - BEAR FLAG	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	2751 9TH AVENUE	4TH "R", THE - BRET HARTE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	1141 SEAMAS AVENUE	4TH "R", THE - CABRILLO	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	5457 CARLSON DRIVE	4TH "R", THE - CALEB GREENWOOD	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	6870 GREENHAVEN DRIVE	4TH "R", THE - CAROLINE WENZEL	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	6490 HARMON DR.	4TH "R", THE - DIDION	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	4951 HARTE WAY	4TH "R", THE - HOLLYWOOD PARK	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	2850 49TH STREET	4TH "R", THE - MARIAN ANDERSON	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	1250 56TH AVENUE	4TH "R", THE - PONY EXPRESS	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	4967 MONTEREY WAY	4TH "R", THE - SUTTERVILLE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	2970 RIVERSIDE BLVD	4TH "R", THE-CROCKER & RIVERSIDE ELEM SCHOOL	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	1410 60TH STREET	4TH "R"-PHOEBE HEARST	X	YES	Moderate

Sacramento	At Risk Population Facilities	School-Age Day Care Center	4700 CREST DRIVE	4TH R - NATOMAS PARK	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	4625 44TH STREET	4TH R, THE - FRUITRIDGE	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	5151 BANFIELD DRIVE	4TH R, THE - HERON	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	1901 60TH AVE.	4TH R-JOHN MORSE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	3201 WEST RIVER DRIVE	4TH R-TWO RIVERS	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	700 SOUTHGATE RD.	4TH 'R'-WOODLAKE	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	2800 STONECREEK DRIVE	B.J. JORDAN CHILD CARE PROGRAMS - AMERICAN LAKES	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	2001 PEBBLEWOOD DRIVE	B.J. JORDAN CHILD CARE PROGRAMS - JEFFERSON CENTER	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	1390 MAIN AVENUE	B.J. JORDAN CHILD CARE PROGRAMS - MAIN AVENUE	X	NO	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	2775 MILLCREEK DRIVE	BANNON CREEK SCHOOL-AGE CHILD DEVELOPMENT CENTER	A99	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	7000 CRANLEIGH AVENUE	BARBARA COMSTOCK MORSE CHILD DEVELOPMENT CENTER	X	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	8625 SERIO WAY	CHILDREN'S WORLD LEARNING CENTER - ELK GROVE	X	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	8401 CENTER PARKWAY	CONSUMNES RIVER COLLEGE CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat

Sacramento	At Risk Population Facilities	School-Age Day Care Center	3600 J STREET	FAITH PROGRAM CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	2520 33RD STREET	KIDS CONNECTION	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	8101 GRANDSTAFF DRIVE	LEIMBACH SCHOOL AGE CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	4840 MARYSVILLE BLVD.	LIBERTY GARDEN CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	1390 FLORIN ROAD	LIVING STONES CENTER FOR EARLY CHILDHOOD	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	4508 BROOKFIELD DRIVE	PLAYFUL SCHOLARS CHILD CARE, INC.	AH	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	5251 VALLEY HI DRIVE	PRAIRIE SCHOOL-AGE CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	8401 VALLEY LARK DRIVE	REITH SCHOOL AGE CHILD DEVELOPMENT CENTER	X	YES	Little or No Threat
Sacramento	At Risk Population Facilities	School-Age Day Care Center	5945 FRANKLIN BLVD.	ST. PATRICK'S DAY CARE CENTER - SCHOOL-AGE	X	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	2635 CHESTNUT HILL DRIVE	THOMAS JEFFERSON ELEMENTARY SCHOOL 4TH "R"	X Protected by Levee	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	2540 ALHAMBRA BLVD.	TSA AFTER SCHOOL PROGRAM	X	YES	Moderate
Sacramento	At Risk Population Facilities	School-Age Day Care Center	1926 V STREET	YMCA CHILD DEVELOPMENT CENTER - SCHOOL-AGE	X Protected by Levee	YES	Little or No Threat
Sacramento	At Risk Population Facilities	Social Rehabilitation Facility	4801 34TH STREET	TURNING POINT CRISIS RESIDENTIAL TREATMENT PROGRAM	X	YES	Little or No Threat

Sacramento	Essential Services Facilities	Airport		Sacramento Executive Airport	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Arena		ARCO ARENA	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Bus Terminal	COSUMNES RIVER COLLEGE	BUS TRANSIT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Bus Terminal	POCKET	BUS TRANSIT CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Bus Terminal	CSUS	BUS TRANSIT CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Bus Terminal	ARDEN FAIR MALL	BUS TRANSIT CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Bus Terminal	715 L ST	GREYHOUND BUS DEPOT	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Bus Terminal	1924 EL CAMINO	GREYHOUND BUS DEPOT	X	YES	Moderate
Sacramento	Essential Services Facilities	Convention Center		SACRAMENTO CONVENTION CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3801 Broadway	American Legion High School (SCME16)	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	7650 Amherst St.	Antioch Progressive Church (CHME39)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5699 S Land Park Dr.	Belle Coolidge (CCSM01)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5625 24th St.	Bethany Presbyterian Church (CHME23)	X Protected by Levee	YES	Moderate

Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3066 Freeport Blvd.	C K McClatchy HS (SCLG02)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	1600 Vallejo	California Middle School (SCLG16)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	515 "L" Street	Calvary Lutheran Church (CHSM03)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5265 "H" Street	Central United Methodist Church (CHME02)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	7500 32nd Street	Cesar Chavez Intermediate School (SCSM05)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	4315 Martin Luther King Jr. Bl	Christian Brothers High School (SCLG56)	X	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	601 Alhambra Blvd.	Clunie Comm Ctr (CCSM02)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	4623 T St.	Coloma Community Center (CCME05)	X	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	8401 Center Parkway	Cosumnes River College (SCLG60)	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3401 Fong Ranch Road	Discovery High School (SCME30)	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	7495 29th Street	Edward Kemble Elementary (SCSM06)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	6446 Riverside Blvd.	Elks Lodge (BUME04)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	7815 35th Ave.	Elmo Allen Slider Clubhouse (CCSM09)	X Protected by Levee	YES	Little or No Threat

Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	915 27th St.	Ethel Macleod Hart (CCSM03)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	1402 Dickson St.	Evelyn Moore Com Ctr (CCSM04)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	625 Florin Road	Faith Presbyterian Church (CHSM04)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3600 J Street	Faith United Methodist Church (CHME06)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3901 Folsom Blvd.	First Christian Church (CHME36)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5770 Catlson	Freemont Presbyterian Church (CHME09)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5601 47th Ave.	Genesis Charter High School (SCME35)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	1400 Grand Ave.	Grant High School - Main Campus (SCLG41)	X	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	1400 Grand Ave.	Grant High Scool - West Campus (SCME21)	X	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	475 Florin Road	Greenhaven Lutheran Church (CHSM08)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3271 Marysville Blvd.	Hagginwood Comm Ctr (CCSM05)	AH	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5151 Banfield	Heron School (SCME33)	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	6879 14 th Ave.	Hiram Johnson HS (SCME02)	X	YES	Little or No Threat

Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	1424 24th Street	Immanuel Baptist Church (CHME22)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	2500 New Market Drive	Inderkum High School (SCLG44)	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	6715 Gloria Dr.	J F Kennedy HS (SCME04)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	2250 John Still Drive	John Still Middle School (SCLG28)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	231 Eleanor Ave.	Johnston Community Center (CCSM08)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5301 N Street	Kit Carson Middle School (SCME13)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	2950 West River Drive	Leroy Greene Middle School (SCLG51)	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3500 Florin Rd.	Luther Burbank HS (SCLG07)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3051 Fairfield St.	Martin Luther King Jr. Tech Academy (SCLG50)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	7480 24th St.	Moments of Blessings (CHSM23)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3301 Fong Ranch Road	Natomas High School (SCLG52)	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3700 Del Paso Road	Natomas Middle School (SCLG47)	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	4400 East Commerce Way	Natomas Pacific Parkways Prep (SCLG49)	A99	YES	Little or No Threat

Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	1400 Dickson Street	New Technology HS (SCME05)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	4601 Norwood Ave.	Norwood Jr. High School (SCME22)	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	4600 Blackrock Drive	Notomas Charter High School (SCLG46)	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3425 Martin Luther King Blvd.	Oak Park Community Center (CCLG02)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	7710 Stockton Blvd.	Radiant Life Church (CHME11)	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	7825 Grandstaff Drive	Rio Cazadero High School (SCSM03)	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	1101 G Street	Rio Linda Jr. High School (SCLG35)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3201 Northstead Drive	Rio Tierra Jr. High School (SCLG37)	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	4401 A St.	River Life Covenant Church (CHSM20)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	6449 Riverside Blvd.	Riverside Wesleyan Church (CHME40)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3525 Norwood Ave	Roberston Comm Ctr (CCSM07)	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	2250 68th Ave	Rosa Parks Middle School (SCLG19)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3835 Freeport Blvd.	Sacramento City College (SCLG55)	X Protected by Levee	YES	Little or No Threat

Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	1400 J Street	Sacramento Convention Center (CCLG03)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	2636 Latham Dr.	Sacramento County Day School (SCME38)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3349 J St.	Sacramento Turn Verein (BULG01)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5301 Elmer Way	Sam Brannan Middle School (SCME12)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	7925 Kentwal Drive	Samuel Jackman Middle School (SCLG31)	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	2450 Meadowview Rd.	Samuel Panell Mountainview Community Center (CCME03)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	6620 Gloria Drive	School of Engineering (SCSM01)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	6151 H St.	Scottish Rite Masonic Center (BULG05)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	7440 Fruitridge Rd.	Signal Heights Baptist Church (CHSM24)	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	2921 Truxel Road	South Natomas Community Center (CCME06)	A99	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	660 Florin Road	St. Anthony Parish (CHME14)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5900 Elvas Ave.	St. Francis Catholic High School (SCLG53)	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	2500 K Street	St. Francis of Assisi (CHME27)	X Protected by Levee	YES	Little or No Threat

Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3996 14th Ave.	St. Pauls Missionary Baptist Church (CHSM15)	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5961 Franklin	St. Rose Parish (CHME25)	X	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	3150 I Street	Sutter Middle School (SCME14)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	1500 27th Street	Trinity Lutheran Church (CHME26)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	6300 Ehrhardt Ave.	Valley High School (SCLG27)	X	YES	Moderate
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	5022 58th St.	West Campus High School (SCLG30)	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Emergency Evacuation Shelter	6201 Lemon Hill Ave.	Will Wood Middle School (SCME15)	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	624 Q ST	SAC CITY STATION 1	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Fire Station	5642 66TH ST	SAC CITY STATION 10	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	785 FLORIN RD	SAC CITY STATION 11	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	4500 24TH ST	SAC CITY STATION 12	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	1100 43RD AVE	SAC CITY STATION 13	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	1341 NORTH C ST	SAC CITY STATION 14	X Protected by Levee	YES	Little or No Threat

Sacramento	Essential Services Facilities	Fire Station	1591 NEWBOROUGH DR	SAC CITY STATION 15	A99	YES	Moderate
Sacramento	Essential Services Facilities	Fire Station	7363 24TH ST	SAC CITY STATION 16	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	1311 BELL AV	SAC CITY STATION 17	X	NO	Moderate
Sacramento	Essential Services Facilities	Fire Station	1700 CHALLENGE WAY	SAC CITY STATION 19	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	1229 I ST	SAC CITY STATION 2	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	2512 RIO LINDA BLVD	SAC CITY STATION 20	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	1901 CLUB CENTER DR	SAC CITY STATION 30	A99	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	3145 GRANADA WAY	SAC CITY STATION 4	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Fire Station	731 BROADWAY	SAC CITY STATION 5	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Fire Station	3301 M.L. KING JR BLVD	SAC CITY STATION 6	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	3301 JULLIARD DR	SAC CITY STATION 60	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	6500 WYNDHAM DR	SAC CITY STATION 7	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	5990 H ST	SAC CITY STATION 8	X Protected by Levee	YES	Little or No Threat

Sacramento	Essential Services Facilities	Fire Station	1910 ARICA WAY	SAC CITY STATION 9	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Fire Station	5801 FLORIN PERKINS RD	SAC CITY STATION 99	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	General Acute Care Hospital	6600 Bruceville Road	KAISER FOUNDATION HOSPITAL SOUTH	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	General Acute Care Hospital	4001 J St	MERCY GENERAL HOSPITAL	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	General Acute Care Hospital	7500 Hospital Drive	METHODIST HOSPITAL OF SACRAMENTO	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	General Acute Care Hospital	2425 Stockton Blvd	SHRINERS HOSPITAL	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	General Acute Care Hospital	2801 L St	SUTTER GENERAL HOSPITAL	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	General Acute Care Hospital	2315 Stockton Blvd	U C DAVIS MEDICAL CENTER	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		BROADWAY POST OFFICE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		CA DEPT OF EMPLOYMENT DEVELOPMENT	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Government Facilities		CA DEPT OF FOOD AND AGRICULTURE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		CA DEPT OF TRANSPORTATION	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		CAMELLIA POST OFFICE	X	YES	Little or No Threat

Sacramento	Essential Services Facilities	Government Facilities		COUNTY ADMINISTRATION	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		CYA RECEPTION CENTER & CLINIC	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Government Facilities		DEL PASO HEIGHTS POST OFFICE	X	NO	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		DEPARTMENT OF MOTOR VEHICLES	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		DEPARTMENT OF MOTOR VEHICLES	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		FEDERAL & COURTHOUSE BUILDING	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		FEDERAL COURT HOUSE	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		FORT SUTTER POST OFFICE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		HALL OF JUSTICE	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		LAND PARK POST OFFICE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		NATIONAL GUARD ARMORY	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		OAK PARK POST OFFICE	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		PARKWAY POST OFFICE	0.2% ANNUAL CHANCE	YES	Little or No Threat

Sacramento	Essential Services Facilities	Government Facilities		SACRAMENTO CITY HALL	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		SACRAMENTO MAIN POST OFFICE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		STATE AUTOMOTIVE SHOPS	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Government Facilities		STATE CAPITOL	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Government Facilities		STATE DEPT OF FINANCE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		STATE EDUCATION DEPT	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Government Facilities		STATE LIBRARY	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		STATE OFFICE CIVIL DEFENSE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		STATE RESOURCES	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		SUPERIOR COURT SACRAMENTO COUNTY	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Government Facilities		US SACRAMENTO SIGNAL DEPOT	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	12th & I	12th & I	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	13th Street	13th Stre	X Protected by Levee	YES	Little or No Threat

Sacramento	Essential Services Facilities	Light Rail Stop	16th Street	16th Stre	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	23rd Street	23rd Stre	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	29th Street	29th Stre	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	39th Street	39th Stre	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	47th Ave	47th Ave	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	48th Street	48th Stre	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	4th Ave/Wayne Hultgren	4th Ave/W	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	59th Street	59th Stre	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	7th & Capitol	7th & Cap	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	7th & I	7th & I	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	7th & K	7th & K S	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	8th & Capitol	8th & Cap	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	8th & K	8th & K	X	YES	Little or No Threat

Sacramento	Essential Services Facilities	Light Rail Stop	8th & O	8th & O	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	9th & K	9th & K S	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Alkali Flats	Alkali Fl	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Archives Plaza	Archives	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Arden/Del Paso	Arden/Del	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Broadway	Broadway	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Cathedral Square	Cathedral	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	City College	City Coll	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	College Greens	College G	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Florin	Florin	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Fruitridge	Fruitridg	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Globe	Globe	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Marconi	Marconi A	X	YES	Little or No Threat

Sacramento	Essential Services Facilities	Light Rail Stop	Meadowview	Meadowvie	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Power Inn	Power Inn	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Roseville Road	Roseville	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Royal Oaks	Royal Oak	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Sac Valley	SacVal IB	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Sac Valley	SacVal OB	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	Swanston	Swanston	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Light Rail Stop	University/65th St	Universit	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2245 Florin Road	12 Ways to Success	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1315 ALHAMBRA BLVD., ST. 100	ALHAMBRA DIALYSIS CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1550 Juliesse Avenue	Alternative House	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	4410 Power Inn Road	AOD - St. John's By Family Service Agency	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1090 RIO LANE	APPLEWOOD CARE CENTER	X Protected by Levee	YES	Moderate

Sacramento	Essential Services Facilities	Medical Health Facility	7801 RUSH RIVER DRIVE	ASIAN COMMUNITY NURSING HOME	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	1900 T Street	Birthing Project Clinic, The	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2100 Capitol Avenue	Bi-Valley Medical Clinic, Inc.	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	310 Harris Avenue	Bi-Valley Medical Clinic, Inc.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	5901 LEMON HILL AVENUE	BRIARWOOD HEALTH CARE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1422 28th Street, Suite A	Bridges Professional Treatment Services	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2727 P Street	Bridges, Inc., "The Promise House"	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1800 TRIBUTE ROAD, SUITE 100	CAPITOL CITY SURGERY CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1500 21st Street	Cares Alcohol & Other Drug Outpatient Program	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1507 21st Street, Suite 100	Chemical Dependency Center for Women - Outpatient	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	700 North 5th Street, Rms 200,	Comprehensive Alcohol Treatment Center	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1803 TRIBUTE ROAD, SUITE B	CORAM HEALTHCARE CORP. OF NO. CALIFORNIA - BRANCH	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2600 STOCKTON BOULEVARD	CRESTWOOD MANOR - SACRAMENTO	X	YES	Moderate

Sacramento	Essential Services Facilities	Medical Health Facility	1820 J Street	Crisis Intake and Counseling Center	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	915 Broadway	CRP WIC - Sacramento	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1500 21st Street	Ctr for Aids Research, Ed & Services - Sac.	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1820 J Street	Effort Medical Clinic, The	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	608 and 610 Tenth Street	El Hogar Mental Health and Community Service Center	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	6821 - 24TH STREET	EMERALD GARDENS NURSING CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	455 FLORIN ROAD	ESKATON CARE CENTER GREENHAVEN	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	7400 - 24TH STREET	FLORIN HEALTH CARE CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	4049 Miller Way	Gateway House	X	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	2217 G Street	Grace House	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	2730 Florin Road	Health for All ADHC, Meadowview	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2118 Meadowview Road	Health For All Freeport Clinic	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	577 las Palmas Avenue	Health For All Las Palmas Clinic	X Protected by Levee	YES	Little or No Threat

Sacramento	Essential Services Facilities	Medical Health Facility	923 V Street	Health for All, Inc	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1201 ALHAMBRA BOULEVARD	HEALTHSOUTH SURGERY CENTER - ALHAMBRA	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2801 K STREET, NO.525	HEALTHSOUTH SURGERY CENTER - FORT SUTTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	3810 J STREET	HEALTHSOUTH SURGERY CENTER -J STREET	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	4250 AUBURN BLVD.	HERITAGE OAKS HOSPITAL	AE	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	7654 22nd Street	House of Umoja/Rafa Project	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	3509 First Avenue	House of Umoja/Rafa Project	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	22 Caprice Court	I'm Not Alone - Lanercie Youth & Adult Servics, Inc.	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	6600 BRUCEVILLE ROAD	KAISER FND HOSP - SOUTH SACRAMENTO	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	3700 H STREET	MCKINLEY HEALTH CARE CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility		Medical Health Facility	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility		Medical Health Facility	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	7601 JACINTO ROAD	MERIDIAN NEURO CARE	X	YES	Little or No Threat

Sacramento	Essential Services Facilities	Medical Health Facility	7500 HOSPITAL DRIVE	METHODIST HOSPITAL OF SACRAMENTO	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2515 48th Avenue	Mi Casa - Outpatient Program	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2805 J STREET, SUITE 100	MICHAEL J. FAZIO, MD. SURGERY CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	7921 34th Avenue	Much Lov 2 Give Treatment Center	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	7600 HOSPITAL DRIVE, SUITE F	NOR-CAL THERAPY, INC.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	500 JESSIE AVENUE	NORWOOD PINES ALZHEIMERS CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	5491 CARLSON DRIVE	OPTION CARE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	7000 Franklin Blvd., Suite 110	Options for Recovery - Passages	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2805 J STREET, SUITE 200	PAIN DIAGNOSTIC AND TREATMENT CENTER, L.P.	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1401 EL CAMINO AVENUE	PEDIATRIC SERVICES OF AMERICA	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	415 P STREET	PIONEER HOUSE - SACRAMENTO	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	102 29th Street	Planned Parenthood Mar Monte B Street Health Ctr	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1125 10th Street	Planned Parenthood-Capitol Plaza	X Protected by Levee	YES	Little or No Threat

Sacramento	Essential Services Facilities	Medical Health Facility	5385 Franklin Blvd, Ste A-D	Planned Parenthood-Fruitridge	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	95 SCRIPPS DRIVE	PLASTIC SURGERY CENTER MEDICAL GROUP, INC, THE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	7880 ALTA VALLEY WAY, STE103	PRO-CARE HOME HEALTH SERVICES	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	3400 Elvas Avenue	Rosenwald C. Robertson ADHC Center	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2925 34th Street	Sacramento Area Emergency Housing Center	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	3307 Broadway Avenue, Suite 20	Sacramento Black Alcoholism Center	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2251 Florin Road, #100	Sacramento County	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2140 Stockton Blvd.	Sacramento County Drug Court	X	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	2150 STOCKTON BOULEVARD	SACRAMENTO COUNTY MENTAL HEALTH TREATMENT CENTER	X	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	3150 'J' STREET	SACRAMENTO EYE SURGICENTER	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	930 Alhambra Blvd, Ste 210	Sacramento Life Ctr	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	3941 J STREET, SUITE 460	SACRAMENTO MIDTOWN ENDOSCOPY CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1914 22nd Street	Sacramento Recovery House	X	YES	Moderate

Sacramento	Essential Services Facilities	Medical Health Facility	2020 J Street	Sacramento Urban Indian Health Project, Inc	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	3500 FOLSOM BOULEVARD	SAYLOR LANE HEALTHCARE CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	4700 ELVAS AVENUE	SHERWOOD HEALTHCARE CENTER	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	2425 STOCKTON BLVD	SHRINERS HOSPITALS FOR CHILDREN NORTHERN CALIF.	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	8001 BRUCEVILLE ROAD	SIERRA VISTA HOSPITAL	0.2% ANNUAL CHANCE	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	2750 24th Street	Society for the Blind, Inc	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	2218 E Street	Starlight	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	814 ALHAMBRA BLVD.	STAT HOME HEALTH AGENCY - BRANCH	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	7700 FOLSOM BOULEVARD	SUTTER CENTER FOR PSYCHIATRY	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2800 L STREET, NO.400	SUTTER HOSPICE - SACRAMENTO-BRANCH	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	5151 F STREET	SUTTER MEMORIAL HOSPITAL	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	7000 Franklin Blvd, Ste 1020	Sutter SeniorCare	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	7000 Franklin Blvd, Ste 1020	Sutter SeniorCare	X Protected by Levee	YES	Little or No Threat

Sacramento	Essential Services Facilities	Medical Health Facility	7000 Franklin Boulevard, Suite	Sutter SeniorCare - Site I	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1234 U Street	Sutter SeniorCare - Site II	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	1234 U Street	Sutter SeniorCare Site II	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	75 SCRIPPS DRIVE	SUTTER SURGERY CENTER	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	111 SCRIPPS DRIVE	SUTTER VISITING NURSE ASSOCIATION	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2701 CAPITOL AVENUE	TRINITY HOUSE	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	3630 BUSINESS DRIVE	UC DAVIS HOME CARE SERVICES	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	3630 BUSINESS DRIVE	UC DAVIS HOSPICE PROGRAM	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	300 UNIVERSITY AVE., SUITE 103	UNIVERSITY DIALYSIS CENTER	X Protected by Levee	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	1771 STOCKTON BLVD., NO.207	UNIVERSITY DIALYSIS CLINIC	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2315 STOCKTON BOULEVARD	UNIVERSITY OF CALIFORNIA DAVIS MEDICAL CENTER	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Medical Health Facility	2120 STOCKTON BOULEVARD	VALLEY SKILLED NURSING FACILITY	X	YES	Moderate
Sacramento	Essential Services Facilities	Medical Health Facility	501 JESSIE AVENUE	VINTAGE ESTATES OF SACRAMENTO	0.2% ANNUAL CHANCE	YES	Moderate

Sacramento	Essential Services Facilities	Medical Health Facility	1590 North A Street	Volunteers of America Pathways Program	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Police		HIGHWAY PATROL HDQTRS	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Police		SAC CITY POLICE STATION	X	YES	Moderate
Sacramento	Essential Services Facilities	Police		SOUTH SACRAMENTO CALIFORNIA HWY PATROL	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Essential Services Facilities	Stadium		HORNET STADIUM	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Stadium		HUGHES STADIUM	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Train Station	401 I St	SACRAMENTO AMTRAK TRAIN STATION	X	YES	Little or No Threat
Sacramento	Essential Services Facilities	Water Treatment Plant		E. A. FAIRBAIRN WATER TREATMENT PLANT	X Protected by Levee	YES	Little or No Threat
Sacramento	Essential Services Facilities	Water Treatment Plant		SACRAMENTO RIVER WATER TREATMENT PLANT	X	YES	Little or No Threat
Sacramento	Hazardous Materials Facilities	Oil Collection Center	5781 Stockton Blvd	Firesone Store #3544	X	YES	Little or No Threat
Sacramento	Hazardous Materials Facilities	Oil Collection Center	7712 Stockton Blvd	Jiffy Lube #2329	0.2% ANNUAL CHANCE	YES	Little or No Threat
Sacramento	Hazardous Materials Facilities	Oil Collection Center	5895 47th Street	Pep Boys #714	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Day Care	1250 HOWE AVENUE, UNIT 14B	ACE-IT I	X Protected by Levee	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Adult Day Care	7125 FAIR OAKS BLVD.	CHATEAU AT CARMICHAEL PARK (ADC), THE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Day Care	2617 A & B ALTA ARDEN EXPY.	EASTER SEAL SOCIETY OF SUPERIOR CA.(FILS PROGRAM)	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Day Care	4708 ROSEVILLE ROAD, STE 112	NORCAL CENTER ON DEAFNESS (EXPRESSIVE COMMU. LEARN	AE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Day Care	3608 MADISON AVENUE	PRIDE INDUSTRIES	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Day Care	6620 MADISON AVENUE	RCCA SACRAMENTO COMMUNITY ACCESS PROGRAM CAP	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Day Care	6137 WATT AVENUE, SUITE 11	REESE ALAN WILSON CENTER, INC.	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Day Care	6254 66TH AVENUE	SAINT FRANCIS ADULT DAY CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Day Care	2331 SAINT MARKS WAY	SHORT CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Day Care	2230 ARDEN WAY, SUITE D.	SOUTH AREA ADULT GROWTH EXPERIENCE (SAAGE)	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Education School	3701 Stephen Dr.	Campos Verdes Adult Education	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Education School	8401 Gerber Rd.	Elk Grove Adult Education	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Education School	3222 WINONA WAY	GRANT ADULT EDUCATION	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Education School	4640 Orange Grove	Orange Grove Adult Education	X	YES	Moderate

Unincorporated	At Risk Population Facilities	Adult Education School	900 Morse Ave.	Winterstein Adult Center	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4741 16TH AQVENUE	A FAMILY AFFAIR CARE V	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4930 ARDEN WAY	AIDA'S FAMILY HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	7016 22ND STREET	AILEEN CANTOR-FERMO RESIDENTIAL CARE HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	4216 COUGAR HILLS WAY	ALBERT A. DIMAANO FAMILY HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	1750 RICHMOND STREET	ARDEN PLACE	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	9437 N. KIEFER BLVD.	ARNETT RESIDENTIAL CARE FACILITY	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	3430 EASTERN AVENUE	BELLE'S CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	3200 COTTAGE WAY	BELLE'S CARE HOME II	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8865 CALVINE ROAD	BEST CARE HOME	0.2% ANNUAL CHANCE	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	7867 DELTA SUNRISE COURT	BIGORNIA'S HOME 1	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4801 F PARKWAY	BROOKINS HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	5914 WEDGEWOODAVE	BUENA VISTA HOME AT WEDGEWOOD	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Adult Residential	6107 LUCERO DRIVE #10	BULLOCK'S BOARD & CARE HOME	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	11325 TWIN CITIES ROAD	C&F RESIDENTIAL CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	3984 ORANGEWOOD DRIVE	CADWAY CARE HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	7496 SACHI WAY	CAMPBELL'S CARE HOME II	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	1221 Q STREET	CANTOR-FERMO RESIDENTIAL HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	7035 24TH STREET	CANTOR-FERMO RESIDENTIAL HOME #2	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	3560 IMPERIAL WAY	CAPULE GUEST HOME	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	11098 TWIN CITIES ROAD	CARLEN'S COUNTRY GUEST HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	4182 SCRANTON CIRCLE	CARMEL CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8091 ELK GROVE-FLORIN ROAD	CENDANA CARE, INC.	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	4613 TIPPWOOD WAY	CHARLES SHERMAN'S HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8744 CRUSHEEN WAY	CHERRY MADAMBA'S RES. FACILITY, INC.#1	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8257 NORTHWIND WAY	COOK FAMILY HOME	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Adult Residential	6336 ORANGE AVENUE	CORA MOOCK HOME/B & C MOOCK CORPORATION	AE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	5413 TOOMBS STREET	DALTON-VONSTRIVER CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	2950 WRIGHT STREET	DANIEL'S GUEST HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4967 J PARKWAY	DANREG,INC.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	9408 MIRA DEL RIO DRIVE	DAVID BLANTON CARE HOME	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	2442 CATALINA DRIVE	DDSO CATALINA HOUSE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	6165 LONGMONT WAY	DEBRA SHANDY RESIDENTIAL CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8100 ORCHID TREE WAY	DELACRUZ HOME CARE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	2009 TERRACE DRIVE	DELIA CYRUS FAMILY HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	6518 LANG AVENUE	DEVELOPMENTAL LIVING CENTER #1	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7909 CAMROSE	DEVENECIA GUEST HOME II	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7911 ELK GROVE FLORIN RD.	DIANA CENDANA'S HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8941 TALISMAN DRIVE	DIANA WRIGHT'S CARE HOME	X Protected by Levee	YES	Moderate

Unincorporated	At Risk Population Facilities	Adult Residential	3353 HORSESHOE DRIVE	DIANE YONG ADULT RESIDENTIAL CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7100 HAYWARD DRIVE	DICHOSO HOME CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	13118 CHRISTENSEN ROAD	DOUG & DEBBIE MONDAY'S CARE HOME #2	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	10841 SIMMERHORN RD.	DOUG & DEBBIE MONDAY'S CAREHOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7125 CANAVERAL WAY	ED DAVID CARE HOME #1	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7200 LARCHMONT DRIVE	ED DAVID CARE HOME #2	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4028 DEXTER CIRCLE	ED DAVID CARE HOMES INC. #3	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7505 AUSPICIOUS WAY	ED DAVID CARE HOMES INC. #4	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7714 SOUTHLAND WAY	ERA'S ADULT CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	6547 RIO LINDA BLVD.	ERLINDA MALAY HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7446 8TH STREET	FLOWERDALE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8021 PARKGATE WAY	GEORGIA WELDON'S CARE HOME INC.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4521 VALMONTE DRIVE	GIL'S VALLEY HOME	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Adult Residential	8056 CAYMUS DRIVE	GLENDA WILLIAMS COUNTRY ESTATES	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	7809 CAMROSE WAY	GM VIADO CARE FACILITY	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	7854 SUMMER MIST CT	GM VIADO CARE FACILITY 2	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7405 RIO LINDA BLVD.	GOODE BOARD & CARE HOME #2	AE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	3323 Q STREET	GOODMAN GUEST HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	4604 ROOSEVELT AVE.	GREEN PASTURE GUEST HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	3909 HENDERSON	HENDERSON HOUSE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8255 WHITE SANDS WAY	HERMAN ADULT RESIDENTIAL FACILITY	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	5755 EL CAMINO AVENUE	HERMIE B. CALIMQUIM OLIVE KNOLL LODGE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	7336 LARCHMONT DRIVE	HILDA GREEN CARE HOME II	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	6958 GILLINGHAM WAY	HILDA GREEN CARE HOME, THE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4305 ROOSEVELT AVENUE	HODGE'S BOARD & CARE HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4309 22ND AVENUE	HODGE'S BOARD AND CARE #2	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Adult Residential	6124 LAURINE WAY	I AM INDEPENDENT LIVING	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8876 SKIPJACK WAY	I AM INDEPENDENT LIVING II	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	5229 CASA DANIELLE CIRCLE	IRENE'S CARE HOME	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4020 47TH STREET	JASMINE-HALL	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	5729 39TH STREET	JASMINE-HALL V	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	5949 BRETT DRIVE	JASMINE-HALL VIII	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	11586 BADGER COLONY COURT	JO BIGORNIA HOME-WILTON	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	5318 PLANET PARKWAY	KIANMAJD CARE FACILITY	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8086 ORANGE AVENUE	KIM'S CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	4140 JUSTIN WAY	KMF CARE HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	1215 WAYLAND AVENUE	LARRY & DELIA CYRUS FAMILY HOME	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8856 HOLLOWSTONE WAY	LARRY & NADIA COVARRUBIAS HOME	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	3917 WILDROSE WAY	LARRY CYRUS FAMILY HOME	0.2% ANNUAL CHANCE	YES	Moderate

Unincorporated	At Risk Population Facilities	Adult Residential	9250 LILIBET AVENUE	MARBLE GUEST HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	5720 WEST 2ND STREET	MARIA WECKMAN CARE HOME	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	4262 STROMFORD WAY	MONROE'S PLACE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	3630 MORSE AVENUE	NEW HORIZONS GUEST HOME, LLC.	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4916 J PARKWAY	PARKWAY HOME CARE FACILITY	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	7871 FAWN TRAIL WAY	PARSON'S CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8858 SWALLOW WAY	PETE CHICO'S CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	505 M STREET	PINECREST LODGE	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7365 POWER INN ROAD	POWER INN HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4600 PARKER AVENUE	PRAISE CARE HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4309 ROSECREST WAY	RITA GASPAR CARE HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8267 CHESTER DRIVE	RODNEY KEINATH COUNTRY HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8868 TIMM AVENUE	ROSA CHICO'S CARE HOME	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Adult Residential	8559 WILLOW GROVE WAY	ROSEMARY'S WILLOW GROVE HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	13386 MARENGO ROAD	ROSEWOOD MANOR	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	9026 TRUJILLO WAY	SAN RAMON BOARD AND CARE	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4991 44TH STREET	SANDY'S GUEST HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	7916 HARTWICK WAY	SANTOS CARE HOME II	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8047 ROCKHURST	SCOTTSDALE GUEST HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7305 JENNA WAY	SEAN SUH'S CARE HOME #1	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7281 JENNA WAY	SEAN SUH'S CARE HOME #2	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8632 OAKBANK WAY	SEAN SUH'S CARE HOME #3	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8273 WINKLER WAY	SEAN SUH'S CARE HOMES INCORPORATED # 4	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8130 LAKESPRING WAY	SELENA SO'S CARE HOME #1	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4616 MAPEL LANE	SIERRA BROOKE CARE HOME #2	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	3481 SIERRA VIEW LANE	SIERRA BROOKE, INC	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Adult Residential	4221 STRATHMORE WAY	SMITH'S RESIDENTIAL CARE FACILITY ADULT	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	8434 SUNRISE WOODS WAY	SOL EDNAVE CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7995 IONA WAY	SOL EDNAVE CARE HOME #2	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	1545 BELL STREET	SQUARE TRIANGLES INC.	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	1347 BELL ST.	ST. MARY'S HOME	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	2525 KENT DRIVE	ST. MARY'S HOME II	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8520 SUNRISE WOODS WAY	ST. THERESE'S HAVEN #2	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	5901 DEL CAMPO LANE	STO. THOMAS GUEST HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8579 PHEASANT HILL CT	SUNBEAM HORIZONS CORPORATION	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	4824 42ND STREET	SUNGOLD GUEST HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4316 37TH AVENUE	SUNRISE GUEST HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	4184 ENGLE ROAD	SUNSHINE GUEST HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	13445 MARENGO ROAD	SUNSHINE HOME	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Adult Residential	5112 FAWN CROSSING WAY	T. F. BOTONES ADULT RESIDENTIAL CARE II	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	5036 ANDREA BLVD.	T.F. BOTONES ADULT RESIDENTIAL CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7649 MCTAVISH CIRCLE	TATY SAEL CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7247 LARCHMONT DR.	THOMPSON ADULT RESIDENTIAL FACILITY	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7919 SUMMER SANDS COURT	THORNTON HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	6746 MAIN AVE	TORNEROS FAMILY HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	6500 47TH AVENUE	TURNING POINT SIERRA APARTMENTS	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	10044 TWIN CITIES RD.	TWIN CITIES RESIDENCES, INC.	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	3525 COMSTOCK WAY	TWIN HEARTS ARF II	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8950 MC COY AVENUE	VELASCO'S CARE HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Adult Residential	6241 GILMAN WAY	VINSON'S CARE HOME II	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8270 NEWFIELD CIRCLE	VIOLETA BIGORNIA FAMILY CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	7432 ESTEEM DRIVE	WASHBURN'S CARE HOME	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Adult Residential	6608 RODNEY COURT	WASHINGTON'S LOVING CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	5900 BEECH AVENUE	WILLIAMS CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	8200 HOME COUNTRY WAY	WILLIAMS FAMILY HOME #3	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	6132 KENNETH AVENUE	WOODACRE FAMILY HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Adult Residential	3020 PORTRAIT WAY	ZINA & LORI'S FAMILY HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Alternative Education School	8301 Madison Ave.	El Sereno Alternative Education	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Alternative Education School	5201 Arnold Ave.	Elwood J. Keema High	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Alternative Education School	3701 STEPHEN DR	GRANT MARITIME TECHNOLOGIES PROGRAM	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Alternative Education School	4420 Monhegan Way	Kitty Hawk	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Alternative Education School	4420 MONHEGAN WAY	YOUTH OPPORTUNITY PROGRAM	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Charter School	3243 Center Court Ln.	Antelope View Charter	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Charter School	4211 Turnbridge Dr.	Bowling Green Elementary	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Charter School	3425 Arden Way	Choices Charter	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Charter School	5201 Arnold Ave.	Community Collaborative Charter	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Charter School	3243 Cutter Court Ln.	Global Youth Charter High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Charter School	5800 Skvarla Ln.	Grant Community Outreach Academy	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Charter School	6450 20th St.	Heritage Peak Charter	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Charter School	6110 Fair Oaks Blvd., Ste. E	Options for Youth-San Juan	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Charter School	4800 Manzanita Ave., Ste. 7	Visions in Education	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Charter School	6537 West Second St.	Westside Charter	X	YES	Moderate
Unincorporated	At Risk Population Facilities	College/University		American River College	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Community Day School	8401-A Gerber Rd.	Capital Community Day	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Community Day School	2040 Ethan Way	Elinor Lincoln Hickey Jr./Sr. High	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Community Day School	4420 Monhegan Way	Mather Youth Academy	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Community Day School	6450 20th St.	Pathways Community Day	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Community Day School	160 Courtland High School Ln.	River Delta Community Day	AE	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Day Care Center	6822 KENNETH AVENUE	ACTION DAY LEARNING CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	9371 ELM AVENUE	ACTION DAY LEARNING CENTER	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6224 GARFIELD AVE	ALPHABET RANCH	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4700 COLLEGE OAK DRIVE	AMERICAN RIVER COLLEGE CHILDREN'S CENTER	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	8141 STEVENSON AVENUE	ANNA KIRCHGATER CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4533 ANTELOPE ROAD	ANTELOPE CHRISTIAN ACADEMY PRESCHOOL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	5013 EL CAMINO AVENUE	APPLE A DAY PRESCHOOL & INFANT CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	1827 MARKSTON RD.	ARDEN MONTESSORI SCHOOL	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	6845 LARCHMONT DR.	B. J. JORDAN PRESCHOOL-VILLAGE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	7900 ELOISE AVENUE	B.J. JORDAN CHILD CARE - ELVERTA ELEMENTARY	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	3735 STEPHEN DRIVE	B.J. JORDAN CHILD CARE PROGRAMS - NORTH HIGHLANDS	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	1230 G. ST.	B.J. JORDAN CHLD CARE-DRY CREEK	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	1040 Q STREET #18	BEANSTALK-ORCHARD PRESCHOOL	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Day Care Center	4680 MONUMENT DR.	BEANSTALK-RIDGEPOINT STATE PRESCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2344 HURLEY AVE	BEARS LEARNING CENTER, THE	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	4390 47TH AVE.	BELL'S CHILD DEVELOPMENT CENTER	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4425 LAURELWOOD WAY	BILLY MITCHELL PRESCHOOL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6807 FRANKLIN BLVD., ROOM BF1	BOWLING GREEN PRESCHOOL	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8324 BRADSHAW ROAD	BRADSHAW CHRISTIAN SCHOOL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	5550 MAIN AVENUE	BRIGHT HORIZONS SCHOOL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6331 WATT AVENUE	CALIFORNIA FAMILY LEARNING CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5051 47TH AVENUE	CALVARY CHRISTIAN PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	9470 MICRON	CAPITAL CHRISTIAN PRESCHOOL	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	3020 MARCONI AVE.	CARDEN SCHOOL OF SACRAMENTO	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8540 MADISON AVE	CARING TREE, THE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2815 GUNN ROAD	CARMICHAEL PARENT PARTICIPATION PRESCHOOL	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Day Care Center	5645 MARCONI AVENUE	CARMICHAEL PRESBYTERIAN CHURCH PRESCHOOL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6049 SUTTER AVE	CARMICHAEL STATE PRESCHOOL & HEAD START	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	2641 COOPER WAY	CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4305 BANNISTER RD.	CHILDREN'S GARDEN	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	5739 EL CAMINO AVENUE	CHILDREN'S WORLD LEARNING CENTER - CARMICHAEL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	5025 MANZANITA AVE	CHRIST COMMUNITY PRE-SCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	3708 MARCONI AVE.	CIRCLE OF FRIENDS CHLDCARE CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	7224 BEECH AVENUE	CLAIRE'S MONTESSORI	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	8790 OAK AVE.	CLAIRE'S MONTESSORI	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	5100 EL PARAISO AVENUE	CLAYTON B. WIRE PRESCHOOL	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6545 BEECH AVE.	COLEMAN HEAD START & PRESCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2800 COTTAGE WAY	COTTAGE KIDS CHILDREN'S CENTER	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2221 MORSE AVENUE	COTTAGE STATE PRESCHOOL	0.2% ANNUAL CHANCE	YES	Moderate

Unincorporated	At Risk Population Facilities	Day Care Center	6131 KENNETH AVE	COUNTRY HILL MONTESSORI	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	2661 NORTHRUP AVENUE	COUNTRY OAKS PRE-SCHOOL	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	6330 COYLE AVE.	COYLE AVE HEAD START & STATE PRESCHOOL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	2641 KENT DRIVE	CREEKSIDE HEAD START	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	3401 SCOTLAND DRIVE	CYRIL SPINELLI STATE PRESCHOOL	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	7600 LINDALE DRIVE	DAVID REESE ELEMENTARY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4444 SAN JUAN AVENUE	DISCOVERY LEARNING CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2236 EDISON AVENUE	DYER KELLY HEAD START	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5350 WALNUT AVENUE	EAGER BEAVER CHILD CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	1500 DOM WAY	EDISON CHILD CARE PROGRAM	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	3541 SAN LUCAS WAY	EDU-CARE CENTERS	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5636 EL CAMINO AVE	EL RANCHO NURSERY SCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	1139 ELVERTA ROAD	ELVERTA HONEY BEARS PRESCHOOL	X	YES	Moderate

Unincorporated	At Risk Population Facilities	Day Care Center	1400 BELL ST	ENCINA HEAD START STATE PRESCHOOL	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	5717 LAURINE WAY, ROOM #8	ETHEL I. BAKER PRESCHOOL	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8090 GRAND AVENUE	FAIR OAKS PARENT PARTICIPATION PRESCHOOL	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8660 MADISON AVENUE	FAIRVALE PRESCHOOL & DAY CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2635 EDISON AVENUE	FAIRYLAND CHILDREN'S DAY NURSERY	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	7426 AMY AVENUE	FAITH LUTHERAN PRESCHOOL AND DAY CARE CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	7300 KARA DRIVE	FLORIN HEAD START	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4011 HOOD-FRANKLIN ROAD	FRANKLIN CHILD DEVELOPMENT CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	3708 WALNUT AVENUE	GARDEN OF KIDS, THE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	3700 GARFIELD AVENUE	GARFIELD STATE PRESCHOOL & HEAD START	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4910 LEMON HILL AVENUE	GLORIA DEI LUTHERAN SCHOOL	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	2220 ROARING CAMP DRIVE	GOLD RIVER PRESCHOOL	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	9045 CANBERRA DR.	GOLDEN EMPIRE PRESCHOOL	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Day Care Center	6524 44TH STREET	GREATER ST STEPHEN	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5031 JACKSON STREET	GREEN ACRES DAYCARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4518 47TH AVE	HAPPY TIME LEARNING CENTER	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	6521 HAZEL AVE, PRESCHOOL #D	HIS FAMILY CHRISTIAN PRESCHOOL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	2404 HOWE AVE.	HOWE AVE. CHILDREN'S CENTER/HEAD START/P.S.	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8201 FLORIN	IMMACULATE TEMPLE OF GOD	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	9025 SALMON FALLS DRIVE, RM.2	ISADOR COHEN PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	9525 GOETHE	JAMES MARSHALL STATE PRESCHOOL	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	3850 CALIFORNIA AVE.	KIDS COMPANY PRESCHOOL & CHILDCARE CENTER	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	2925 ROOT AVE.	KIDS WAY, LLC	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8887 VINTAGE PARK	KINDERCARE LEARNING CENTER, INC.	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8896 N. WINDING WAY	LA BELLA LEARNING CENTERS	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6045 MARGO DRIVE	LA PETITE ACADEMY - ORANGEVALE	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Day Care Center	11378 COLOMA ROAD	LA PETITE ACADEMY - RANCHO CORDOVA	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	5249 ELKHORN BLVD.	LA PETITE ACADEMY - SACRAMENTO	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6035 MAIN AVE	LEARNING PATCH CHILDREN'S CENTER, THE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	5132 ELKHORN BLVD	LIBERTY TOWERS CHRISTIAN PRESCHOOL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	9200 FAIR OAKS BLVD.	LIFEWAYS CENTER	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8827 GERBER ROAD	LITTLE ANGELS LEARNING CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	7520 STOCKTON BLVD	LITTLE FRIENDS PRE-SCHOOL & DAY CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	9849 FAIR OAKS BLVD	LITTLE METHODIST SCHOOL	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8144 FLORIN ROAD	LITTLE TREASURES CHILD CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5915 MAIN AVE.	LITTLE TREASURES CHRISTIAN PRESCHOOL & DAY CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	7700 MASSIE CIRCLE	LOVING HANDS EDUCATIONAL FUN CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	1615 MORSE AVENUE	LUTHERAN CHURCH OF THE GOOD SHEPHERD PRESCHOOL	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	8140 CAYMUS DRIVE	MAEOLA BEITZEL CHILD DEVELOPMENT CENTER	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Day Care Center	5619 MARCONI AVE.	MARCONI MONTESSORI SCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5309 KENNETH AVENUE	MARVIN MARSHALL CHILDREN'S CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	8737 BRITTANY PARK DRIVE	MARY TSUKAMOTA CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2820 EASTERN AVENUE	MERRYHILL COUNTRY SCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	6201 WINDING WAY	NATIONAL HUMAN DEVELOPMENT CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	10821 SIMMERHORN ROAD	NATURE'S WAY MONTESSORI	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6746 34TH STREET	NEW TESTAMENT CHRISTIAN SCHOOL INC.	0.2% ANNUAL CHANCE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	6601 STEINER DRIVE	NICHOLAS PRESCHOOL	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	3901 LITTLE ROCK DR	NORTH COUNTRY STATE PRESCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5811 WALNUT AVENUE	OAKTREE MONTESSORI, INC.	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2581 HOWE AVENUE	ONLY LOVE CHILDREN'S CENTER	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2666 HOWE AVENUE	ONLY LOVE CHILDREN'S CENTER	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	7145 SANTA JUANITA AVENUE	OUR HOUSE	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Day Care Center	6201 41ST STREET, ROOM 23	PACIFIC PRESCHOOL	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	8924 KIEFER BLVD.	PARADISE PLACE PRESCHOOL INFANT TODDLER CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	4720 FOREST PARKWAY	PARKWAY PRESCHOOL	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4330 PASADENA AVENUE	PASADENA STATE PRESCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	8065 ELK GROVE-FLORIN RD. #160	PHOENIX SCHOOL, THE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	2921 GARFIELD AVE	PHOENIX SCHOOL, THE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	4110 SKYLAND COURT	PHOENIX SCHOOL, THE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	9646 BUTTERFIELD WAY	POPPY PATCH-PHASE I	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	9645 BUTTERFIELD	POPPY PATCH-PHASE II	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4848 COTTAGE WAY	RALPH RICHARDSON PRESCHOOL-RM 2	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	7879 VAN VLECK RD.	RANCH, THE	X	NO	High
Unincorporated	At Risk Population Facilities	Day Care Center	7191 MURIETA PARKWAY	RANCHO MURIETA ASSOCIATION	X	NO	High
Unincorporated	At Risk Population Facilities	Day Care Center	4331 GALBRATH DRIVE	READY-SET-GO CHILDREN'S CENTER	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Day Care Center	7191 MURIETA PARKWAY	RMA PRESCHOOL	X	NO	High
Unincorporated	At Risk Population Facilities	Day Care Center	5630 ILLINOIS AVE.	ROBERTS HEAD START/PARENT PARTICIPATION	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	9499 FOLSOM BLVD.	ROSEMONT PLAYSCHOOL	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	4533 PASADENA AVENUE	SACRAMENTO CRISIS NURSERY	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	7037 BRIGGS DRIVE	SAMUEL KENNEDY ELEMENTARY HEAD START	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	6929 FRANKLIN BLVD.	SETA - FRANKLIN HEAD START	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5746 FORTIETH ST	SETA - FRUITRIDGE COMMUNITY CTR HEADSTART	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5665 HILLSDALE BLVD	SETA - HILLSDALE AVENUE HEAD START	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5545 SKY PARKWAY	SETA - LAVERNE STEWART - HEAD START	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	4516 PARKER AVENUE	SETA - PARKER AVENUE HEAD START	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	3829 STEPHEN DR	SETA - STRIZEK PARK - HEAD START	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8120 POWER INN ROAD	SETA- AUBERRY PARK HEAD START	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	7322 FLORIN WOODS DRIVE	SETA CROSSROADS HEADSTART	0.2% ANNUAL CHANCE	YES	Moderate

Unincorporated	At Risk Population Facilities	Day Care Center	9000 LA RIVIERA DR.	SETA LA RIVIERA HEAD START	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	6450 20TH STREET	SETA VINELAND HEAD START	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6015 WATT AVENUE #5	SETA-FREEDOM PARK EARLY LEARNING CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	3638 BAINBRIGE DRIVE	SETA-SIERRA VIEW HEADSTART	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	14273 RIVER ROAD	SETA-WALNUT GROVE HEAD START	AE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2351 WYDA WAY	SHALOM PRESCHOOL	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	3949 23RD AVENUE	SHILOH ARMS CHILD DEVELOPMENT CENTER	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	6800 MAIN AVE.	SMALL WONDERS CHRISTIAN	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	4706 ARDEN WAY	SMALLVILLE PRESCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	7916 AZTEC WAY	SOMETHING EXTRA PRESCHOOL & CHILDCARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2140 MISSION AVE	ST MICHAEL'S EPISCOPAL SCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2391 ST. MARKS'S WAY	ST. MARK'S PRESCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	1940 MORSE AVE.	STORYBOOK COTTAGE	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Day Care Center	7231 LINCOLN AVE.	STORYBOOK COTTAGE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	8344 MADISON AVENUE	SUNRISE CHILDRENS CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	1949 BELL ST	TINY TOTS PRESCHOOL	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	2550 BELPORT LANE	TOWN AND COUNTRY PRE-SCHOOL	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	7610 ELSIE AVE.	TREEHOUSE LEARNING CENTER-ELSIE	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	5225 HILLSDALE	TRINITY TOTS	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	4858 SAN JUAN AVE	TUTOR TIME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	5033 FAIR OAKS BLVD	VILLAGE MONTESSOR SCHOOL, LLC	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	4248 WHITNEY AVENUE	WHITNEY STATE PRESCHOOL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Day Care Center	3300 WALNUT AVENUE	WONDER LAND SCHOOL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Day Care Center	180 PRIMASING	YMCA - COURTLAND CHILD DEVELOPMENT CENTER	AE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Detention Center		BOYS RANCH	A	NO	Moderate
Unincorporated	At Risk Population Facilities	Detention Center		JUVENILE HALL	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Detention Center		RIO CONSUMNES CORRECTIONAL CENTER	AE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	730 SANTA RITA WAY	ATKINSON GROUP HOME I	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	9042 TRUJILLO WAY	ATKINSON GROUP HOME II	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	6808 KERMIT LANE	ATKINSON GROUP HOME III	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	5636 MARCONI AVE.	ATKINSON GROUP HOME IV	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	3943 NICKLAUS	BREAKING THE CYCLE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	5309 TERRACE OAK CIR.	BREAKING THE CYCLE-TERRACE OAK	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	8945 AKSARBEN DRIVE	COMPASS ROSE - AKSARBEN HOUSE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	7524 MOUNTAIN AVENUE	COMPASS ROSE GROUP HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	8901 GENOA AVE.	CROSSROADS - GENOA	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	7315 REDWING CT.	CROSSROADS TREATMENT CENTER	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	7441 HICKORY AVENUE	CROSSROADS TREATMENT CENTER, INC.	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	3017 SUBARU COURT	DIOGENES YOUTH SERVICES #1	0.2% ANNUAL CHANCE	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Group Home	9099 TUOLUMNE DRIVE	DIOGENES YOUTH SERVICES #2	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	9097 TUOLUMNE DRIVE	DIOGENES YOUTH SERVICES #3	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	11990 FAIR OAKS BLVD	GATEWAY RESIDENTIAL PROGRAM-FAIR OAKS HOUSE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	7327 HICKORY AVENEUE	GATEWAY RESIDENTIAL PROGRAMS - HICKORY HOUSE	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	7241 PALM AVENUE	GATEWAY RESIDENTIAL PROGRAMS-PALM HOUSE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	7441 WINDING WAY	GATEWAY RESIDENTIAL PROGRAMS-WINDING HOUSE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	4340 GREENWICH CIRCLE	GREENWICH YOUTH CARE CENTER	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	7744 COUNTRYFIELD DRIVE	IROKO FOUNDATION, INC.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	8219 MOOREHAVEN WAY	IROKO FOUNDATION, INC. II	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	7354 ALDEN WAY	K.C. FAMILY CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	4232 BIG CLOUD WAY	KOINONIA GROUP HOME #5	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	7447 HAZEL AVENUE	MARTINS' ACHIEVEMENT PLACE - HAZEL II	X	YES	High
Unincorporated	At Risk Population Facilities	Group Home	5133 MARCONI AVENUE	MARTINS' ACHIEVEMENT PLACE, INC.	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Group Home	4800 NORTH AVENUE	MARTINS' ACHIEVEMENT PLACE, INC.	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	9324 FAIR OAKS BLVD.	MARTINS' ACHIEVEMENT PLACE, INC.	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	5021 SUNSHINE LANE	MARTINS' ACHIEVEMENT PLACE, INC.	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	6904 MAIN AVE	MARTINS' ACHIEVEMENT PLACE, INC.	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	7331 HAZEL AVE	MARTINS' ACHIEVEMENT PLACE, INC.	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	8983 COAN LANE	MATHIOT GROUP HOMES - COAN	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	9401 DRIFT WAY	MATHIOT GROUP HOMES - DRIFT	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	5900 RANGER WAY	MATHIOT GROUP HOMES - RANGER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	6521 SKYVIEW DRIVE	MATHIOT GROUP HOMES-SKYVIEW	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	7818 BAR DU LANE	MILHOUS CHILDRENS SERVICES-BAR DU	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	6171 BRADSHAW RD.	MILHOUS CHILDREN'S SERVICES-BRADSHAW	AE	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	9211 GERBER ROAD	MILHOUS TREATMENT CENTER - GERBER	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	9451 POND LANE	MILHOUS TREATMENT CENTER-POND	AE	NO	Moderate

Unincorporated	At Risk Population Facilities	Group Home	8382 SIERRA SUNSET DR.	OBID FOUNDATION, INC.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	6458 OLD ORCHARD WAY	ODYSSEY LEARNING CENTER #1	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	8261 RHODORA COURT	ODYSSEY LEARNING CENTER #2	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	8297 SUNSET AVENUE	PARADISE OAKS YOUTH SERVICES - SUNSET	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	8301 OLIVE HILL COURT	PARADISE OAKS YOUTH SERVICES, INC.	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	5445 LAUREL HILLS DRIVE	RIVER OAK - LAUREL HOUSE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	3990 BRANCH CENTER ROAD	SACRAMENTO ASSESSMENT CENTER	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	4533 PASADENA AVE.	SACRAMENTO CRISIS NURSERY NORTH	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	8208 BRIDGEWOOD COURT	SHERMAN'S HILLTOP: BRIDGEWOOD	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	9149 GERBER ROAD	SOUTHPOINT HOMES I	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	5036 LEMON HILL AVE	ST. PATRICK'S HOME FOR CHILDREN - LEMON HILL	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Group Home	8529 FLORIN ROAD	ST. PATRICKS HOME FOR CHILDREN-MCMAHON	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	8742 PALMIAS COURT	TABULA RASA TREATMENT HOME	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Group Home	5540 CYPRESS AVE.	TRINITY-CARMICHAEL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	9349 CENTRAL AVE	TRINITY-CENTRAL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	7700 HAZEL AVENUE	TRINITY-EL DORADO RANCH	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Group Home	8188 NIESSEN WAY	TRINITY-FAIR OAKS	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Group Home	7306 WALNUT AVE.	TRINITY-WALNUT	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Hotel		HOLIDAY INN NORTH EAST	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Hotel		HOST INTERNATIONAL HOTEL	A99	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Hotel		HOWARD JOHNSON HOTEL (3336 BRADSHAW RD)	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Hotel		LA QUINTA INN	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Hotel		MARRIOTT RESIDENCE INN (1501 HOWE AV)	AE	YES	Moderate
Unincorporated	At Risk Population Facilities	Hotel		MARRIOTT RESIDENCE INN (1530 HOWE AV)	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Hotel		SIERRA INN	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Hotel		SUPER 8 LODGE	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Infant Center	5051 47TH AVENUE	CALVARY CHRISTIAN PRESCHOOL/INFANT CENTER	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Infant Center	8540 MADISON AVE	CARING TREE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Infant Center	8896 N. WINDING WAY	CHILDREN'S WORLD LEARNING CENTER	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Infant Center	1139 ELVERTA ROAD	ELVERTA HONEY BEARS PRESCHOOL (INFANTS)	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Infant Center	1400 BELL STREET	ENCINA EARLY HEAD START	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Infant Center	6524 44TH STREET	GREATER ST. STEPHEN CHILDCARE	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Infant Center	5325 GARFIELD AVENUE	LAUREL RUFF TEEN PARENTING	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Infant Center	9638 BUTTERFIELD WAY	POPPY PATCH-PHASE III	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Infant Center	7277 LONE PINE, STE 102	RANCHO MURIETA LEARNING CENTER	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Infant Center	2351 WYDA WAY	SHALOM INFANT DAY CARE CENTER	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Infant Center	890 MORSE AVE	SIERRA ARDEN INFANT/TODDLER CENTER	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Infant Center	1400 BELL STREET	SIERRA NUEVA INFANT/TODDLER CENTER	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Infant Center	4858 SAN JUAN AVE	TUTOR TIME-INFANT	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Infant Center	6131 ORANGE AVE.	WILLIAM DAYLOR HIGH SCHOOL CHILD CARE CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	4533 Antelope Road	Antelope Christian Academy	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private Elementary School	5636 EL CAMINO AVE	EL RANCHO, INC	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	4000 San Juan Avenue	Faith Lutheran Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	6521 Hazel Avenue	Family Christian Academy	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	4910 Lemon Hill Avenue	Gloria Dei Lutheran School	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Private Elementary School	5132 Elkhorn Boulevard	Liberty Towers Christian	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	2730 Eastern Avenue	Merryhill School	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	6746 34th Street	New Testament Christian School	0.2% ANNUAL CHANCE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	5810 Pecan Avenue	Orangevale Seventh-day Adventist	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private Elementary School	2141 Walnut Avenue	Our Lady of the Assumption	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private Elementary School	3100 Norris Avenue	Our Lady of the Presentation Catholic	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	1150 Eastern Avenue	River Oak Center For Children	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Private Elementary School	5445 Laurel Hills Drive	River Oak Center For Children	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	5601 Winding Way	Sacramento Adventist Academy	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private Elementary School	9224 Chestwall Street	Saint Joseph's Catholic Academy	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	2351 Wyda Way, Suite 2	Shalom	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	8804 Nipawin Way	St. Benedict	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Private Elementary School	3245 Arden Way	St. Ignatius Elementary	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	5701 Locust Avenue	St. John Evangelist	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	4325 Don Julio Boulevard	St. Lawrence Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	4745 Pennsylvania Avenue	St. Mel	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	2140 Mission Avenue	St. Michael's Episcopal Day	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	4049 Marconi Avenue	Town & Country Lutheran	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	5225 Hillsdale Boulevard	Trinity Christian School	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private Elementary School	5010 Hazel Avenue	Victory Christian	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Private High School	5325 ENGLE RD	ADVANCED EDUCATION SERVICES	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private High School	5051 47th Avenue	Calvary Christian	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private High School	9470 Micron Avenue	Capital Christian School	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private High School	7524 Mountain Avenue	Compass Rose	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private High School	4433 Florin Road, Suite 810	Franklin D. Roosevelt Private School	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private High School	7736 Sunset Avenue	Freedom Christian	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private High School	4148 San Juan Avenue	Gateway Christian Life Schools	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private High School	1200 Jacob Lane	Jesuit High	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Private High School	5325 ENGLE RD	LAUREATE LEARNING CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private High School	3419-C Arden Way	Learning Institute for Success, The	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private High School	2360 El Camino Avenue	Loretto High	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Private High School	5240 Jackson Street	Martins' Achievement	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private High School	451 Parkfair Drive	River Valley	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Private High School	2929 El Camino Avenue	Sierra School at El Camino	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private High School	3045 Garfield Avenue	Victory Christian	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private K-12 School	4436 Engle Road	Aldar Academy	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	8616 Greenback Lane	Almondale Academy	X	NO	Very High
Unincorporated	At Risk Population Facilities	Private K-12 School	3600 Fair Oaks Boulevard	Atkinson Youth Services	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Private K-12 School	5325 Engle Road, Suite 425	Atkinson Youth Services	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private K-12 School	4801 Keema Avenue	Berean Christian	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	8324 Bradshaw Road	Bradshaw Christian	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	6608 16th Street	Calvary Baptist Church	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	10961 Wethersfield Drive	Eastridge Christian Academy	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	5636 El Camino Avenue	El Rancho, Inc.	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private K-12 School	3501 Q Street	Faith Baptist Tabernacle	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	8144 Florin Road	Florin Christian	0.2% ANNUAL CHANCE	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Private K-12 School	5736 NORTH AVE	HERITAGE CHRISTIAN ACADEMY	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private K-12 School	5736 North Avenue	Heritage Christian Academy	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private K-12 School	5894 Santa Fe Way	Highlands Christian Academy	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private K-12 School	5325 ENGLE RD	KEYSTONE CARMICHAEL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private K-12 School	4619 Auburn Boulevard, Suite *	Master's Academy	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Private K-12 School	6171 Bradshaw Road	Milhous School-Bradshaw	AE	YES	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	9211 Gerber Road	Milhous-Gerber	AE	YES	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	2013 Rushing River Court	North Valley Academy	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	7150 Santa Juanita Avenue	Odyssey Learning Center	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Private K-12 School	6600 44th Street	South Pointe Academy	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Continuation High School	8333 Vintage Park Dr.	Calvine High	0.2% ANNUAL CHANCE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Continuation High School	14049 Boys Ranch Rd.	Carson Creek Jr./Sr. High	A	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Continuation High School	6131 Orange Ave.	Daylor (William) High (Continuation)	0.2% ANNUAL CHANCE	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Public Continuation High School	3990 Branch Center Rd.	DRC/Morgan Jr./Sr. High	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Continuation High School	9601 Keifer Blvd.	El Centro Jr./Sr. High	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Continuation High School	4000 Branch Center Rd.	Esperanza Jr./Sr. High	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Continuation High School	7956 Cottonwood Ln.	Insights High (Continuation)	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Continuation High School	5320 Hemlock St.	La Entrada Continuation High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Continuation High School	8725 Watt Ave.	McClellan High (Continuation)	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Continuation High School	151 Courtland High School Ln.	Mokelumne High (Continuation)	AE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Continuation High School	3800 Bolivar Ave.	Pacific High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Continuation High School	1400 Bell St.	Sierra Nueva High (Continuation)	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Continuation High School	4925 Dewey Dr.	Via del Campo Continuation High	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	5450 Georgia Dr.	Aero Haven Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	4350 Glenridge Dr.	Albert Schweitzer Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	8141 Stevenson Ave.	Anna Kirchgater Elementary	0.2% ANNUAL CHANCE	YES	Moderate

Unincorporated	At Risk Population Facilities	Public Elementary School	8343 PALMERSON DR	ANTELOPE MEADOWS ELEMENTARY	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	11755 Ivie Rd.	Arcohe Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	9927 Wildhawk West Dr.	Arnold Adreani Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	8000 Aztec Way	Arthur S. Dudley Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	7720 Ocean Park Drive	Barrett Ranch Elementary School	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	180 Primasing Ave.	Bates Elementary	AE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	4425 Laurelwood Way	Billy Mitchell Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	9721 Dillard Rd.	C. W. Dillard Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	4333 Hackberry Ln.	Cameron Ranch Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6141 Sutter Ave.	Carmichael Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6230 Rutland Dr.	Charles Peck Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	5100 El Paraiso Ave.	Clayton B. Wire Elementary	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	13580 Jackson Rd.	Cosumnes River Elementary	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Public Elementary School	2221 Morse Ave.	Cottage Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6330 Coyle Ave.	Coyle Avenue Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	7201 Arutas Dr.	Creative Connections Arts Academy	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	3401 Scotland Dr.	Cyril Spinelli Elementary	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	7600 Lindale Dr.	David Reese Elementary	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	1301 McClaren Dr.	Del Dayo Elementary	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	2700 Maryal Dr.	Del Paso Manor Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	1230 G St.	Dry Creek Elementary	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	2236 Edison Ave.	Dyer-Kelly Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	4623 Kenneth Ave.	Earl Legette Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	7900 Eloise Ave.	Elverta Elementary	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	5717 Laurine Way	Ethel I. Baker Elementary	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	7300 Kara Dr.	Florin Elementary	0.2% ANNUAL CHANCE	YES	Moderate

Unincorporated	At Risk Population Facilities	Public Elementary School	5520 Lancelot Dr.	Foothill Oaks Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	4011 Hood-Franklin Rd.	Franklin Elementary	AE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	6050 Watt Ave.	Frederick Joyce Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6691 Silverthorne Cir.	Frontier Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	3700 Garfield Ave.	Garfield Elementary	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	2200 Roaring Camp Dr.	Gold River Discovery Center	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	9045 Canberra Dr.	Golden Empire Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	7145 Filbert Ave.	Green Oaks Fundamental Elementary	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	2301 Hurley Way	Greer Elementary	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	7025 Falcon Rd.	Harry Dewey Fundamental ELementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	6469 Guthrie Way	Hillsdale Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	2404 Howe Ave.	Howe Avenue Elementary	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	8351 Cutler Way	Isabelle Jackson Elementary	0.2% ANNUAL CHANCE	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Public Elementary School	9025 Salmon River Dr.	Isador Cohen Elementary	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	9525 Goethe Rd.	James Marshall Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	3350 Becerra Way	James R. Cowan Fundamental Elementary	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	4501 Bannister Ave.	John Holst Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	4004 Bruce Way	Kohler Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6560 Melrose Dr.	Larchmont Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	5241 Harrison St.	Madison Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	8140 Caymus Dr.	Maeola E. Beitzel Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	1401 Corta Way	Mariemont Elementary	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6000 Stanley Ave.	Mary Deterding Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	8737 Brittany Park Dr.	Mary Tsukamoto Elementary	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	4370 Mather School Rd.	Mather Heights Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	2925 Mission Ave.	Mission Avenue Open Elementary	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Public Elementary School	6601 Steiner Dr.	Nicholas Elementary	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	3901 Little Rock Dr.	North Country Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	5150 Cocoa Palm Way	Northridge Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	2441 Stansberry Way	O. W. Erlewine Elementary	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	3909 North Loop Blvd.	Oak Hill Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	3708 Myrtle Ave.	Oakdale Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	7229 Beech Ave.	Oakview Commuinity Elementary	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	7926 Firestone Way	Olive Grove Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	7201 Arutas Dr.	Oliver Wendell Holmes Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	6550 Filbert Ave.	Orangevale Open Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	1040 Q St.	Orchard Elementary	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	9460 Ottomon Way	Ottomon Way Elementary	X	YES	High
Unincorporated	At Risk Population Facilities	Public Elementary School	6201 41st St.	Pacific Elementary	X Protected by Levee	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Public Elementary School	4720 Forest Pkwy.	Parkway Elementary	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	4330 Pasadena Ave.	Pasadena Avenue Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	9010 Pershing Ave.	Pershing Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	5816 Pioneer Way	Pioneer Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	4680 Monument Dr.	Ridgepoint Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	631 L St.	Rio Linda Elementary	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	9561 Butler School Dr.	Robert J. Fite Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	7037 Briggs Dr.	Samuel Kennedy Elementary	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	3333 Rosemont Dr.	Sequoia Elementary	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	171 Mills Rd.	Sierra Oaks Elementary	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	3638 Bainbridge Dr.	Sierra View Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	9115 Fruitridge Rd.	Sierra-Enterprise Elementary	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	4848 Cottage Way	Starr King Elementary	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Public Elementary School	6545 Beech Ave.	Thomas Coleman Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	1500 Dom Way	Thomas Edison Elementary	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6301 Moraga Dr.	Thomas Kelly Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6601 Trajan Dr.	Trajan Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	5515 Main Ave.	Twin Lakes Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6845 Larchmont Dr.	Village Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	6450 20th St.	Vineland Elementary	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	14181 Grove St.	Walnut Grove Elementary	X Protected by Levee	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Elementary School	4315 Don Julio Blvd.	Warren A. Allison Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	6537 West Second St.	Westside Elementary	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	4248 Whitney Ave.	Whitney Avenue Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Elementary School	5761 Brett Dr.	Woodridge Elementary	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public High School	8301 Madison Ave.	Bella Vista High	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Public High School	9151 Oak Ave.	Casa Roble Fundamental High	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public High School	3111 Center Court Ln.	Center High	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public High School	4925 Dewey Dr.	Del Campo High	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public High School	4300 El Camino Ave.	El Camino Fundamental High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public High School	7956 Cottonwood Ln.	Florin High	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Public High School	5000 McCloud Dr.	Foothill High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public High School	3701 Stephens Dr.	Futures High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public High School	6601 Guthrie Way	Highlands High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public High School	4000 Edison Ave.	Mira Loma High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public High School	4540 American River Dr.	Rio Americano High	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Public High School	6309 Dry Creek Rd.	Rio Linda High	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public High School	9594 Kiefer Blvd.	Rosemont High	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public High School	8333 Kingsbridge Dr.	Sheldon High	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Public Middle School	9325 Mirandy Dr.	Albert Einstein Middle	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Middle School	8920 Elwyn Ave.	Alpha Technology	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	5820 Illinois Ave.	Andrew Carnegie Middle	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	9200 Palmerson Dr.	Antelope Crossing Middle	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Middle School	3500 Edison Ave.	Arcade Fundamental Middle	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Middle School	1640 Watt Ave.	Arden Middle	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	6444 Walerga Rd.	Don Julio Junior High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	4140 Cuny Ave.	Fern Bacon Middle	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	5001 Diablo Dr.	Foothill Farms Junior High	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	7350 Palmer House Dr.	James Rutter Middle	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	4243 Barrett Rd.	John Barrett Middle	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Public Middle School	2950 Hurley Way	Jonas Salk Middle	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	8935 Elm Ave.	Louis Pasteur Fundamental Middle	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Public Middle School	1101 G St.	Rio Linda Junior High	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	4848 Cottage Way	Starr King Middle	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	8239 Kingsbridge Dr.	T. R. Smedberg Middle	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	4924 Dewey Dr.	Will Rogers Middle	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Public Middle School	4900 Whitney Ave.	Winston Churchill Middle	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7413 SKANDER WAY	A & A CARE HOME	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7837 ABBINGTON WAY	ABBINGTON CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6832 OAKLAWN WAY	ACE HOME-FAIR OAKS	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4050 WALNUT AVENUE	AEGIS OF CARMICHAEL	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4080 PALM AVENUE	AFABLE HOME CARE II	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7804 SANDILANDS WAY	AGUILAR ELDERLY CARE FACILITY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9166 SEBASTIANI WAY	AGUSTIN CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4916 DON JULIO BLVD	ALAMO HOME QUALITY CARE	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	1411 ROWENA WAY	ALFARO MANOR	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6117 RUTLAND DRIVE	ALL SAINTS FRANCES	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6135 ALMOND AVENUE	ALMOND AVENUE RESIDENCE CLUB	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5818 WEST 2ND STREET	AMBER OAKS CARE HOME	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3817 MARCONI AVE	AMERICAN RIVER CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4822 IMAGE WAY	AMITY HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7405 LINDALE DRIVE	ANNA'S HOME CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7662 COPPER COVE PLACE	ANTELOPE HILLS HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3313 DAVIDSON DRIVE	ANTELOPE QUALITY CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3950 ANNADALE LANE	APPLE RIDGE ASSISTED LIVING	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	1099 STEWART ROAD	ARDEN HILLS CARE HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3408 ALTA ARDEN EXPRESSWAY	ARDEN PARK VILLA	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6007 OVERWOOD COURT	ATHALIA CARE HOME	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	2426 GARFIELD AVENUE	ATRIA EL CAMINO GARDENS	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5105 SCHUYLER DRIVE	AUGUSTUS CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3446 BECERRA WAY	BECERRA HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8932 BEDFORD AVENUE	BEDFORD HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6705 JUDISTINE DRIVE	BEST SENIOR CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5210 ENGLE ROAD	BETHEL HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6307 GRANT AVENUE	BLESSING CARE HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3429 BRAEBURN STREET	BRAEBURN SENIOR CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4136 SINGING TREE WAY	BRIGHT FUTURE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3024 EASTERN AVE	CAJUCOM CARE HOME #1	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3030 EASTERN AVE	CAJUCOM CARE HOME #2	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8006 BUCKS HARBOR WAY	CAMELOT CARE HOME # 1	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	1075 FULTON AVENUE	CARLTON PLAZA OF SACRAMENTO	X	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5725 CENTURY WAY	CENTURY CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7125 FAIR OAKS BLVD.	CHATEAU AT CARMICHAEL PARK, THE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	641 FEATURE DRIVE	CHATEAU AT RIVER'S EDGE, THE	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8208 SUMMER FALLS CIRCLE	CHRIS BEST CARE FOR ELDERLY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7249 CARMI STREET	CLEGG CARE FACILITY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5926 DAHBOY WAY	CLEMENTINE HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7030 SPICER DRIVE	COMPASSIONATE CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4919 HAZEL AVENUE	COMPASSIONATE CARE HOME II	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	532 K STREET	CORA'S RESIDENTIAL CARE HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	2100 BUTANO DRIVE	COUNTRY CLUB MANOR	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5643 CLARK AVENUE	COZY HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9222 ROCK CANYON WAY	CROWN JEWEL	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	1547 BELL STREET	CYON SAMALA FAMILY CARE HOME #2	X Protected by Levee	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4021 FAIRWOOD WAY	DANA'S HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8261 SUNBONNET DRIVE	DANUBIUS HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8157 WALNUT HILLS WAY	DANUBIUS HOME CARE #2	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5650 MARTIN LUTHER KING BLVD	DAWSON LODGE	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8900 FAIR OAKS BLVD.	DELL VILLA CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4221 MACEY DRIVE	DELUCA FAMILY RESIDENCE	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5228 EL CAMINO AVENUE	DELUCA FAMILY RESIDENCE II	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5216 EL CAMINO AVENUE	DELUCA FAMILY RESIDENCE III	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4415 COFFEE LANE	DORIS'S HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	1360 ROWENA WAY	DURANA RONQUILLO HOME CARE	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	2629 EASTERN AVENUE	EASTERN MANOR	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4339 LANTZY COURT	EDEN MANOR	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3741 EDISON AVENUE	EDISON ESTATES	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5206 ROBERTSON AVENUE	ELDERLY INN I, THE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5210 ROBERTSON AVENUE	ELDERLY INN II	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	940 WATT AVENUE	ELLEN ELDER CARE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7845 DOMINION WAY	ELVERTA CHARITY HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6324 WINDING WAY	EMILIA'S VILLA-ELDERLY CARE FACILITY	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6842 SILVERTHORNE CIRCLE	ENE'S LOVING CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	11390 COLOMA ROAD	ESKATON GOLD RIVER LODGE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3939 WALNUT AVENUE	ESKATON VILLAGE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8840 CENTRAL AVENUE	ETTYS' CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5917 KIFISIA WAY	ETTY'S CARE II	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7710 SUNSET AVENUE	FAIR OAKS COMMUNITY AT SUNSET	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8845 FAIR OAKS BLVD.	FAIR OAKS ESTATES	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5121 ARROYO STREET	FAIR OAKS HOME CARE	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8078 ORANGE AVENUE	FAIR OAKS RESIDENTIAL ELDERLY CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6035 GLENBROOK LANE	FLORITA LEISURE CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8773 OAK AVE	FOUNTAIN WOOD	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8967 AMORUSO AVENUE	FRIENDLY CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8934 VAN MOORE LANE	FRIENDLY CARE HOME II	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8500 PALLADAY ROAD	G. CELESTE SALVADOR HOME, THE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5637 WHITE FIR WAY	G.M. ROJO GUEST HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3101 CALIFORNIA AVENUE	GARBI'S RESIDENTIAL CARE FACILITY FOR THE ELDERLY	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8160 STEVENSON AVENUE	GARDENIA HOME	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6309 PATTYPEART WAY	GERIATRIC CARE LUCI'S HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3734 HOLLISTER AVE.	GINA'S HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8510 ELM AVENUE	GLEN CREEK VILLA II-RES. CARE FAC. FOR THE ELDERLY	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9015 PLUM BLOSSOM COURT	GLEN ORCHARD	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6091 TRAJAN DRIVE	GOLD COUNTRY HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6029 DAHBOY WAY	GOLD HOME, THE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6323 PERRIN WAY	GOLDEN AGE CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7710 ELSIE AVENUE	GOLDEN HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8708 GERBER ROAD	GOLDEN PARADISE MANOR AT LAKEWOOD	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3415 MAYHEW ROAD	GOLDEN POND RETIREMENT COMMUNITY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7622 COUNTRY PARK DRIVE	GOLDEN VALLEY HOME CARE FOR ELDERLY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5801 PECAN AVENUE	GRACE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9260 LOMA LANE	GRACE HOME II	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	2200 GRAMERCY DRIVE	GRAMERCY COURT	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9039 WINDING OAK DRIVE	GREEN BELT CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9932 DIAMONTE WAY	GREYSTONE RCFE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5000 MELVIN DRIVE	HARMONY HOME	0.2% ANNUAL CHANCE	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	2121 VIOLET STREET	HAVEN HOME, THE	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6125 HAZEL AVENUE	HAZEL CREEK	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3105 HEMPSTEAD	HEMPSTEAD HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4114 SCHOFIELD WAY	HICE'S HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5125 CHICAGO AVENUE	HILLSIDE MANOR	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9330 PADDOCK COURT	HOLLY HOUSE, THE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7848 IVY HILL WAY	HOLY FAMILY CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7400 WALNUT ROAD	HOME CARE MANOR I	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8278 NEWFIELD CIRCLE	INDOCARE HOUSE 1	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8830 JERIDA LANE	JERIDA LANE RESIDENTIAL CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7100 KENNETH AVE	KENNETH OAKS RES. CARE FOR THE ELDERLY	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5729 LA FIELD DRIVE	LA FIELD HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3940 LA HONDA WAY	LA HONDA GUEST HOME	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8970 LA SERENA DRIVE	LA SERENA HOUSE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3207 KAISER WAY	LALAINE'S RESIDENTIAL CARE HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7931 COOK RIOLO ROAD	LOVE & CARE FOR ELDER	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7797 MAGNOLIA AVENUE	MAGNOLIA ELDERLY CARE HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8505 COTTONWOOD	MANNA HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7732 GYAN WAY	MARIA TERESA HOME CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5914 CANARY DRIVE	MARIA'S HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3405 HUNTSMAN DRIVE	MARINAS MANOR	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4194 ENGLE ROAD	MARYLOU'S HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8558 SHERATON DRIVE	MARY'S HOME CARE	X	NO	Very High
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3442 CALIFORNIA AVENUE	MCGUIRES GUEST HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8928 BARR HILL WAY	MEADOWVIEW	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8216 COTTONBALL WAY	MELINDA'S CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3160 SHASTA WAY	MIA'S HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6732 LINCOLN OAKS DRIVE	MISSION HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6101 FAIR OAKS BLVD	MOUNTAIN MANOR	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7726 MALLON COURT	MUSCAN HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5340 NELLE PL	NELLE HOME PLACE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4982 TYLER ST.	NELUS CARE HOME II	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4941 TYLER STREET	NELUS HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5813 KENNETH AVENUE	NORA'S HOME CARE #2	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6707 SUN DOWN COURT	OAK GARDEN SENIOR RESIDENCE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7016 LINCOLN OAKS DR.	OAKS PRIVATE HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4424 PENWITH WAY	OLIVIA'S HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4213 WALNUT AVENUE	OLTEAN'S HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4901 MELVIN DRIVE	ONLY LOVE ELDERLY CARE HOME	AE	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3428 PAGEANT DRIVE	PARADISE QUALITY GUEST HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	1922 MORSE AVE	PARK SACRAMENTO	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4450-A PARKWAY	PARKWAY GUEST HOME	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4728 JOHNSON DRIVE	PASCONI CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8682 PHOENIX AVENUE	PHOENIX MANOR	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7757 POWER INN ROAD	POWER INN MANOR	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4129 SINGING TREE WAY	PRESTIGE ELDERLY CARE HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9316 APPALACHIAN DRIVE	QUALITY CARE	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9328 APPALACHIAN DR.	QUALITY CARE TOO	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9464 OAK AVENUE	QUEEN OF HEARTS CARE HOME	X	YES	High
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9374 MANETTE WAY	RENAISSANCE HOME CARE	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9225 CLENDENEN WAY	ROSEMONT CAREHOME #2	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3348 HUNTSMAN DRIVE	ROSEMONT SENIOR CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8900 GLEN ALDER	SACRED HEART CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6254 66TH AVE.	SAINT FRANCIS SENIOR RESIDENCE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6024 KIFISIA WAY	SENIOR GARDEN	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6650 24TH STREET	SENIOR'S PARADISE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7953 IVY HILL WAY	SERENITY CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5510 SKY PARKWAY	SKY PARK GARDENS	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9173 LUCCHESI DRIVE	SMILE HOUSE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7814 NEYLAND WAY	SONETTE GARDENS RESIDENTIAL CARE HOME 1	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7860 SUNRISE GREENS DRIVE	SOUTHBREEZE GARDENS, INC.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	10396 SPIVA ROAD	SPIVA ACRES	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5929 SPRING GLEN DRIVE	SPRING GLEN ELDER VILLA	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7104 SANTA JUANITA AVENUE	ST. PATRICK'S GOLDEN CARE RANCH	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3933 EDISON AVE.	ST. PETER GUEST HOME	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8978 MERLOT WAY	STA. RITA'S SENIOR CARE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9847 FOLSOM BLVD.	STACIE'S CHALET	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	2525 STANSBERRY WAY	STANSBERRY PLACE	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4301 WATKINS DR.	STERLING SUITES-FAIR OAKS	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3431 PALESTINE LANE	SUE'S GOLDIN CARE HOME # 3	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4405 BELCREST WAY	SUE'S GOLDIN CARE HOME #1	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6450 WINDING WAY	SUNFLOWER'S HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4820 HAZEL AVENUE	SUNRISE ASSISTED LIVING OF FAIR OAKS	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	345 MUNROE STREET	SUNRISE ASSISTED LIVING OF SACRAMENTO	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6653 BIG CHIEF CT.	SUNRISE HOUSE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8052 SUNSET AVENUE	SUNSET GARDENS CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5010 OLEAN STREET	SUNSHINE CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9845 ALTA MESA ROAD	SUNSHINE GLORY CARE HOME	X	NO	Moderate

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8356 FIELDPOPPY CIRCLE	SUSIE YASAY HOME FOR THE ELDERLY	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3180 WATT AVENUE	SWEET MEMORIES GUEST HOME	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3832 MILTON WAY	TAYLOR HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3609 PLYMOUTH DRIVE	TAYLOR HOME II, THE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8679 THELEN WAY	THELEN GARDENS	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6036 TIMBERLEAF WAY	TIMBERLEAF HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4232 DON JULIO BLVD.	TINA'S HOME CARE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5115 CYPRESS AVENUE	TORRES RESIDENTIAL HOMECARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8780 CRUSHEEN WAY	TRANQUILITY CARE	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8874 NIMBUS WAY	TREE OF LIFE VILLA	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	2600 TRENTWICK CT.	TRENTWICK PLACE SENIOR CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	7111 MAIN AVENUE	VILLA ELENA	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6044 KIFISIA WAY	VILLA KIFISIA	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6501 LINDA WAY	VILLA LINDA	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	6121 GILMAN WAY	VINSON'S CARE HOME	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	3401 WALNUT AVENUE	WALNUT HOUSE	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	1413 ROWENA	WARWICK MANOR	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	5208 FAIR OAKS BLVD.	WELCOME HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8298 WHITE SANDS WAY	WHITE SANDS CARE HOME	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	4825 COLLEGE OAK DRIVE	WILLIAM JERRY C. WINTER FAMILY HOME II	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8513 YELLOWTAIL WAY	YELLOWTAIL HOME CARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9027 COLOMBARD WAY	YOUNG AT HEART RCFE	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9016 COLOMBARD WAY	YOUNG AT HEART RCFE #2	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	9375 BROWNSBERG WAY	YOUNG AT HEART RCFE NO. 3	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Residential Care/Elderly	8302 FOSS LAKE WAY	ZENITH CARE HOME	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Residential Facility Chronically	2709 WALNUT AVE	AVALON	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	School-Age Day Care Center	2441 STANSBERRY WAY	4TH "R", THE - ERLEWINE	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	3333 ROSEMONT DRIVE	4TH "R", THE - SEQUOIA	X Protected by Levee	YES	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	8141 STEVENSON AVENUE	ANNA KIRCHGATER SCHOOL-AGE CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	1230 G. ST.	B. J. JORDAN CHILD CARE-DRY CREEK	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	6845 LARCHMONT DRIVE	B.J. JORDAN CHILD CARE PROGRAMS-VILLAGE CENTER	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	4680 MONUMENT DRIVE	BEANSTALK-RIDGEPOINT	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	5051 47TH AVE.	CALVARY CHRISTIAN SCHOOL AGE CARE	X Protected by Levee	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	7217 FLORIN MALL DRIVE	CEREZO'S MARTIAL ARTS	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	13580 JACKSON ROAD	COSUMNES RIVER ELEMENTARY	A	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	8000 AZTEC WAY	DUDLEY SCHOOL AGE CDC	X	NO	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	4011 HOOD-FRANKLIN	FRANKLIN CDC	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	9045 CANBERRA DRIVE	GOLDEN EMPIRE 4TH "R"	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	8351 CUTLER WAY	JACKSON SCHOOL AGE CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat

Unincorporated	At Risk Population Facilities	School-Age Day Care Center	9927 WILDHAWK WEST DRIVE	KNOWLEDGE LEARNING CORPORATION	X	NO	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	5915 MAIN AVENUE	LITTLE TREASURES CHRISTIAN LEARNING CENTER	X	NO	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	8140 CAYMUS DRIVE	MAEOLA BEITZEL SCHOOL-AGE CHILD DEVELOPMENT CENTER	X	NO	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	5309 KENNETH AVENUE	MARVIN MARSHALL SCHOOL AGE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	8737 BRITTANY PARK DRIVE	MARY TSUKAMOTO SCHOOL-AGE CHILD DEVELOPMENT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	6201 WINDING WAY	NATIONAL HUMAN DEVELOPMENT FOUNDATION	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	6746 34TH STREET	NEW TESTAMENT CHRISTIAN SCHOOL	0.2% ANNUAL CHANCE	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	3901 LITTLE ROCK DRIVE	NORTH COUNTRY SCHOOL-AGE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	3127 EASTERN AVE.	NORTHEAST FAMILY YMCA PROGRAM CENTER	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	2670 HOWE AVENUE	ONLY LOVE CHILDREN'S CENTER	X	YES	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	1150 EASTERN AVE	RIVER OAK CENTER FOR CHILDREN	X	YES	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	9561 FITE SCHOOL RD.	ROBERT J. FITE CHILD DEVELOPMENT CENTER	X	NO	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	3401 SCOTLAND DRIVE	SPINELLI SCHOOL AGE CHILD DEVELOPMENT CENTER	X	YES	Moderate

Unincorporated	At Risk Population Facilities	School-Age Day Care Center	2391 ST. MARK'S WAY	ST. MARK'S AFTERSCHOOL PROGRAM	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	8343 PALMERSON	SUNRISE KIDS CLUB - ANTELOPE MEADOWS	X	NO	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	3909 NORTH LOOP BLVD	SUNRISE KIDS CLUB - OAK HILL DAYCARE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	7926 FIRESTONE WAY	SUNRISE KIDS CLUB OLIVE GROVE	X	NO	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	7720 OCEAN PARK DR	SUNRISE KIDS CLUB, BARRETTE RANCH	X	NO	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	5033 FAIR OAKS BLVD	VILLAGE MONTESSORI SCHOOL, L.L.C	X	YES	Moderate
Unincorporated	At Risk Population Facilities	School-Age Day Care Center	3300 WALNUT AVE.	WONDERLAND SCHOOL-SCHOOL AGE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Social Rehabilitation Facility	4741 ENGLE ROAD	ENGLE HOUSE	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Social Rehabilitation Facility	4256 FRUITRIDGE ROAD	FRUITRIDGE TRANSITIONAL HOME	X	YES	Moderate
Unincorporated	At Risk Population Facilities	Special Education School	9601 Lake Natoma Dr.	La Vista Center	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Special Education School	5325 Garfield	Laurel Ruff Center	X	NO	Moderate
Unincorporated	At Risk Population Facilities	Special Education School	5309 Kenneth Ave.	Marvin Marshall Children Center Elementary	X	NO	Little or No Threat
Unincorporated	At Risk Population Facilities	Special Education School	4330 Keema Ave.	Miles P. Richmond	X	NO	Little or No Threat

Unincorporated	At Risk Population Facilities	Special Education School	2040 Ethan Way	Palmiter Special Education	X	YES	Little or No Threat
Unincorporated	At Risk Population Facilities	Special Education School	4848 Cottage Way	Ralph Richardson Center	X	NO	Moderate
Unincorporated	Essential Services Facilities	Airport		Franklin Field	AE	NO	Moderate
Unincorporated	Essential Services Facilities	Airport	3745 WHITEHEAD ST	MATHER AIRPORT	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Airport		Mather Field	X	YES	Moderate
Unincorporated	Essential Services Facilities	Airport		McClellan Air Park	X	NO	Moderate
Unincorporated	Essential Services Facilities	Airport		Rancho Murieta Airport	A	NO	High
Unincorporated	Essential Services Facilities	Airport		Rio Linda Airport	AE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Airport		Sacramento Internat'l Airport	A99	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Airport		Sunset Skyranch	X	NO	Moderate
Unincorporated	Essential Services Facilities	Airport		Walnut Grove Airport	AE	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Bus Terminal	FLORIN MALL	BUS TRANSIT CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Detention Basin	CALVINE ALBERRY	CALVINE MT BELL	AE	YES	Moderate

Unincorporated	Essential Services Facilities	Detention Basin	E/O I5	STONELAKE WILDLIFE 2	AE	YES	Moderate
Unincorporated	Essential Services Facilities	Detention Basin	W/O I5	STONELAKE WILDLIFE R	AE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Detention Basin	S/O WILTON	WILTON	AE	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	9325 Mirandy Drive	Albert Einstein Middle School (SCLG17)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4700 College Oak Drive	American River College (SCLG57)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5820 Illinois Ave	Andrew Carnegie Middle School (SCME18)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2924 Becerra Way	Arcade Church (CHSM01)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	3500 Edison Ave.	Arcade Middle School (SCME27)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	3337 Arden Way	Arden Church of the Nazarene (CHME19)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	1640 Watt Ave	Arden Middle School (SCME24)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	1000 La Sierra Drive	Arden Park RPD Community Center (CCSM11)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	8301 Madison Ave.	Bella Vista HS (SCLG01)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	9721 Dillard Rd.	C. W. Dillard Elementary School (SCSM09)	X	NO	Little or No Threat

Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5051 47th Ave.	Calvary Christian School (CHME34)	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	8333 Vintage Park Drive	Calvine High School (SCSM04)	0.2% ANNUAL CHANCE	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7916 Aztec Way	Capehart Sports Complex (CCME13)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	9470 Micron	Capital Christian Center (CHLG01)	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5750 Grant Ave.	Carmichael Community Clubhouse (CCME09)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4600 Winding Way	Carmichael Seveth-Day Adventist Church (CHSM02)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	9151 Oak Ave.	Casa Roble HS (SCME01)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	3111 Center Court Lane	Center High School (SCME07)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	9249 Folosm Blvd.	Christ Unity Church (CHME38)	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4900 Whitney Ave.	Churchill Middle School (SCME31)	AE	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5709 Cypress Ave.	Cypress Avenue Baptist Church (CHME04)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4925 Dewey Dr.	Del Campo HS (SCLG03)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	1415 Rushden Drive	Deterding Community Center (CCSM10)	X	YES	Little or No Threat

Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4036 14th Ave.	Dr. Ephraim Williams Family Lif Center (CHLG06)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2236 Edison Ave.	Dyer Kelly Elementary School (SCSM17)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7801 Hazel	East Valley Foursquare Church (CHME05)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4300 El Camino Ave.	El Camino HS (SCLG04)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	1400 Bell Street	Encina HS (SCLG05)	X Protected by Levee	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7997 California Ave.	Fair Oaks Community Clubhouse (CCME14)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	9849 Fair Oaks Blvd.	Fair Oaks United Methodist Church (CHSM10)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4000 San Juan Ave.	Faith Lutheran Church (CHME21)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6521 Hazel	Family Christian Center (CHSM06)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4141 Cuny Ave.	Fern Bacon Middle School (SCLG15)	X Protected by Levee	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4401 San Juan Ave.	First Baptist Church - Fair Oaks (CHME08)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6125 Watt Ave	First Baptist Church - N. Highlands (CHSM11)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7031 Watt Ave.	Fitness System (BUME02)	X	NO	Moderate

Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7956 Cottonwood Lane	Florin High School (SCLG29)	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7560 Florin Road	Florin United Methodist Church (CHSM19)	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5510 Diablo Drive	Foothill Community Center (CCSM15)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5001 Diablo Drive	Foothill Farms Jr. High (SCLG43)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5000 McCloud Drive	Foothill High School (SCLG42)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4910 Lemon Hill Ave.	Gloria Dei Lutheran Church (CHSM21)	X Protected by Levee	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2200 Roaring Camp Dr.	Gold River K-8 (SCSM13)	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4855 Hamilton Street	Hamilton Community Center (CCME07)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6601 Guthrie	Highlands High School (SCLG45)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6444 Walerga	Highlands Middle School (SCME25)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2402 Howe Ave.	Howe Avenue Elementary (SCSM15)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7350 Palmer House Drive	James Rutter Middle School (SCLG33)	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	1200 Jacob Ln.	Jesuit High School (SCLG58)	X Protected by Levee	YES	Moderate

Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4243 Barrett Road	John Barrett Middle School (SCME26)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2950 Hurley Way	Jonas Salk High Tech Academy (SCME23)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5325 Engle Rd.	La Sierra Community Center (CCLG04)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5132 Elk Horn Blvd.	Liberty Towers Church of the Nazarene (CHLG05)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2360 El Camino Ave.	Loretto High School (SCLG48)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	8935 Elm Ave	Luis Pasteur Middle School (SCME19)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4000 Edison Ave.	Mira Loma HS (SCLG09)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4701 Gibbons	Mission Oaks Community Center (CCME11)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6040 Watt Ave.	North Highlands Community Center (CCME12)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2441 Stansberry Way	O. W. Erlewine Elementary School (SCSM12)	X Protected by Levee	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	3708 Myrtle Ave.	Oakdale Community Room & Gym (CCME08)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6826 Hazel	Orangevale Park & Recreation (CCME04)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2141 Walnut Ave.	Our Lady of Assumption School (CHME33)	X	NO	Moderate

Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	100 Oxbow Marina Dr.	Oxbow Marina (BUSM01)	AE	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	9010 Pershing Ave.	Pershing Elementary School (SCSM16)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7443 Murieta Drive	Rancho Murieta Airport (BULG04)	A	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7000 Alameda Drive	Ranco Murieta Country Club (BUME03)	X	NO	High
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2201 Cottage Way	Richard T. Conzelmann Community Center (CCME10)	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4540 American River Dr	Rio Americano HS (SCLG12)	AE	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6309 Dry Creek Road	Rio Linda High School (SCLG34)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	810 Oak Lane	Rio Linda/Elverta Community Center (CCSM12)	AE	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	9594 Kiefer Blvd.	Rosemont High School (SCLG18)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5601 Winding Way	Sacramento Adventist Academy (CHME12)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6926 Franklin	Sacramento Japanese Methodist Church (CHME24)	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6201 Winding Way	Sacramento Metro Church of Christ (CHME32)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	3750 Bannister Road	Sacramento Waldorf School (SCME29)	AE	YES	Moderate

Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2320 Sierra Blvd.	Shalom School (SCSM16)	AE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	8333 Kingsbridge Drive	Sheldon High School (SCLG24)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	171 Mills Rd.	Sierra Oaks Elementary (SCSM15)	X Protected by Levee	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	7520 Stockton Blvd.	Southpointe Christian School (CHSM16)	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	8890 Gerber Road	Southside Community Church (CHME28)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	11430 Fair Oaks Blvd.	St. Francis Episcopal Church (CHSM13)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	3245 Arden Way	St. Ignatius Parish School (CHME31)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4325 Don Julio Blvd.	St. Lawrence Catholic Church (CHME30)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	3200 Edison	St. Matthew's Episcopal Church (CHSM14)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	2428 Bell Street	St. Philomene Church (CHME16)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4848 Cottage Way	Starr King K-8 (SCME32)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	8321Greenback Lane	Sunrise Community Church (CHME17)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	8239 Kingsbridge	T. R. Smedberg Middle School (SCLG25)	X	NO	Moderate

Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4049 Marconi Ave.	Town & Country Lutheran Church (CHME18)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	5515 Main Ave.	Twin Lakes Elementary School (SCSM19)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	3045 Garfield Ave.	Victory Christian Schools (SCME28)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	820 Elk Grove-Florin Rd.	Vintage Park Community Church (CHSM18)	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	14120 Grand Ave.	Walnut Grove Community Presbyterian Church (CHSM22)	AE	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	14181 Grove St.	Walnut Grove Elementary (SCME37)	X Protected by Levee	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4924 Dewey Drive	Will Rogers Middle School (SCLG40)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	6131 Orange Ave.	William Daylor High School (SCSM02)	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	4747 PFE	Wilson C. Riles Middle School (SCLG54)	X	YES	Moderate
Unincorporated	Essential Services Facilities	Emergency Evacuation Shelter	9697 Dillard	Wilton Christian School (CHME37)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	3000 FULTON AVE	ARFD STATION 101	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	4501 MARCONI AVE	ARFD STATION 102	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	3824 WATT AVE	ARFD STATION 103	X	NO	Little or No Threat

Unincorporated	Essential Services Facilities	Fire Station	2691 NORTHROP AVE	ARFD STATION 105	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	2200 PARK TOWNE CIR	ARFD STATION 106	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	970 LA SIERRA DR	ARFD STATION 107	X	YES	Moderate
Unincorporated	Essential Services Facilities	Fire Station	6701 WINDING WAY	ARFD STATION 108	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	5634 ROBERTSON AVE	ARFD STATION 109	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	1432 EASTERN AVE	ARFD STATION 110	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	6749 FRONT ST	ARFD STATION 111	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	6801 34TH ST	ARFD STATION 112	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	7995 ELWYN AVE	ARFD STATION 116	X	YES	Moderate
Unincorporated	Essential Services Facilities	Fire Station	7961 CHERRY BROOK DR	ARFD STATION 117	X	YES	Moderate
Unincorporated	Essential Services Facilities	Fire Station	8880 GERBER RD	ARFD STATION 50	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	8210 MEADOW HAVEN DR	ARFD STATION 51	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	6722 FLEMMING AVE	ARFD STATION 53	0.2% ANNUAL CHANCE	YES	Little or No Threat

Unincorporated	Essential Services Facilities	Fire Station	8900 FREDERIC AVE	ARFD STATION 54	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	Essential Services Facilities	Fire Station	7776 EXCELSIOR RD	ARFD STATION 55	X	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	7250 SLOUGHHOUSE RD	ARFD STATION 58	X	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	7210 MURIETA DR	ARFD STATION 59	X	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	154 MAGNOLIA AVE	COURTLAND STATION 91	AE	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	951 HOOD-FRANKLIN RD	COURTLAND STATION 92	AE	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	12746 IVIE RD	HERALD STATION 87	X	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	11620 CLAY STATION RD	HERALD STATION 88	X	NO	High
Unincorporated	Essential Services Facilities	Fire Station	746 N MARKET BLVD	SAC CITY STATION 18	A99	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	7208 W ELKHORN BLVD	SAC CITY STATION 3	A99	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	3720 47TH AVE	SAC CITY STATION 56	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	7927 EAST PKWY	SAC CITY STATION 57	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	6248 CHESTNUT AVE	SAC COUNTY STATION 22	X	NO	Moderate

Unincorporated	Essential Services Facilities	Fire Station	4942 COLLEGE OAK DR	SAC COUNTY STATION 24	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	7352 ROSEVILLE RD	SAC COUNTY STATION 25	X	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	8000 PALMERSON DR	SAC COUNTY STATION 26	X	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	6314 HICKORY AVE	SAC COUNTY STATION 29	X	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	7950 CALIFORNIA AVE	SAC COUNTY STATION 31	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	8890 ROEDIGER LN	SAC COUNTY STATION 32	X	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	5148 MAIN AVE	SAC COUNTY STATION 33	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	6900 THOMAS DR	SAC COUNTY STATION 41	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	5608 NORTH HAVEN DR	SAC COUNTY STATION 42	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	3646 BRADSHAW RD	SAC COUNTY STATION 62	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	9116 VANCOUVER DR	SAC COUNTY STATION 64	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	11201 COLOMA RD	SAC COUNTY STATION 65	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	5816 KELLY WAY	STATION 114	X	NO	Moderate

Unincorporated	Essential Services Facilities	Fire Station	4727 KILZER AVE	STATION 115	X	YES	Moderate
Unincorporated	Essential Services Facilities	Fire Station	9780 ELDER CREEK RD	STATION 52	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	10321 TRUEMPER WAY	STATION 97	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	14061 GRAND AVE	WALNUT GROVE STATION 95	AE	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	14160 GROVE ST	WALNUT GROVE STATION 96	X Protected by Levee	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	9800 DILLARD RD	WILTON STATION 81	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Fire Station	12844 ORANGE RD	WILTON STATION 83	X	NO	Moderate
Unincorporated	Essential Services Facilities	Fire Station	10661 ALTA MESA RD	WILTON STATION 84	X	NO	Moderate
Unincorporated	Essential Services Facilities	General Acute Care Hospital	2025 Morse Ave	KAISER FOUNDATION HOSPITAL	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		ARDEN POST OFFICE	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		ARMY NATIONAL GUARD	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		CARMICHAEL POST OFFICE	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		COLONIAL POST OFFICE	X	YES	Moderate

Unincorporated	Essential Services Facilities	Government Facilities		COUNTRY CLUB CENTRE POST OFFICE	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		DEPARTMENT OF MOTOR VEHICLES	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		DEPARTMENT OF MOTOR VEHICLES	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		ELVERTA POST OFFICE	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		FAIR OAKS POST OFFICE	X	YES	Moderate
Unincorporated	Essential Services Facilities	Government Facilities		FEDERAL BUILDING	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		FLORIN POST OFFICE	X	YES	Moderate
Unincorporated	Essential Services Facilities	Government Facilities		FOOTHILL FARMS POST OFFICE	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		NIMBUS FISH HATCHERY	0.2% ANNUAL CHANCE	YES	High
Unincorporated	Essential Services Facilities	Government Facilities		NORTH HIGHLANDS POST OFFICE	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		ORANGEVALE POST OFFICE	X	NO	Moderate
Unincorporated	Essential Services Facilities	Government Facilities		PERKINS POST OFFICE	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		RIO LINDA POST OFFICE	X	YES	Little or No Threat

Unincorporated	Essential Services Facilities	Government Facilities		TOWN & COUNTRY POST OFFICE	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Government Facilities		WILTON POST OFFICE	X	NO	Moderate
Unincorporated	Essential Services Facilities	Light Rail Stop	Butterfield	Butterfie	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Light Rail Stop	Hazel	Hazel	X	YES	Moderate
Unincorporated	Essential Services Facilities	Light Rail Stop	Starfire	Starfire	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Light Rail Stop	Tiber	Tiber	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Light Rail Stop	Watt/I-80	Watt/I-80	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Light Rail Stop	Watt/Manlove	Watt/Manl	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	5777 Madison Avenue, Suite 240	A.F.T.E.R. Counseling Agency	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	2143 HURLEY WAY, SUITE 240	ACCENTCARE SKILLED NURSING SERVICES	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	8400 Fair Oaks Blvd.	Alpha Oaks	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	4234 N. Freeway Boulevard	Altamedix ADHC	A99	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	12490 Alta Mesa Road	Altua	X	NO	Moderate

Unincorporated	Essential Services Facilities	Medical Health Facility	8632 GREENBACK LANE	ALWAYS HOME NURSING SERVICES, INC	X	NO	Very High
Unincorporated	Essential Services Facilities	Medical Health Facility	5415 Florin Road	Another Choice, Another Chance	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3400 ALTA ARDEN EXPRESSWAY	ARDEN REHABILITATION AND HEALTH CARE CENTER	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	2257 FAIR OAKS BOULEVARD	ASBURY PARK NURSING AND REHABILITATION CENTER	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	6622 MERCY COURT	BIRTH CENTER, A NURSING CORPORATION, THE	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	6127 Fair Oaks Blvd.	Bi-Valley Medical Clinic, Inc.	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	11228 Fair Oaks Blvd.	Center Point	X	NO	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	8946 Madison Avenue	Clean and Sober Detox	X	NO	Very High
Unincorporated	Essential Services Facilities	Medical Health Facility	4635 COLLEGE OAK DRIVE	COLLEGE OAK NURSING AND REHABILITATION CENTER No.558	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	6350 Appian Way	Cornerstone	X	NO	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	5524 ASSEMBLY COURT SUITE 58	CUSTOMCARE HOME HEALTH SERVICES	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	2540 CARMICHAEL WAY	EL CAMINO CARE CENTER	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	11300 FAIR OAKS BOULEVARD	ESKATON CARE CENTER FAIR OAKS	X	NO	Little or No Threat

Unincorporated	Essential Services Facilities	Medical Health Facility	5318 MANZANITA AVENUE	ESKATON CARE CENTER MANZANITA	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	5105 Manzanita Avenue, Suite C	Eskaton Carmichael Adult Day Health Care	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	9722 FAIR OAKS BLVD., NO.A	ESKATON HOME CARE	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3939 WALNUT AVENUE	ESKATON VILLAGE CARE CENTER	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	8304, 8312, 8324 Madison Ave.,	Fair Oaks Recovery Center	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	8912 Volunteer Lane, Suite 100	Family Service Agency of Greater Sacramento	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	1750 Wright Street, Ste 1	Feminist Women's Health Ctr-Sacramento	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	7000 STOCKTON BOULEVARD	FLORIN DIALYSIS CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	2221 FAIR OAKS BOULEVARD	GARDENS HEALTHCARE	X Protected by Levee	YES	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	2020 HURLEY WAY, NO.490	GENTIVA HEALTH SERVICES - CERTIFIED	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	2020 HURLEY WAY, SUITE 490	GENTIVA HEALTH SERVICES-PRIVATE	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	2288 AUBURN BOULEVARD, NO.201	GREATER SACRAMENTO SURGERY CENTER	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3205 Hurley Way	Help to Recovery	X	YES	Little or No Threat

Unincorporated	Essential Services Facilities	Medical Health Facility	5255 HEMLOCK STREET	HERITAGE CONVALESCENT HOSPITAL, INC	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	2941-B FULTON AVENUE	INTERIM HEALTHCARE	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	2025 MORSE AVENUE	KAISER FND HOSP - SACRAMENTO	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3174 ARDEN WAY	KAISER FOUNDATION HOSPITAL - HOSPICE	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3240 ARDEN WAY	KAISER FOUNDATION HOSPITAL HHA - SACRAMENTO	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	4232 Big Cloud Way	Koinonia Group Homes #5	X	NO	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	4241 Florin Road, Suite 110	MAAP Counseling Center	X Protected by Levee	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3437 Myrtle Avenue, Suite 420	MAAP Counseling Center	AE	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	5222 MADISON AVENUE	MADISON DIALYSIS CLINIC	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	4005 MANZANITA AVE.	MANZANITA DIALYSIS CENTER	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	1050 FULTON AVENUE, SUITE 150	MAXIM HEALTHCARE SERVICES, INC.	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	650 Howe Avenue, Suite 400	Mercy Perinatal Recovery Network (PRN)	X Protected by Levee	YES	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	6501 COYLE AVENUE	MERCY SAN JUAN HOSPITAL	X	NO	Little or No Threat

Unincorporated	Essential Services Facilities	Medical Health Facility	3630 MISSION AVENUE	MISSION CARMICHAEL HEALTHCARE CENTER	X	NO	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	1300 Ethan Way, Suite 250	National Council on Alcoholism and Drug Dependence	AE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	950 Fulton Avenue, Suite 200	National Educatinal Enrichment Development Services (NEEDS)	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	8780 & 8782 Sherry Drive	New Dawn Recovery Center	X	NO	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	6039, 6043, and 6045 Roloff Wa	New Dawn Recovery Center	X	NO	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	4986 WATT AVENUE, SUITE F	NORTH HIGHLANDS DIALYSIS CENTER	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	9267 GREENBACK LANE, SUITE A-2	ORANGEVALE DIALYSIS CENTER	X	NO	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	7240 East Southgate Drive, Sui	PharmaTox, Inc.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	5700 Watt Avenue	Planned Parenthood-North Highlands	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	6041 FAIR OAKS BOULEVARD	REDWOOD TERRACE CARE AND REHABILITATION	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	4640 MARCONI AVENUE, SUITE 1	RX STAFFING AND HOME CARE	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3205 HURLEY WAY	SACRAMENTO AREA EASTER SEAL REHABILITATION CENTER	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	4516 Parker Avenue	Sacramento Area Emergency Housing Center	X	YES	Little or No Threat

Unincorporated	Essential Services Facilities	Medical Health Facility	7270 East Southgate Drive, Bld	Sacramento Veterans Resource Center	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	7270 East Southgate Drive	Sacramento Veterans Resource Center's Outpatient Substance A	0.2% ANNUAL CHANCE	YES	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	7231 EAST SOUTHGATE DRIVE	SOUTHGATE DIALYSIS CLINIC, INC.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	6248 - 66TH AVENUE	ST. CLAIRE'S NURSING CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3900 GARFIELD AVENUE	SUNBRIDGE BRITTANY CARE CENTER	X	NO	Moderate
Unincorporated	Essential Services Facilities	Medical Health Facility	8336 FAIR OAKS BOULEVARD	SUNBRIDGE CARE AND REHABILITATION FOR CARMICHAEL	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3841 NORTH FREEWAY BLVD. NO.13	TENDER LOVING CARE	A99	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	7586 Stockton Blvd.	The Effort Detoxification Center	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	7225 East Southgate Drive, Sui	Treatment Associates, Inc.	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	7225 East Southgate Drive, Sui	Treatment Associates, Inc. (Sac Treatment Clinic)	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3841 N. FREEWAY BLVD.	VITAS HEALTHCARE CORPORATION OF CALIFORNIA	A99	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	3529 WALNUT AVENUE	WALNUT WHITNEY CONVALESCENT HOSPITAL	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Medical Health Facility	2240 NORTHROP AVENUE	WOODSIDE HEALTHCARE	AE	YES	Moderate

Unincorporated	Essential Services Facilities	Police	4005 Manzanita Ave	CARMICHAEL SERVICE CENTER (NE DIV)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Police	7000 65th St	CENTRAL DIVISION	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Police	140 Brannan Island Rd	DELTA SERVICE CENTER (SOUTH DIV)	AE	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Police	8525 Madison Ave	FAIR OAKS & ORANGEVALE SERVICE CENTER (NE DIV)	X	NO	Moderate
Unincorporated	Essential Services Facilities	Police		N SACRAMENTO CALIFORNIA HWY PATROL	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Police	2500 Marconi Ave	NORTH CENTRAL DIVISION	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Police	5510 Garfield Way	NORTHEAST DIVISION	X	YES	Moderate
Unincorporated	Essential Services Facilities	Police	6028 Price Ave	NORTHWEST DIVISION	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Police	7511 Watt Ave	NW SERVICE CENTER	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Police	9183 Kiefer Blvd	ROSEMONT SERVICE CENTER	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Police	14160 Grove St	SOUTH DIVISION	X Protected by Levee	NO	Moderate
Unincorporated	Essential Services Facilities	Police	9800 Dillard Rd	WILTON SERVICE CENTER (SOUTH DIV)	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Stadium		BEAVER STADIUM	AE	YES	Moderate

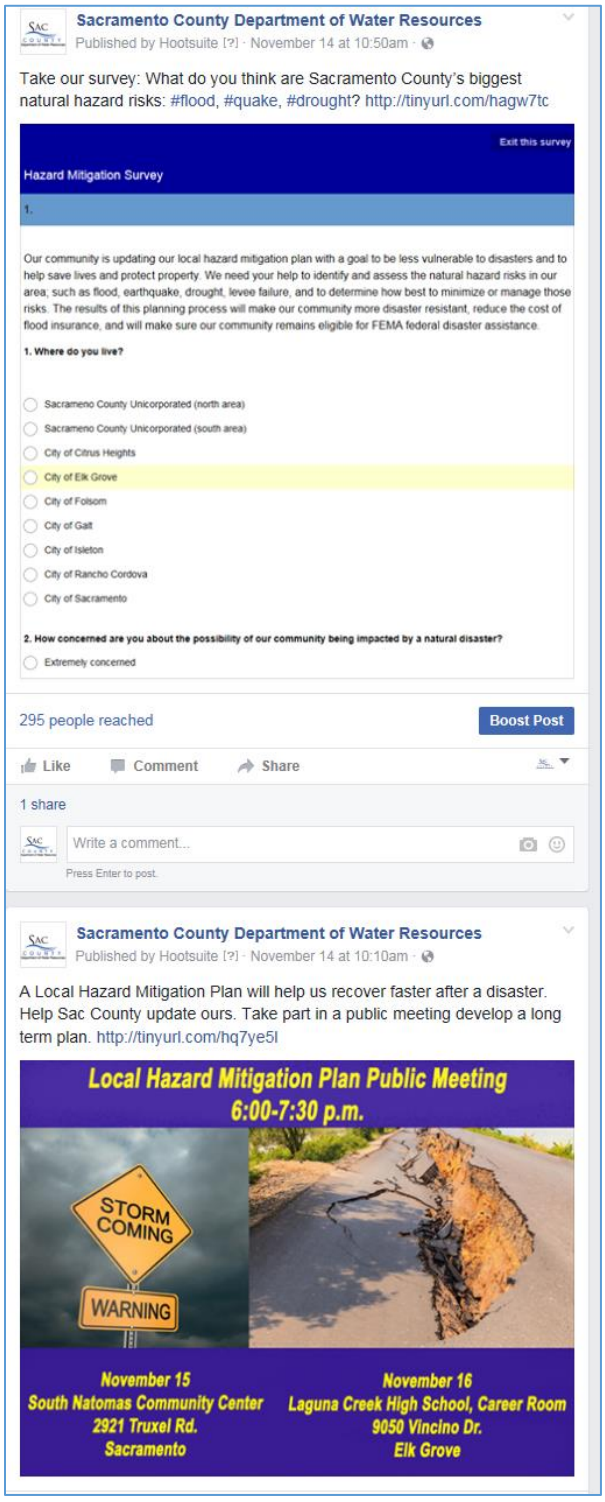
Unincorporated	Essential Services Facilities	Traffic Operations Center	9630 Conservation Road	Traffic Operations Center	X	YES	Little or No Threat
Unincorporated	Essential Services Facilities	Vehicle and Equipment Storage	2535 El Sutton Lane	North Station Garage	X	NO	Little or No Threat
Unincorporated	Essential Services Facilities	Vehicle and Equipment Storage	903 Enterprise Drive	Sheriff SSD Parking/Towing	X Protected by Levee	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	8135 Florin Road	Auto Zone #2867	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	5820 Auburn Blvd	Auto Zone #2895	X	YES	Moderate
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	3675 Elkhorn Blvd	Auto Zone #5590	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	2160 El Camino Ave	Auto Zone #5602	X	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	3455 Watt Ave	Auto Zone #5603	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	5780 Auburn Blvd	Brake Masters #131	X	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	9348 Greenback Ln	Brake Masters #133	X	NO	Moderate
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	6955 Stockton Blvd	Brake Masters #134	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	4706 Manzania Ave	Firestone Store #3539	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	2547 Marconi Ave	Firestone Store #3545	X	NO	Little or No Threat

Unincorporated	Hazardous Materials Facilities	Oil Collection Center	4637 Watt Ave	Firstone Store #3538	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	2338 Gold River Rd	Gold Country Service Cente	X	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	5464 Florin Road	Jiffy Lube #1464	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	4800 Watt Ave	Jiffy Lube #2225	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	3447 Marconi Ave	Jiffy Lube #2354	X	NO	Moderate
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	4160 Sunrise Blvd	Jiffy Lube #381	X	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	6709 Watt Ave	Jiffy Lube #384	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	9286 Greenback Lane	Jiffy Lube #385	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	1640 Fulton Ave	Jiffy Lube #387	X Protected by Levee	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	2560 Cottage Way	Kragen Auto Parts #0227	X	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	4300 Marconi	Kragen Auto Parts #0313	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	4423 Elkhorn Blvd	Kragen Auto Parts #0321	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	3659 Bradshaw Road	Kragen Auto Parts #0324	X	YES	Little or No Threat

Unincorporated	Hazardous Materials Facilities	Oil Collection Center	5417 Auburn Ave	Kragen Auto Parts #1198	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	8158 Gerber Road	Kragen Auto Parts #1321	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	6608 Fair Oaks Blvd	Kragen Auto Parts #1464	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	6150 Watt Ave	Kragen Auto Parts #4032	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	4410 San Juan Ave	Lube Express	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	5135 Auburn Blvd	Pep Boys #719	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	7600 Stockton Blvd	Pick-N-Pull/Sacramento #10	0.2% ANNUAL CHANCE	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	4930 Auburn Blvd	Purrfect Auto Service	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Oil Collection Center	2361 Butano Dr	Tire Station #35C1	X	YES	Little or No Threat
Unincorporated	Hazardous Materials Facilities	OTHER	11855 WHITE ROCK RD	GEM OF RANCHO CORDOVA LLC	X	NO	Little or No Threat
Unincorporated	Hazardous Materials Facilities	Sewer Treatment Plant		SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT	AE	YES	Little or No Threat

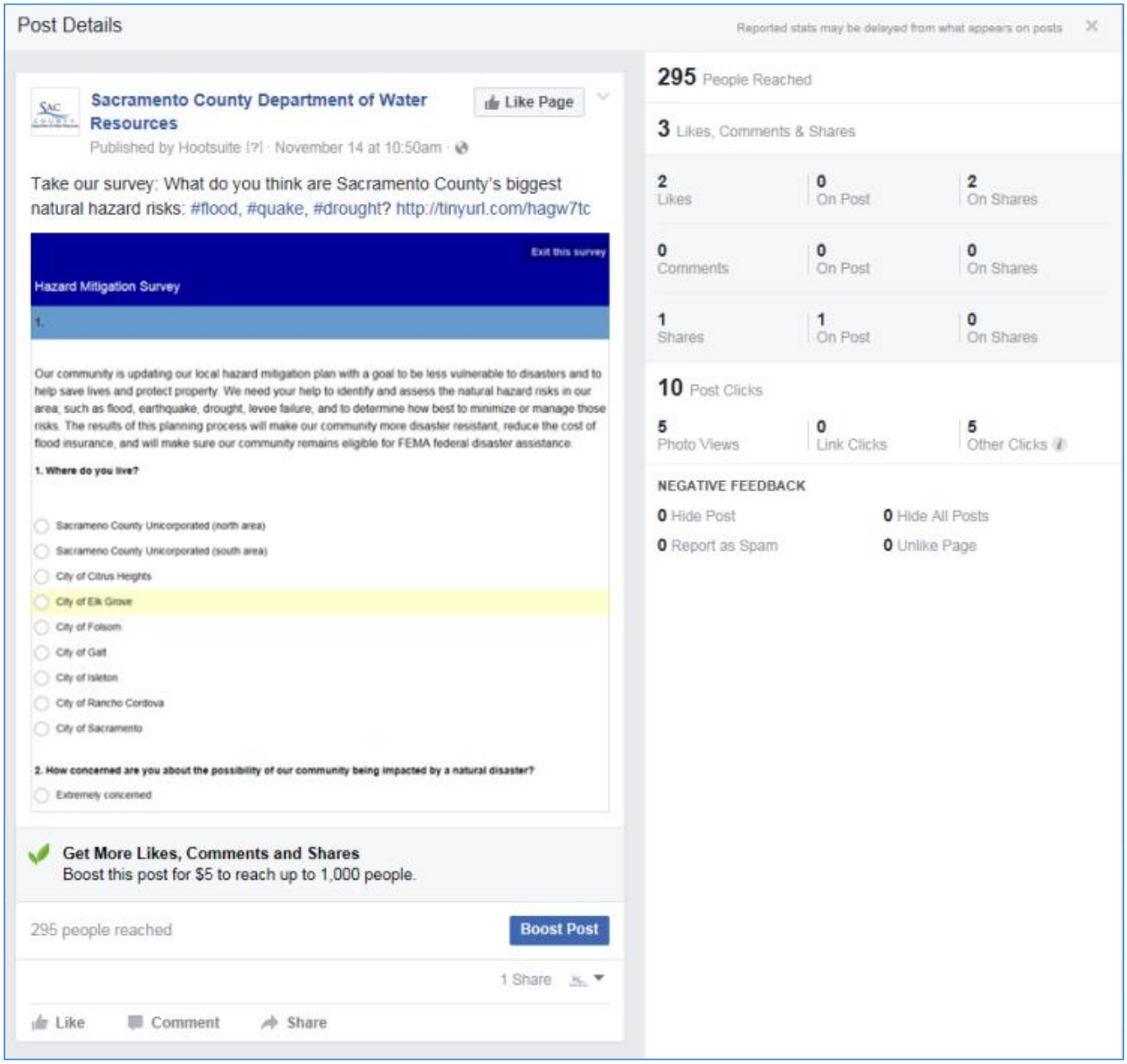
Appendix F Public Survey

Figure F-1 Facebook Outreach



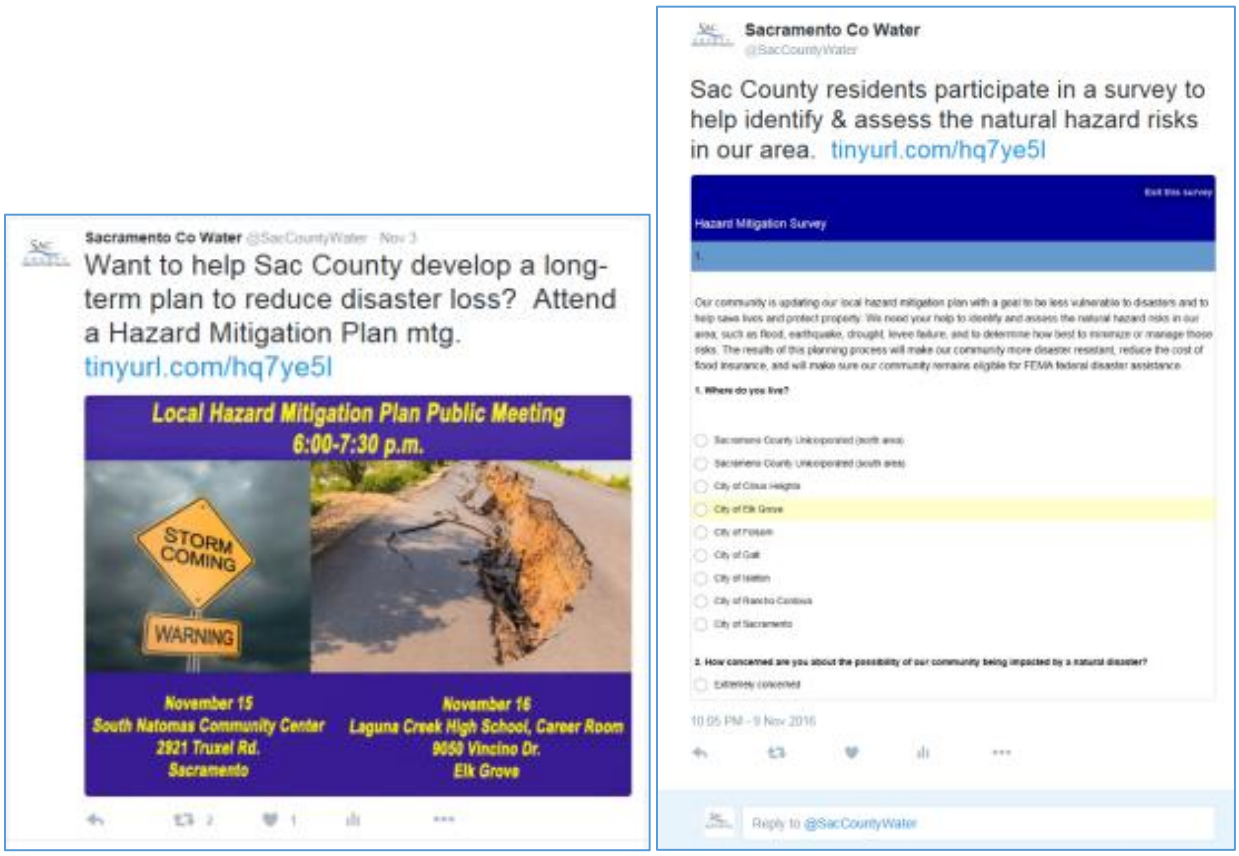
Source: Sacramento County

Figure F-2 Facebook Outreach Results



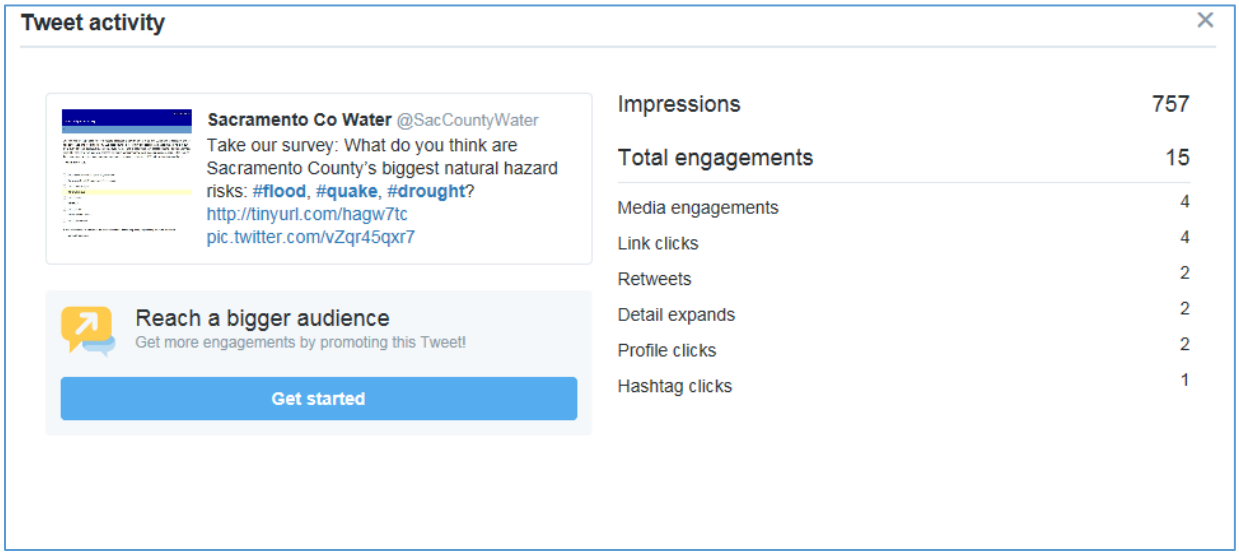
Source: Sacramento County

Figure F-3 Twitter Outreach



Source: Sacramento County

Figure F-4 Twitter Outreach Results

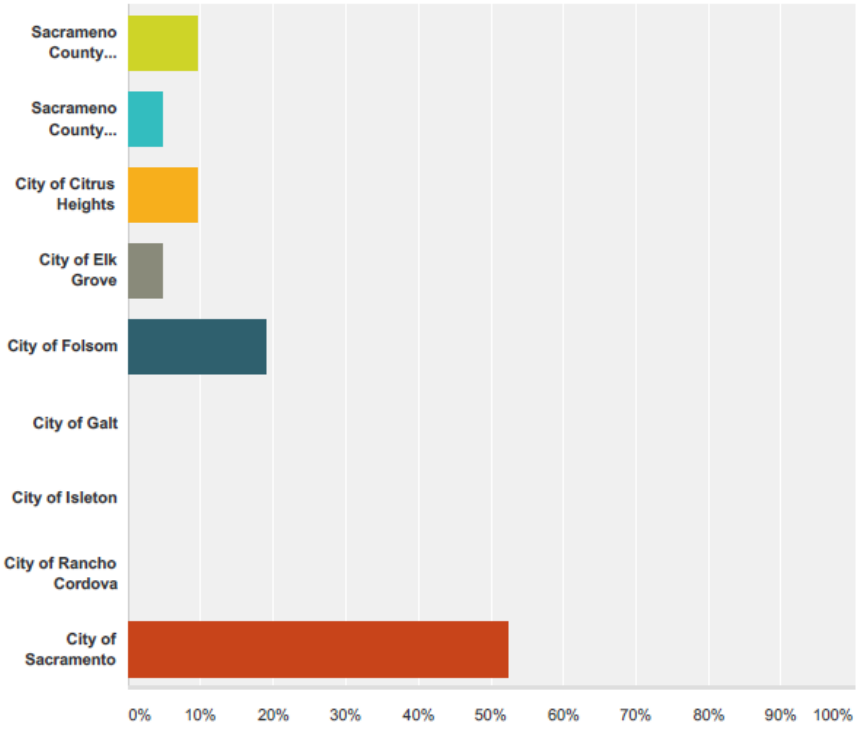


Source: Sacramento County

Survey Results

Q1 Where do you live?

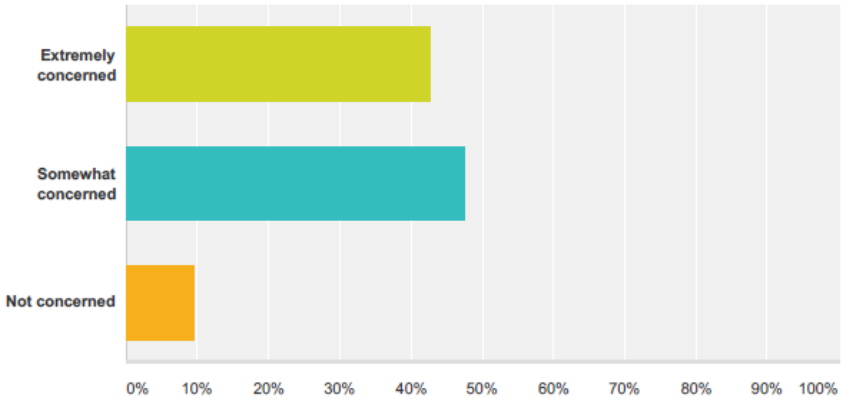
Answered: 21 Skipped: 0



Answer Choices	Responses	
Sacrameno County Unicorporated (north area)	9.52%	2
Sacrameno County Unicorporated (south area)	4.76%	1
City of Citrus Heights	9.52%	2
City of Elk Grove	4.76%	1
City of Folsom	19.05%	4
City of Galt	0.00%	0
City of Isleton	0.00%	0
City of Rancho Cordova	0.00%	0
City of Sacramento	52.38%	11
Total		**21**

Q2 How concerned are you about the possibility of our community being impacted by a natural disaster?

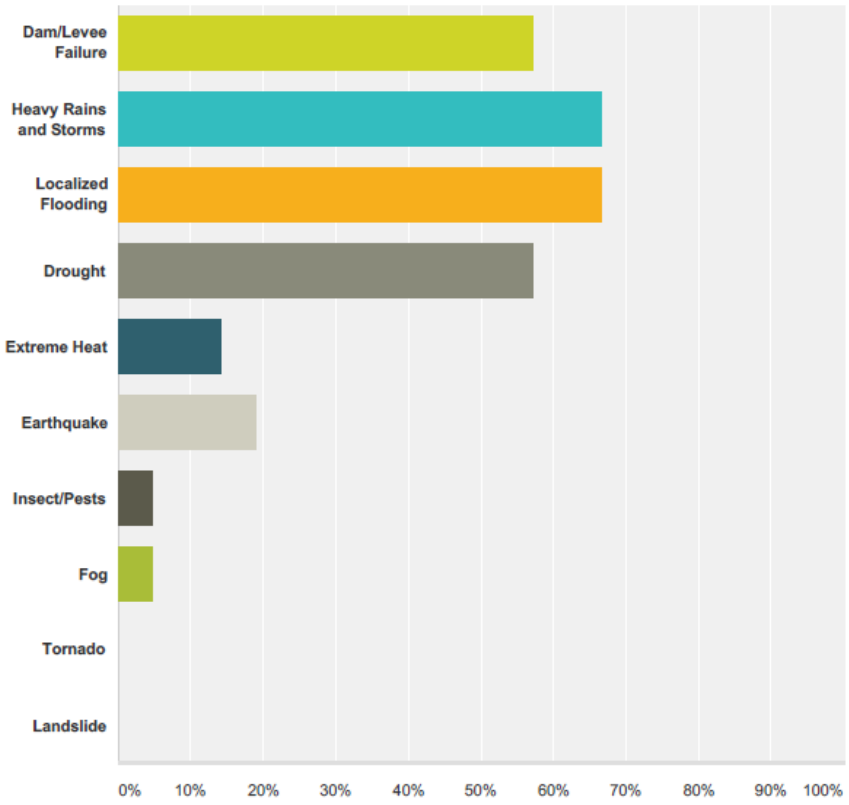
Answered: 21 Skipped: 0



Answer Choices	Responses	
Extremely concerned	42.86%	9
Somewhat concerned	47.62%	10
Not concerned	9.52%	2
Total		21

Q3 Please select the top three hazards you think are the highest threat to your neighborhood.

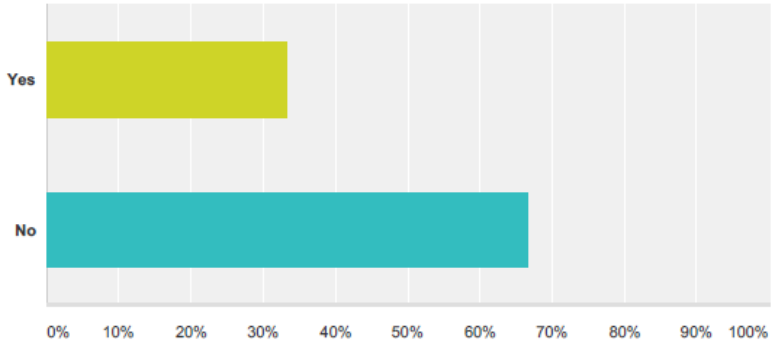
Answered: 21 Skipped: 0



Answer Choices	Responses	
Dam/Levee Failure	57.14%	12
Heavy Rains and Storms	66.67%	14
Localized Flooding	66.67%	14
Drought	57.14%	12
Extreme Heat	14.29%	3
Earthquake	19.05%	4
Insect/Pests	4.76%	1
Fog	4.76%	1
Tornado	0.00%	0
Landslide	0.00%	0
Total Respondents: 21		

Q4 Have you ever experienced or been impacted by a natural disaster?

Answered: 21 Skipped: 0



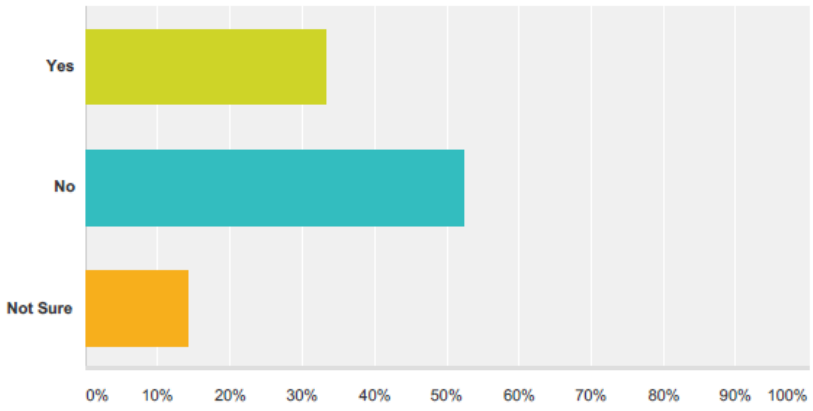
Answer Choices	Responses	
Yes	33.33%	7
No	66.67%	14
Total		21

Q5 If you answered yes to question 4, please describe the type of hazard and if it affected your home or business.

Answered: 8 Skipped: 13

Q6 Are communities doing enough to inform the public about the dangers of the hazards affecting Sacramento Couinty listed in question 3 above?

Answered: 21 Skipped: 0



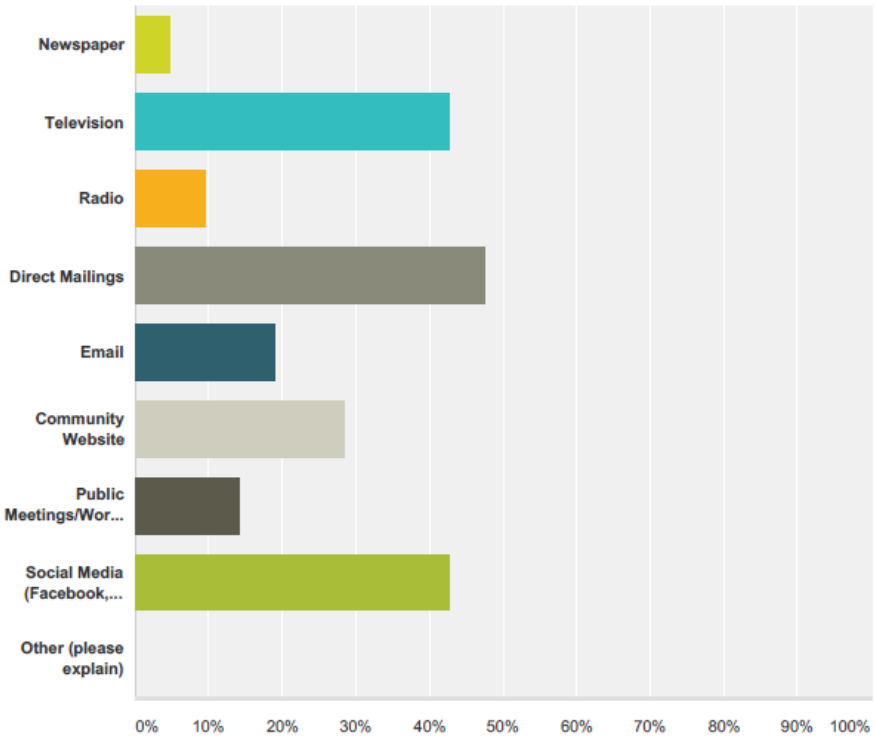
Answer Choices	Responses	
Yes	33.33%	7
No	52.38%	11
Not Sure	14.29%	3
Total		21

Q7 If your answer to question 5 above is no, what can communities do to improve your knowledge of the risks associated with these hazards?

Answered: 12 Skipped: 9

Q8 In your opinion, what are the two (2) most effective ways for you to receive information on how to make your home and neighborhood more disaster resistant? Select your top two (2) choices:

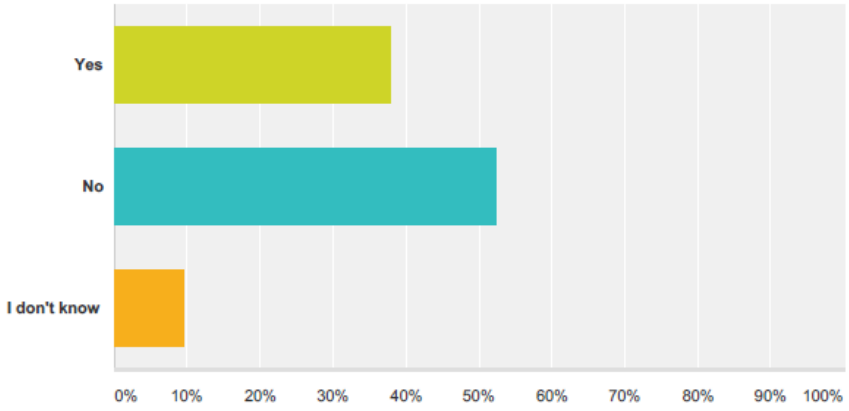
Answered: 21 Skipped: 0



Answer Choices	Responses	
Newspaper	4.76%	1
Television	42.86%	9
Radio	9.52%	2
Direct Mailings	47.62%	10
Email	19.05%	4
Community Website	28.57%	6
Public Meetings/Workshops	14.29%	3
Social Media (Facebook, Twitter, etc.)	42.86%	9
Other (please explain)	0.00%	0
Total Respondents: 21		

Q9 Is your home or business protected by a levee?

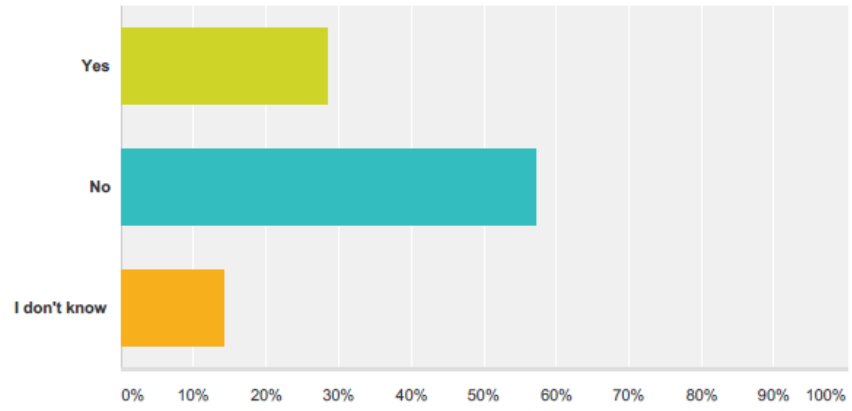
Answered: 21 Skipped: 0



Answer Choices	Responses	
Yes	38.10%	8
No	52.38%	11
I don't know	9.52%	2
Total		21

Q10 Is your home or business located in a floodplain?

Answered: 21 Skipped: 0



Answer Choices	Responses	
Yes	28.57%	6
No	57.14%	12
I don't know	14.29%	3
Total		21

Appendix G Repetitive Loss Area Analysis Report

CITY OF SACRAMENTO
REPETITIVE LOSS AREA ANALYSIS SUMMARY

On May 3, 2016, the City's Repetitive Loss Area Analysis (RLAA) was adopted by City Council as part of the City of Sacramento's Comprehensive Flood Management Plan. The RLAA analyzed the cause of repetitive flooding for five regions within the city. It was found that the main cause of repetitive flooding was the undersized drainage conveyance system. GEI Consultants conducted further investigation of flooding for Region 5 properties and provided mitigation recommendations for three areas within the region. The updated RLAA (December 2016) has been incorporated into the 2016 Comprehensive Flood Management Plan. Below is a summary of the City of Sacramento's Repetitive Loss Area Analysis.

Region 1 – South Natomas

The greater Natomas basin is 55,000 acres in size and extends into the northwest portion of Sacramento County running south just north of downtown at the American River Parkway (3 miles from downtown). Within the City, the area of the Natomas basin is approximately 12,500 acres and is surrounded by levees. The area of the Natomas is identified within the SFHA and is at risk to internal drainage issues, riverine flooding and potential breach. The Natomas area is broken into North Natomas and South Natomas, with our focus in terms of the RLAA being on South Natomas. Within the South Natomas area, three repetitive loss areas were analyzed.

Region 1 Overview	
Number of Properties in the Defined Region	92
Number of NFIP Repetitive Loss Properties	3
Number of Claims	6
Dates of Flooding	January 1995, January 1997, February 1998, January 2000
Flood Zone	A99

Findings and Recommendations:
Area 1: The addition of fill to the repetitive loss property causes water to seep into a portion of the structure that is built below grade. *Recommendations:* Remove the landscaping fill from the property, sandbags, or elevate the portion of the structure that is built below grade.

Area 2: Flooding occurred during heavy winter storms. The source of the flooding was from an adjacent property built at a higher elevation. *Recommendations:* Grading on the property to redirect the flow of water, installation of drains to divert pooling water, or sandbags.

Area 3: Flooding was caused due to the failure of a floodproofing system on a building located on the river side of levee. *Recommendations:* Improvement or replacement of floodproofing system.

Region 2 – Downtown East

The three repetitive loss areas in Region 2 are located in or near the River Park Neighborhood. This neighborhood is located west of Sacramento State University and follows the American River. This area is vulnerable to overbank flooding and has other risks such as drainage issues from the combined sewer system.

Region 2 Overview	
Number of Properties in the Defined Region	74
Number of NFIP Repetitive Loss Properties	3
Number of Claims	7
Dates of Flooding	February 1986, June 1993, April 1995, January 1995, January 1997, February 1998
Flood Zone	Shaded-X Zone

Findings and Recommendations:
Area 4: During the flooding events, the industrial park was in a low-lying area near the American River with an undersized drainage conveyance system and with no onsite drainage. *Recommendations:* It is recommended that this area be removed from the Repetitive Loss List because of the completion of mitigation projects. Sump 31 has been enlarged and a new force main was constructed to the American River. Additionally, a detention basin has also been added to help mitigate flooding in the area.

Area 5: Flooding occurred during heavy storms that overwhelmed the undersized drainage system in the area. *Recommendations:* Based on the Basin 10 Drainage Master Plan, it is suggested that critical pipes in the system should be enlarged and a detention basin should be constructed to provide adequate flood protection for the basin. These improvements would mitigate the repetitive loss properties in Area 5.

Area 6: This area is located in the combined sewer system with an undersized drainage conveyance system. During large storms water pools in the streets and yards of the surrounding residents. Most flood loss was due to water seeping into garages and into doorways located at grade level. *Recommendations:* Improvement of drainage system, elevation of lower homes, sandbags, flood insurance, and outreach to express the importance of keeping storm drains clear of leaves and debris.

Region 3 – Downtown West

Region 3 of the City of Sacramento's RLAA is the western portion of Downtown Sacramento located just east of the Sacramento River. This area consists of several commercial buildings and high-rises as well as housing. The repetitive loss properties located in this region are all in the category of housing and the primary source of flooding in this area occurs due to the combined sewer systems that back up due to the undersized conveyance system.

Region 3 Overview	
Number of Properties in the Defined Region	234
Number of NFIP Repetitive Loss Properties	5
Number of Claims	13
Dates of Flooding	January 1995, March 1995, December 1995, January 1997, September 2004
Flood Zone	Shaded-X

Findings and Recommendations:
Areas 7-11: These areas are located in the combined sewer system with an undersized conveyance system. Flooding occurs when the system is overwhelmed due to a long duration storm. *Recommendations:* Improvement of drainage system, elevation of buildings, basements and garages, sandbags or floodgates, and flood insurance.

Region 4 – Southeast Sacramento

Region 4 of the RLAA is located near the Southeast portion of Sacramento's city limits. This entire region is comprised of residential properties located between 65th Avenue and Power Inn Road. There are 2 repetitive loss properties located in this region that have flooded due to uneven land. Water from higher adjacent properties flows into low lying areas cause some homes to flood.

Region 4 Overview	
Number of Properties in the Defined Region	79
Number of NFIP Repetitive Loss Properties	2
Number of Claims	6
Dates of Flooding	January 1995, December 1996, January 1997, December 2005
Flood Zone	Shaded-X

Findings and Recommendations:
Area 12: This area is in an undersized conveyance system which floods during heavy storms. *Recommendations:* Improvement of drainage system, elevation of buildings, sandbags or floodgates, and flood insurance.

Area 13: Flooding occurred during heavy winter storms. The source of the flooding was from open land adjacent to the property. *Recommendations:* Grading on the property to redirect the flow of water, installation of drains to divert water, or sandbags.

Region 5 – Sutterville/Meadowview

Region 5 of the RLAA stretches from Sutterville Road down south to Meadowview Road. The majority of this area is residential, however it does consist of a few shopping/corporate centers, Bing Maloney Gold Course, and the Sacramento Executive Airport. This entire region is classified by FEMA as a Shaded-X Zone with a low risk of flooding due to surrounding levees.

Region 5 Overview	
Number of Properties in the Defined Region	252
Number of NFIP Repetitive Loss Properties	8
Number of Claims	22
Dates of Flooding	March 1989, January 2000, February 2000, January 1993, January 1995, January 1996, February 1996, January 1997, February 2000, December 2005
Flood Zone	Shaded-X

Findings and Recommendations:

Area 14: Based on the investigation preformed by GEI Consultants it was discovered that flooding likely occurred due to undersized drainage system during long duration storm events. Discussions with the property owner confirmed this conclusion and acknowledge that water would enter the building through two doors that were at grade. *Recommendations:* Design and construct a low-lying floodwall in front of the two entrances, increase pipe size in drainage system, additional drainage and grading of the property, or elevation of the finished floor.

Area 15: This area is located in a low-lying area with an undersized drainage conveyance system. Flooding occurs during long duration storms. *Recommendations:* Construction of a detention basin at Land Park Golf Course, flood insurance, or possible elevation of structures.

Area 16: This area is located in a low-lying area with an undersized drainage conveyance system. Flooding occurs during long duration storms. *Recommendations:* Improvement of drainage system, elevation of buildings and garages, sandbags or floodgates, and flooding insurance.

Area 17: Based on GEI Consultants' investigation the most logical reason for flooding is unique to one structure within the area. It is believed that an addition of a patio structure in the back of the property reduced the ability of the property to drain properly. *Recommendations:* Place underground drains to allow the backyard to discharge on the main street, flood insurance, and sandbags.

Area 18: Based on GEI Consultants' investigation the flooding in this area is caused by undersized drain pipes that are overwhelmed during long duration storms. *Recommendations:* Drainage system improvements, flood preparedness education, flood insurance, and sandbags.

Sacramento County

Department of Water Resources
Drainage Development

REPETITIVE LOSS AREA ANALYSIS REPORT

JULY 2015

SACRAMENTO COUNTY

Sacramento County
Repetitive Loss Area Analysis

Table of Contents

Appendix 4	Chicken Ranch Slough Floodplain
Appendix 5	Lower Cosumnes River / Beach-Stone (Twin Cities Road)
Appendix 6	Brooktree Creek Floodplain
Appendix 7	Morrison Creek Floodplain
Appendix 8	Cosumnes River Floodplain
Appendix 9	South Branch of Arcade Creek Floodplain
Appendix 10	Strong Ranch Slough Floodplain
Appendix 11	Linda Creek Floodplain
Appendix 12	Grand Island Road & Vieira's Resort
Appendix 13	Local Floodplain (Badger Creek)
Appendix 14	Arcade Creek Floodplain
Appendix 15	Local Floodplain (Dillard Road/Berry Road)
Appendix 16	Robla Creek Floodplain
Appendix 17	Sacramento River Floodplain (Garden Highway)
Appendix 18	Local Floodplain (Leona Circle)
Appendix 19	Local Floodplain (Tangerine Avenue)
Appendix 20	Local Floodplain (Treehouse Lane)
Appendix 21	Rio Linda Dry Creek Floodplain
Appendix 22	North Natomas East Main Drain Canal
Appendix 23	Morrison Creek Floodplain
Appendix 24	Arcade Creek Floodplain at Park Road
Appendix 25	Local Floodplain Madison Avenue at Rollingwood
Appendix 26	Strong Ranch Slough
Appendix 27	Brooktree Creek Floodplain
Appendix 28	Verda Cruz Creek Floodplain

EXECUTIVE SUMMARY

The purpose of this Report is to assist home owners in reducing their flood risk by providing a broader understanding of the potential and existing flooding problems and identifying potential solutions. This is one component of Sacramento County's overall floodplain management program. Due to the number of properties in Sacramento County that meet the National Flood Insurance Program's (NFIP's) definition of Repetitive Loss properties, a Repetitive Loss Area Analysis (RLAA) is required for Sacramento County as a part of its participation in the Community Rating System (CRS) program. This Report contains all twenty-eight (28) designated Repetitive Loss Areas (RLAs) within Sacramento County.

The County followed a process prescribed by the CRS program. An area analyses must have been prepared and adopted for each repetitive loss area in the community. The analyses must meet the following criteria:

- The repetitive loss areas must be mapped.
- A five-step process must be followed. Although all five steps must be completed, steps 2–4 do not have to be done in the order listed. For example, staff may want to contact agencies and organizations to see if they have useful data (Step 2) after the site visit is conducted (Step 3).
- The repetitive loss area analysis report(s) must be submitted to the community's governing body and made available to the media and the public. If private or sensitive information is included in the report, then a summary report may be prepared for the media and the public. The complete repetitive loss area analysis report(s) must be adopted by the community's governing body or by an office that has been delegated approval authority by the community's governing body.
- An annual evaluation report must be done.
- The analysis must be updated in time for each CRS cycle verification visit.

Properties in the RLAs were notified of the analysis and data was collected from various sources to identify the hazard and capabilities to mitigate them.

Section 2 of this Report describes the specific steps, which include: implementing recommended flood hazard mitigation measures, obtaining funding assistance for these measures, and annually updating this Report.

1. BACKGROUND

1.1 Problem Statement

More than 370 square miles of Sacramento County is within the Special Flood Hazard Area. Additionally, the Department of Water Resources has identified many other areas that are subject to local flood hazards that are not shown on FEMA's maps. Flooding is a reoccurring problem for communities within Sacramento County, and neighborhood flooding events disrupt transportation, commerce, and lives. Property damage due to flooding is more than an inconvenience; it carries a significant price of both time and money.

Flooding is defined as a damaging overflow of water into a building or onto land that is dry most of the time. One type of flooding occurs when streams or rivers overflow into a floodplain, but flooding also occurs outside of floodplains when the rate of storm water runoff exceeds the capacity of the drainage system. Flooding in Sacramento County is due to the capacity of the drainage system and to overflowing rivers or streams.

The purpose of this Report is to help home owners reduce their flood risk by providing a broader understanding of the problems and identifying potential solutions. This is one component of Sacramento County's overall floodplain management program. Due to the number of properties in Sacramento County that meet the National Flood Insurance Program's (NFIP's) definition of repetitive loss properties, a Repetitive Loss Area Analysis (RLAA) is required for Sacramento County as a part of its participation in the Community Rating System (CRS) program.

1.2 National Flood Insurance Program (NFIP)

The NFIP is based on a cooperative agreement between the Federal Emergency Management Agency (FEMA) and local units of government. FEMA agrees to underwrite flood insurance policies within a community and the community agrees to regulate development in the floodplain. Participation in the NFIP is voluntary, but communities have incentive to join because Federally- backed flood insurance is not available in non-participating communities and a non-participating community will not receive Federal aid for damage to insurable buildings in the floodplain.

The three basic components of the NFIP are floodplain mapping, flood insurance, and floodplain management regulations. Floodplain mapping is provided by FEMA on a series of maps called Flood Insurance Rate Maps (FIRM), which designate areas of a community according to various levels of flood risk. Regardless of its risk level, any building in an NFIP participating community can be covered by a flood insurance policy, even buildings not located in a mapped floodplain. A flood insurance policy is only mandated for Federally-backed

mortgages on buildings in the floodplain. Any new buildings constructed in a floodplain, and any improvements or repair of existing buildings in a floodplain, is subject to the Sacramento County Floodplain Management Ordinance (Chapter 6).

1.3 Community Rating System (CRS)

The CRS is a voluntary program designed to reward a community for doing more than meeting the NFIP minimum requirements to reduce flood damages. Communities can be rewarded for activities such as: reducing flood damage to existing buildings, managing development in in areas not shown in the floodplain on the FIRMs, protecting new buildings from floods greater than the 100-year flood, helping insurance agents obtain flood data, and helping people obtain flood insurance. The reward for these activities comes in the form of reduced premiums for flood insurance policy holders.

Once a community has been accepted into the CRS, the community's floodplain management activities are rated according to the scoring system described in the CRS Coordinator's Manual. CRS communities are rated on a scale of 1-10. A Class 10 community receives no reduction in flood insurance premiums, but every class above 10 receives an additional 5% premium reduction. Class 1 requires the most credit points and provides a 45% premium reduction. Sacramento County is currently a Class 3.

1.4 Repetitive Loss Area (RLA)

The NFIP considers a property a Repetitive Loss Property if two or more flood insurance claims of more than $1,000 have been paid within any 10-year period since 1978. According to FEMA's records, there are 101 Repetitive Loss Properties within Sacramento County. Several more properties within Sacramento County may have reached the damage threshold for Repetitive Loss Properties, but not all properties are covered by flood insurance and flood insurance claims are not submitted for all flood damage sustained.

A Repetitive Loss Area (RLA) consists of Repetitive Loss Properties and the surrounding properties that experience the same or similar flooding conditions, whether or not the buildings on those surrounding properties have been damaged by flooding. Figure 1 shows the 26 RLAs in Sacramento County.

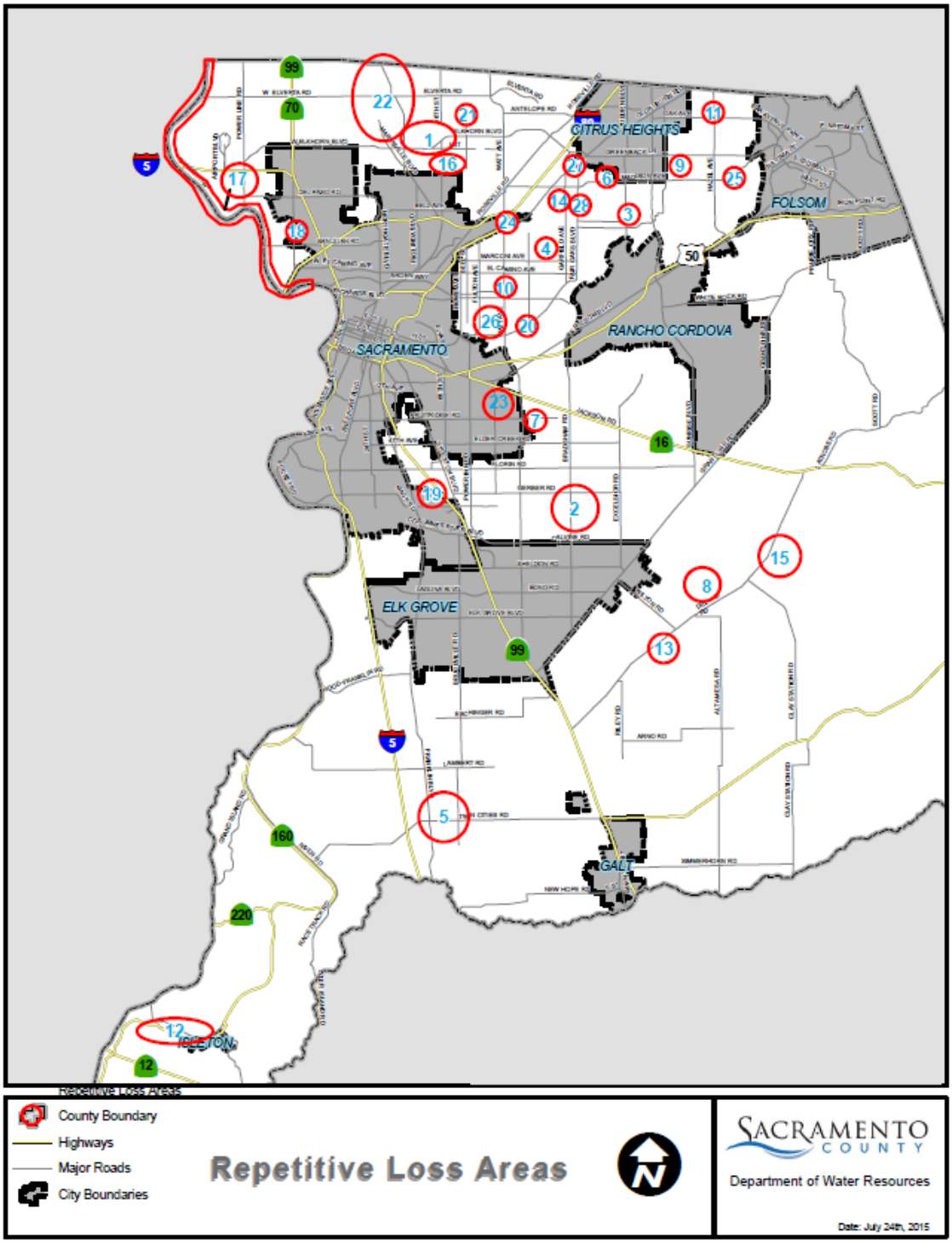
1.5 Sacramento County Floodplain Management Ordinance

The Floodplain Management Ordinance specifically describes what types of development activities are allowed and how proposed development may be permitted. The floodplain management is to realize the extent of flood hazards and to manage the flooding in a manner so

as to reduce damage to structures and infrastructure and to minimize the risk of human casualties.

FIGURE 1

Repetitive Loss Areas in Sacramento County



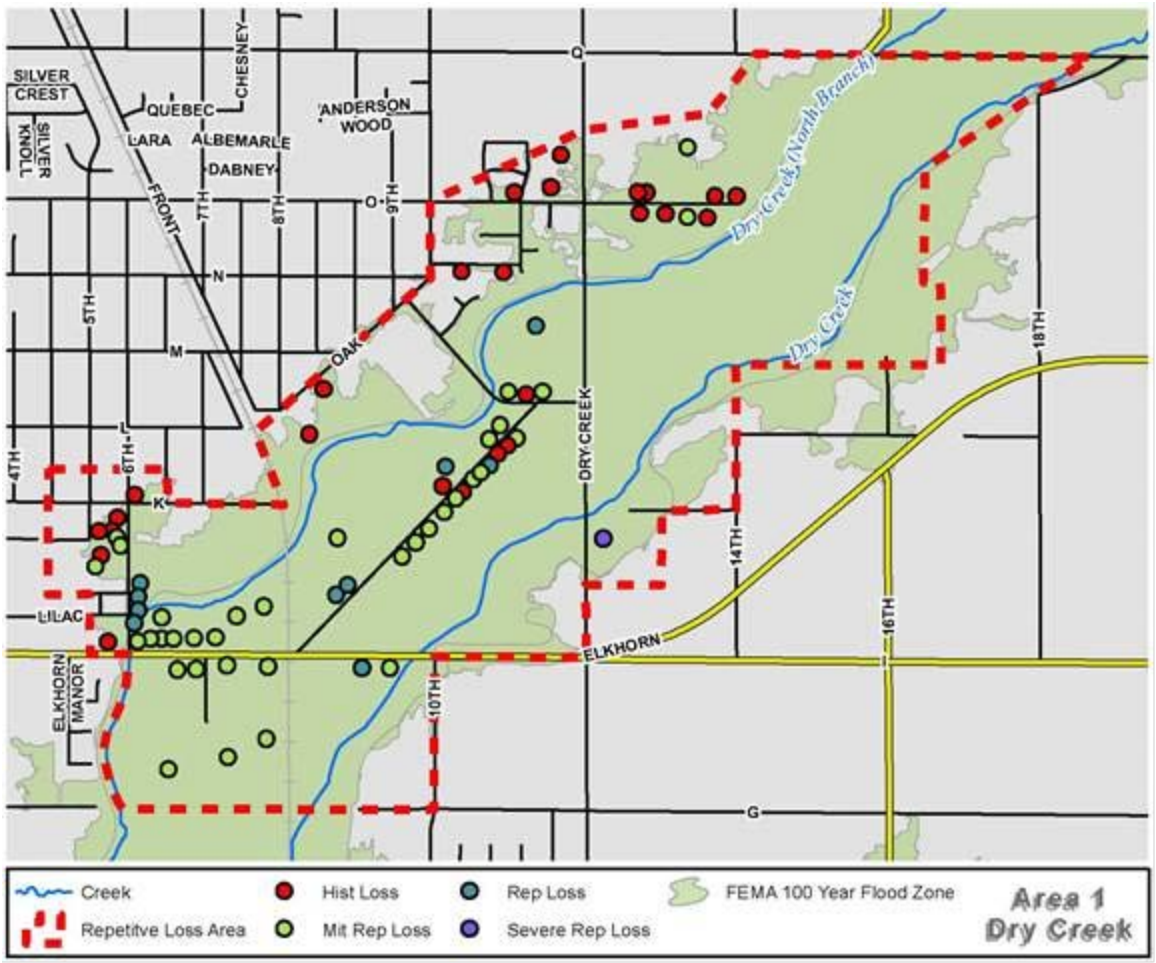
1.6 Repetitive Loss Area Analysis (RLAA)

A repetitive loss area analysis is a detailed mitigation plan for a repetitive loss area. It provides more specific guidance on how to reduce damage from repetitive flooding than the local hazard mitigation plan. The summary RLAA can be found in the Sacramento County Local Hazard Mitigation Plan.

As with a local hazard mitigation plan, CRS credit is dependent upon the community's following an appropriate process. The five steps for an area analysis are less involved than the 10-step local hazard mitigation planning process, but the analysis must evaluate each building in the repetitive loss area(s).

Figure 2 demonstrates a RLAA map with the typical information in the legend.

FIGURE 2
Repetitive Loss Area



2. REPETITIVE LOSS AREA ANALYSIS PROCESS

The process of developing a RLAA consists of five steps:

Step 1 – Advise all the properties in each Repetitive Loss Area (RLA) that the analysis will be conducted and request their input on the hazard and recommended actions.

Step 2 – Collect data from agencies or organizations that may have plans or studies that could affect the cause or impacts of the flooding.

Step 3 – Inspect each building in the RLA and collect basic data. Building entry is not necessary for this step since adequate information can be collected by observing the building from the street.

Step 4 – Review alternative approaches and determine whether any property protection measures or drainage improvements are feasible. The review must consider the full range of property protection measures for the types of buildings affected, including: preventative activities, property protection activities, natural resource protection activities, emergency services measures, structural projects, and public information activities.

Step 5 – Document the findings in a report. The report should include: a summary of the process that was followed and how property owners were involved in the process; a problem statement with a map of the affected area; a list or table showing basic information for each building in the affected area; the alternative approaches that were reviewed; and a list of action items identifying the responsible party, when the action should be completed, and how it will be funded.

2.1 Advise the Residents

Sacramento County sent Storm Ready letters and mailers to all residents informing them of the potential flooding they may experience during storm events. Annual outreach letters have been mailed to residents in RLAs since 1992. Further a website has been developed and communicated to residence for more information on measures to take in advance of the rainy season to prepare for inclement weather and possible flooding, www.stormready.org.

Sacramento County shall notify residents of the ongoing RLAA and requested their input. Upon completion of a draft of this Report, a letter and survey was sent out to residents in each of the RLAAs informing them of this Report, where and how they would be able to review it, and where and how they might submit comments regarding it. Both communication documents are shown in Figure 2A & 2B respectively.

FIGURE 2A
Repetitive Loss Area Report Letter

Robert B. Leonard
Chief Deputy County Executive

Department of Water Resources
Michael L. Peterson, Director

County of Sacramento

Bradley J. Hudson
County Executive

Dear Resident,

The Sacramento County Department of Water Resources is conducting a Repetitive Loss Area Analysis (RLAA) report. A Repetitive Loss Area (RLA) includes the properties on the repetitive loss list obtained from FEMA and all nearby properties with the same or similar flooding conditions. It is important to note that the only reason a property appears on FEMA's list is because the structure had flood insurance and received two or more claims of at least $1,000 during any given 10-year period. These properties are merely representative of the County's overall repetitive flooding problem.

You are receiving this letter because this property has been identified in a RLA. Sacramento County is looking for input from residents in these areas about their flooding experiences and for comments on our draft report. Please take a few minutes to complete the attached survey and return it by **DATE** to:

Sacramento County
Department of Water Resources
827 7th St. Suite 301
Sacramento, CA 95814
Attention: Floodplain Management

You may also fax your survey to (916)874-3789 or email it to floodj@saccounty.net. The survey is also available online survey at www.surveymonkey.com. At the end of the survey, you will have the opportunity to express your interest in commenting on our draft report or just to review it.

Thank you in advance for your assistance. If you have any further questions, please contact Sacramento County Department of Water Resources Floodplain Management at (916) 874-6851.

FIGURE 2B-1
Repetitive Loss Area Report Survey

Take the Survey

SACRAMENTO COUNTY

1. Address _____

_____

2. How long have you lived at this address? _____ ☐ Months ☐ Years

3. Was your home built before 1979? ☐ NO ☐ YES ☐ DON'T KNOW

4. What Type of Foundation does your house have?

☐ Slab ☐ Crawlspace (answer #5) ☐ Post/piles (answer #5)

5. If your house has a crawlspace or post/piles foundation, please indicate how high from the grade (ground) your lowest floor of the living area. _____ (in, ft.)

6. Has the property ever flooded? ☐ YES ☐ NO

7. In what year(s) did your structure(s) flood? _____

8. Did you experience flooding in your ☐ Home ☐ Attached Garage ☐ Other

If other indicate type of structure (barn, detached garage, etc.) _____

9. Please indicate the depth of flooding:

☐ Home Depth of flooding _____ inches

☐ Attached Garage Depth of flooding _____ inches

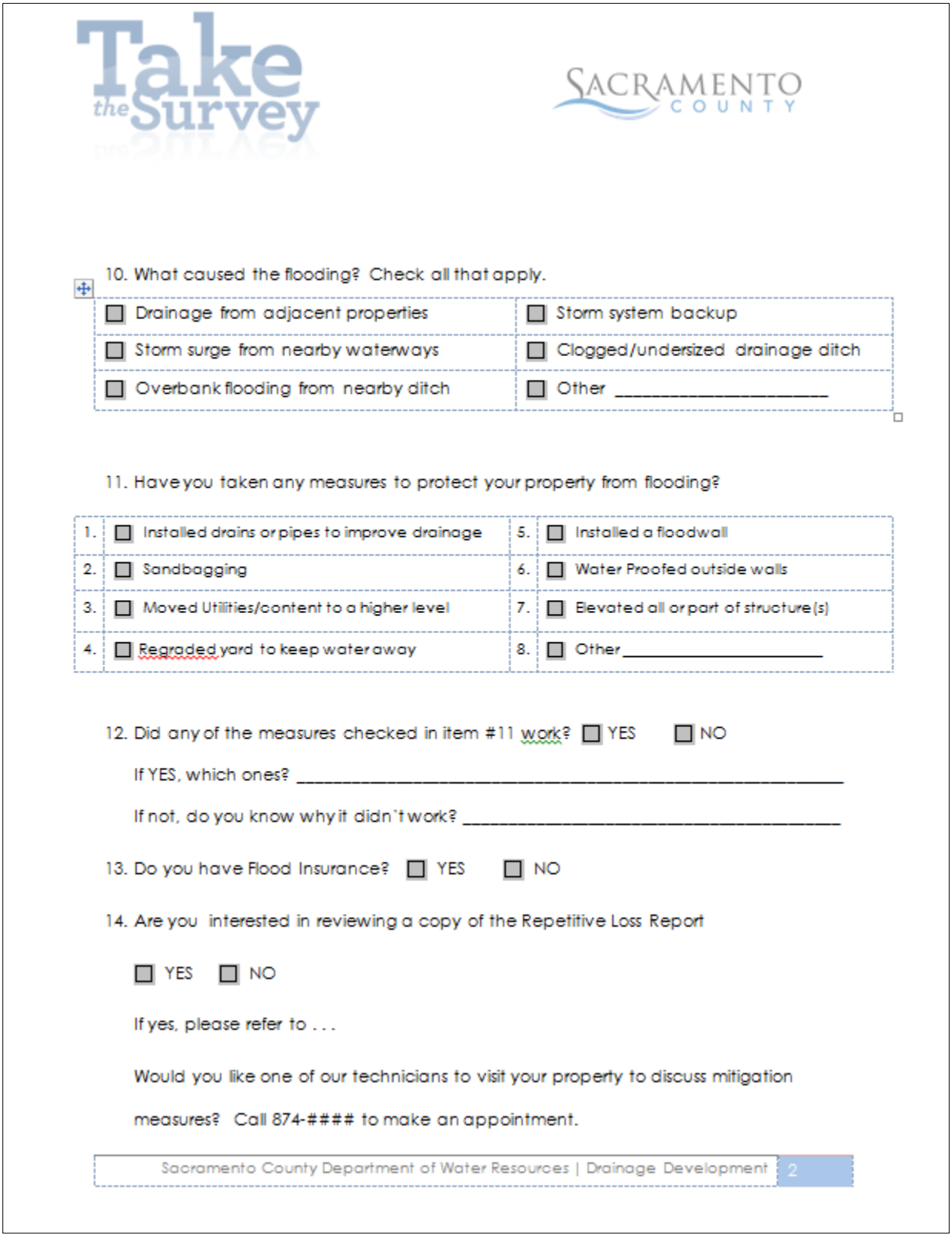
☐ Other (describe): _____.

Depth of flooding _____ inches

☐ Flood water was kept out of structure by sandbagging or other protective measure. Describe: _____.

Sacramento County Department of Water Resources | Drainage Development 1

FIGURE 2B-2
Repetitive Loss Area Report Survey



Take the Survey

SACRAMENTO COUNTY

10. What caused the flooding? Check all that apply.

☐ Drainage from adjacent properties	☐ Storm system backup
☐ Storm surge from nearby waterways	☐ Clogged/undersized drainage ditch
☐ Overbank flooding from nearby ditch	☐ Other _____

11. Have you taken any measures to protect your property from flooding?

1.	☐ Installed drains or pipes to improve drainage	5.	☐ Installed a floodwall
2.	☐ Sandbagging	6.	☐ Water Proofed outside walls
3.	☐ Moved Utilities/content to a higher level	7.	☐ Elevated all or part of structure(s)
4.	☐ Regraded yard to keep water away	8.	☐ Other _____

12. Did any of the measures checked in item #11 work? ☐ YES ☐ NO

If YES, which ones? _____

If not, do you know why it didn't work? _____

13. Do you have Flood Insurance? ☐ YES ☐ NO

14. Are you interested in reviewing a copy of the Repetitive Loss Report

☐ YES ☐ NO

If yes, please refer to . . .

Would you like one of our technicians to visit your property to discuss mitigation measures? Call 874-#### to make an appointment.

Sacramento County Department of Water Resources | Drainage Development 2

2.2 Contact Agencies or Organizations

Agencies or organizations that were contacted that may have plans or studies that could affect the cause or impacts to flooding are:

- Sacramento County Department of Transportation
- Sacramento Area Flood Control District
- Sacramento County Planning and Environmental Review
- Department of Water Resources Drainage Maintenance Engineering

2.3 Visit RLAs and Collect Basic Building Data

On-site inspections of buildings in the RLA were performed. This inspection was performed from the public right-of-way by a County Certified Floodplain Manager (CFM). As such, the CFM did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations and information obtained, and when available from Elevation Certificates on file. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Garage location and relative elevation;
- Property grading;
- Neighborhood topography and flow routes.

A table will be used for each RLA property to summarize the findings.

Condition of Structure – These data are based on the level of repair required. Consultation with the local building official is highly recommended.

- **Good** (optional minor repair) – Select this option when only cosmetic type repairs are needed.
- **Fair** (needs minor repair) – Select this option when the following characteristics are observed:
  - Minor shrinkage cracks due to thermal expansion and contraction
  - Signs of rust on iron or steel members
  - Signs of corrosion of rebar
- **Poor** (needs significant repair) – Select this option when the following types of damage are observed:
  - Bowed brick veneer wall or parapet walls
  - Leaning of wall
  - Cracking of wall due to excessive settlement
  - Building settlement

- Large cracking around sills, eaves, chimneys, parapets, and iron or steel lintels
- Differential settlement of chimney
- Fungal and insect attack of wood
- Exposed rebar in concrete walls due to corrosion
- Fire damage

Foundation Type – The selection of a foundation type may require a close inspection of the structure. Consultation with the local building official is highly recommended (see Section 2.5).

2.4 Review Alternatives

Many types of flood hazard mitigation exist, and there is not one mitigation measure that fits every case. Nor is there even one application that fits most cases. Successful mitigation often requires multiple strategies. The CRS Coordinator's Manual breaks the primary types of mitigation down as displayed in Figure 3.

FIGURE 3
Categories of Floodplain Management Activities (FEMA FIA-15, 2013)

1. **Preventive** activities keep flood problems from getting worse. The use and development of flood-prone areas is limited through planning, land acquisition, or regulation. They are usually administered by building, zoning, planning, and/or code enforcement offices.
2. **Property Protection** activities are usually undertaken by property owners on a building-by- building or parcel basis.
3. **Natural Resource Protection** activities preserve or restore natural areas or the natural functions of floodplain and watershed areas. They are implemented by a variety of agencies, primarily parks, recreation, or conservation agencies or organizations.
4. **Emergency Services** measures are taken during an emergency to minimize its impact. These measures are usually the responsibility of city or county emergency management staff and the owners or operators of major or critical facilities.
5. **Structural Projects** keep flood waters away from an area with a levee, reservoir, or other flood control measure. They are usually designed by engineers and managed or maintained by public works staff.
6. **Public Information** activities advise property owners, potential property owners, and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of local floodplains. They are usually implemented by a public information office.

2.4.1 Preventative

Sacramento County regulates residential and commercial development through its building code, planning and zoning requirements, stormwater management regulations and floodplain management ordinances. Any project located in a floodplain, regardless of its size, requires a

permit from Sacramento County, unless the project can be characterized as routine maintenance.

2.4.2 Property Protection

These measures are generally performed by the property owners or their agents. FEMA has published numerous manuals that help a property owner determine which property protection measures are appropriate for particular situations, several of which are listed below. The manuals listed below are available for review at FEMA website.

- FEMA 259, Engineering Principles and Practices of Retrofitting Floodprone Residential Structures
- FEMA 312, Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding
- FEMA 551, Selecting Appropriate Mitigation Measures for Floodprone Structures
- FEMA 348, Protecting Building Utilities from Flood Damage
- FEMA 511, Reducing Damage from Localized Flooding
- FEMA 102, Floodproofing Non-Residential Structures
- FEMA 84, Answers to Questions about the NFIP
- FEMA 54, Elevated Residential Structures Book
- FEMA 268, Protecting Floodplain Resources: A Guidebook for Communities
- FEMA 347, Above the Flood: Elevating Your Floodprone House
- FEMA 85, Protecting Manufactured Homes from Floods and Other Hazards

For a complete guide to retrofitting your home for flood protection see *FEMA P-312, Homeowner's Guide to Retrofitting 3rd Edition (2014).* The primary methods of property protection in Sacramento County are:

1. Demolition/Relocation.
2. Elevation (structure or damage prone components such as furnace or AC unit)
3. Dry flood-proof (so water cannot get in).
4. Wet flood-proof portions of the building (so water won't cause damage).
5. Direct drainage away from the building.
6. Drainage maintenance.
7. Sewer Improvements.

Demolition

The only way to ensure a structure will not accumulate additional losses from future flood events is to demolish the structure completely. There are two options demolishing a structure.

- A government agency can purchase the property, demolish the structure, and convert the property to a park or other open space.
- The property owner may retain ownership, demolish the structure, and build a new structure in a manner that meets all local building and flood protection code requirements.

Home Elevation

Sometimes dry or wet floodproofing are not enough and greater measures must be taken. For example, if the floodwaters are too high for dry floodproofing and the inhabited area is too low for wet floodproofing, it may be necessary to raise the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, Sacramento County has utilized FEMA grant money for dozens of qualified elevation projects.

The structure in Figure 4 is an example of a home that is elevated above the 100-year flood elevation. The Sacramento County Floodplain Management Ordinance requires all substantially improved residential buildings have their lowest floor elevated 18 inches above the 100-year flood elevation. This may exclude a basement in the elevated building.

FIGURE 4
Elevated House

Dry Floodproofing

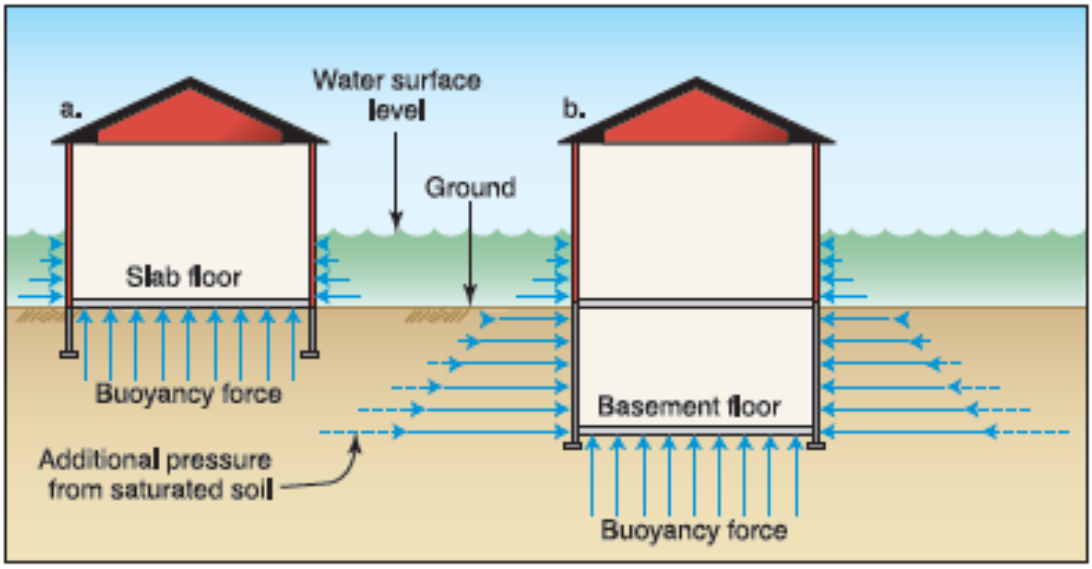
Dry floodproofing consists of completely sealing around the exterior of the building so that water cannot enter the building (see Figure 5). Dry floodproofing is not a good option for areas where floodwater is deep or flows quickly. The hydrostatic pressure and/or

hydrodynamic force can structurally damage the building by causing the walls to collapse or causing the entire structure to float. However, in areas that have minimal velocity and low depth, dry floodproofing can be a good option

Many flood hazards can be mitigated with various forms of dry flood proofing. Properties that do not have adequate protection of their low opening (window or basement door) can effectively raise the low opening height with a window well or a flood gate. The ultimate height of the low opening depends on several factors, such as: the level of flood protection desired, the appearance, and cost. The flood protection elevation could be set 1-foot higher than the existing low opening elevation, or it could be set to match the elevation of the lowest opening into a home that cannot be raised. This might be the elevation of the threshold of a door, for example.

The NFIP only allows dry floodproofing for residential retrofits that are not classified as a substantial improvement. A substantial improvement is any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the "start of construction" of the improvement.

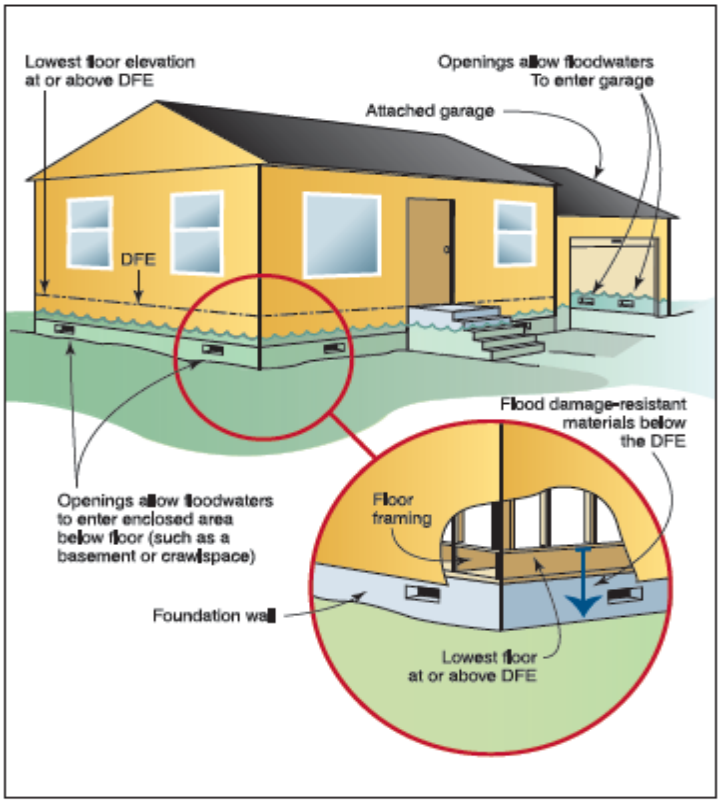
FIGURE 5
Dry Floodproofing Example (FEMA P-312, June 30, 2014)



Wet Floodproofing

Wet floodproofing consists of modifying uninhabited portions of a home, such as a crawl space, garage, or unfinished basement with flood-damage resistant materials, to allow floodwaters to enter the structure without causing damage (see Figure 6). Wet floodproofing requires portions of the building need to be cleared of valuable items and mechanical utilities. A key component of wet floodproofing is providing openings large enough for the water to flow through the structure such that the elevation of the water in the structure is equal to the elevation of the water outside of the structure. This equilibrium of floodwater prevents hydrostatic pressure from damaging structural walls.

FIGURE 6
Wet Floodproofing Example (FEMA P-312, June 30, 2014)



Direct Drainage Away From the Building

In some cases, there are things that the property owner can do on-site such as directing shallow floodwater away from a flood-prone structure. In other cases, there are drainage improvement projects that can be constructed by Water Resources staff.

Shallow flooding can often be kept away from a structure if some simple improvements are made to the yard. Sometimes structures are built at the bottom of a hill or in a natural

drainage way or storage area, so that water naturally flows toward them.

One solution is to regrade the yard. If water flows toward the building; a new swale or wall can direct the flow to the street or a drainage way. Filling and grading next to the building can also direct shallow flooding away. Although water may remain in the yard temporarily, it is kept away from the structure. When these types of drainage modifications are made, care must be taken not to adversely affect the drainage patterns of adjacent properties.

Over time, the swales along the lot lines or in the back yard may get filled in. Property owners build fences, garages, sheds, swimming pools, and other obstructions up to the lot line. These drainage problems can be fixed by removing the obstructions and restoring the swales so they will carry water away from the building

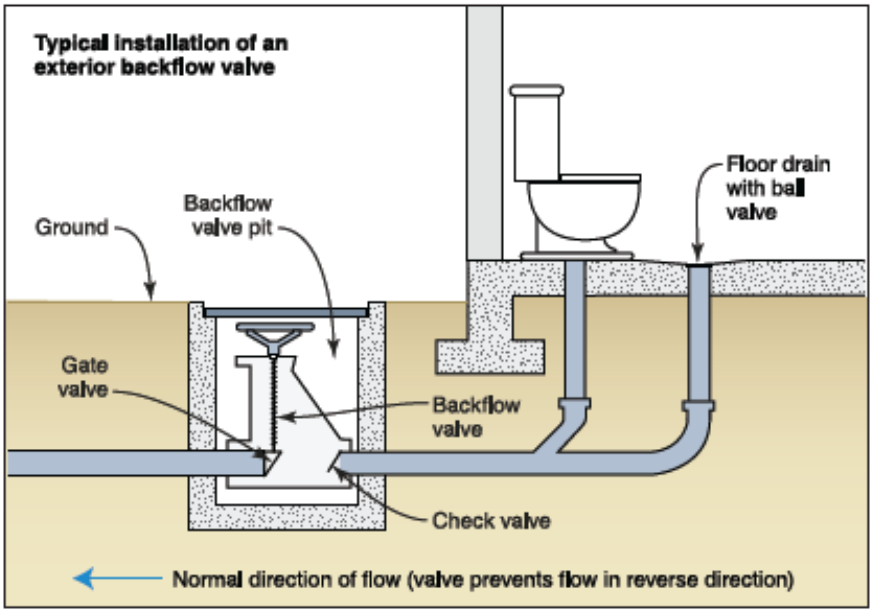
Drainage Maintenance

Rake leaves from inlets. If a nearby creek has fallen or collected debris, call 875-rain. The Stormwater Utility provides funds for systematic maintenance of the County's storm drain system, and allows for repair and construction projects that directly target local flooding problems. Do not dump or throw anything into drainage ditches, streams or storm drains. Dumping into our drainage system is a Sacramento County Code violation. Debris can accumulate and restrict the flow of stormwater which increases the potential of localized - flooding. To report flood problems or illegal dumping into the drainage system, please call (916) 875-RAIN (7246).

Sewer Improvements

Heavy rains can saturate the soil and infiltrate the sanitary sewer system through leaky joints or cracks in the pipes. The inflow of stormwater floods the sanitary sewer system causing water to back-up into the home through lower level plumbing fixtures. This occurrence can be prevented by installing a sewer backflow preventer (see Figure 7). A backflow preventer will allow the sanitary sewer water to flow freely from the home to the sewer, but restrict the reverse flow. Backflow preventers do require maintenance and can fail if debris in the sewer prevents the valve seating properly. An overhead sewer system pumps wastewater from basement level plumbing fixtures up to an elevation near the ground level, where it can drain by gravity into the sewer service line. This higher sewer makes it unlikely that water will back-up into the building.

FIGURE 7
Install Sewer Backflow Valves Example (FEMA P-312, June 30, 2014)



Temporary Barriers

Several types of temporary barriers are available to address typical flooding problems. They work with the same principles as permanent barriers, such as floodwalls or levees, but can be removed, stored, and reused in subsequent flood events (Figure 8).

FIGURE 8
Temporary Flood Barrier

2.4.3 Natural Resources Protection

Care should be taken to maintain the streams, wetlands and other natural resources within a floodplain. Removing debris from streams and channels prevents obstructions. Preserving and restoring natural areas provides flood protection, preserves water quality and provides natural habitat. Most of the natural resources within Sacramento County are in open spaces owned and maintained by the Sacramento County Park District or Sacramento County.

2.4.4 Emergency Services

Advance identification of an impending storm is only the first part of an effective Flood Warning and Response Plan. To truly realize the benefit of an early flood warning system, the warning must be disseminated quickly to floodplain occupants and critical facilities. Appropriate response activities must then be implemented, such as: road closures, directing evacuations, sandbagging, and moving building contents above flood levels. Finally, a community should take measures to protect public health and safety and facilitate recovery. These measures may include: cleaning up debris and garbage, clearing streets, and ensuring that that citizens have shelter, food, and safe drinking water.

2.4.5 Structural Projects

In response to the flood damage resulting from severe storm events, Sacramento County initiated several Flood Risk Reduction Assessments to determine what structural improvements could be made to mitigate flood damage from future storm events in the areas that have proven to be the most susceptible to flooding.

2.4.6 Public Information

One of the most important, and often overlooked, aspects of mitigation is public awareness. Awareness starts with recognition of the flood risk. FIRM panels, which designate areas of a community according to various levels of flood risk, can be viewed at www.FEMA.gov. Also, real estate transactions require disclosure of known flood hazards.

The next level of awareness is related to hazard mitigation measures. Often homeowners can greatly reduce their risks with mitigation efforts; they just do not know it. *For that reason, as part of this analysis, every resident in the RLA has been contacted and informed of the opportunity to review this Report.* In addition, Sacramento County sends out an annual outreach letter to every resident in each RLA.

2.5 Document the Findings

This report outlines the process that was followed and any relevant general background information. A separate analysis for each Repetitive Loss Area was done and is detailed in each respective area to this plan in the appendices. Each area analysis will include

- A summary of property owner responses, logged phone calls, survey results, etc.
- The problem statement with a map of the area affected.
- A table showing basic information for each building, such as address, foundation type, condition, and appropriate mitigation measures.
- Any alternative approaches that were reviewed.
- Action items that include:
  - ✓ Who is responsible for implementing the action,
  - ✓ When it will be done,
  - ✓ How it will be funded.

The summary report for Repetitive Loss Area Analysis is included in the Sacramento County Local Hazard Mitigation Plan 2011, approved December 6, 2011 by resolution number 2011-0886 and WA-2818. *This report is the complete repetitive loss area analysis and has been approved by the governing body of Sacramento County.*

An annual evaluation report will be completed in the fall of each year and submitted with the CRS annual recertification. The evaluation report will review each action item, describe what was implemented (or not implemented), and recommend changes to the action items as appropriate. The annual report will cover all the repetitive loss areas in the appendices and be made available to the media and public.

In time for each CRS cycle verification visit, the repetitive loss area analysis will be updated. The update will review the flooding and building conditions as well as any changes to FEMA's repetitive loss list, to determine whether the number of buildings on the list or other circumstances have changed, and revise the mapping and action items accordingly. The update may be a new report or an addendum to the existing report.

2.5.1 Data Collection

Sacramento County Plans and studies were utilized in this analysis. The sources listed below provided data related to the causes and impacts of flooding in the RLA.

- FEMA - NFIP Repetitive Loss Update CD that includes the repetitive loss properties. The mitigated and unmitigated properties are provided for reference purposes, and to assist in defining repetitive loss areas.

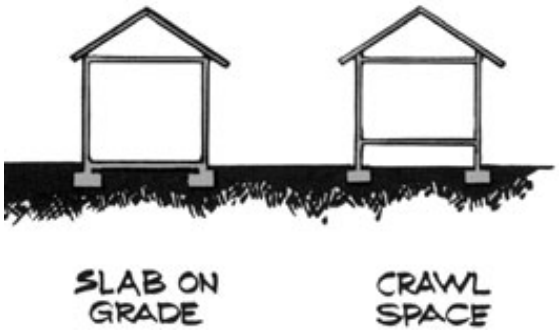
- Sacramento County Hazard Mitigation Grant Program (HMGP) - HMGP provided grants to Sacramento County residence to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.
- Local Floodplain Management Activities – Sacramento County has over the years collected base flood elevations related to actual surveyed ground elevation to determine the local flood hazard areas. The review of Elevation Certificates, Local Floodplain Mapping and general review of topography.
- GIS – Data for elevations, number of structures, location of structures, and other pertinent data to determine the potential risk of flooding.
- FIRM – Federal floodplain mapping, *Flood Insurance Study – Sacramento County, California and Incorporated Areas* (FEMA 06067C0062H and 06067C0054H August 2012)
- Drainage Maintenance and Engineering Section (DME) Service Request Tracking System provided storm event dates, customer problem descriptions, and specific address of affected flooding areas.

2.5.2 Types of Foundations

Within Sacramento County there are basically two types of foundations either slab on grade, crawl space (raised). Figure 12 shows the two common foundation types, which on the Elevation Certificate these are referenced as 1, 1A, 1B, or 8:

1. Crawl Space or raised foundation is a common type that you'll find in home construction. This foundation gets its name due to the fact that it's built above the ground, allowing for just enough room to crawl underneath. There are stem walls on the perimeters, pierced in-between and then a girder system and floor joists on top of that. The foundation is high enough to that you have at least 2' under there to crawl around to take care of the mechanical systems of the house.
2. Slab foundation is usually concrete poured directly onto the ground. This type of foundation is also different from other foundations in that it uses concrete, not wood, to help support the weight of the home.

FIGURE 12
Foundation Types



2.6 Funding Assistance

The most common hazard mitigation assistance programs are: the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), and Flood Mitigation Assistance (FMA). Each program has its own eligibility and funding criteria, but each can be used to fund property protection measures as shown in Figure 8 below, provided that the Benefit Cost Ratio exceeds 1.0. In general, these programs are funded when FEMA approves an application prepared jointly by a local government. In most cases, FEMA pays 75% of eligible expenses, but the federal share can reach 90% for Repetitive Loss Properties and 100% for Severe Repetitive Loss (SRL) properties.

FIGURE 13
Eligible Activities by Hazard Mitigation Assistance Program
(FEMA Hazard Mitigation Assistance Unified Guidance, July 2013)

Eligible Activities	HMG	PDM	FMA
Property Acquisition and Structure Demolition	√	√	√
Structure Elevation	√	√	√
Mitigation Reconstruction			√
Dry Floodproofing of Historic Residential Structures	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√
Minor Localized Flood Reduction Projects	√	√	√
Structural Retrofitting of Existing Buildings	√	√	
Non-structural Retrofitting of Existing Buildings	√	√	√
Infrastructure Retrofit	√	√	√
Post-Disaster Code Enforcement	√		
5 Percent Initiative Projects	√		
Advance Assistance	√		

APPENDICES

REPETITIVE LOSS REPORT

Appendix 1

REPETITIVE LOSS AREA 1

DRY CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 1
TABLE OF CONTENTS

A1.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 1, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 1 analysis includes properties on Cherry Lane, Dry Creek Road, O Street, Elkhorn Boulevard and 4th Street and is defined by **Figure A1**.

A1.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A1.3 PROBLEM STATEMENT

The location of Area 1 is generally Elkhorn Boulevard east of Rio Linda Boulevard. Floods in the Dry Creek watershed generally occur from October through April. The floods are usually caused by a combination of prolonged rainfall leading to saturated soils, and a short period of one to six hours of intense precipitation associated with frontal convection or severe thunderstorms. The source of flooding was primarily identified as the Dry Creek floodplain (North and South Branch) out of bank flooding in older residential areas constructed prior to NFIP requirements.

Dry Creek and its tributaries have an extensive record of flood conditions,. Damaging floods occurred in December 1955, April 1958, October 1962, December 1964, March 1983 and February 1986. The floods of 1983 and 1986 were the largest and most damaging on record before 1992. Hydrologic studies have shown that the recurrence interval of the March 1983 flood was approximately 10 years and the recurrence interval of the February 1986 flood was from 50 to 100 years, depending on the specific location in the Dry Creek watershed.6 Flood events also occurred in in January 1995, January 1997, February 1998, and December 2005, with the 1995 flood event causing extensive damage.

There are 272 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions. Twenty-two (22) properties were acquired and demolished as part of the Hazard Mitigation Grant Program and seven (7) properties were mitigated by elevation.

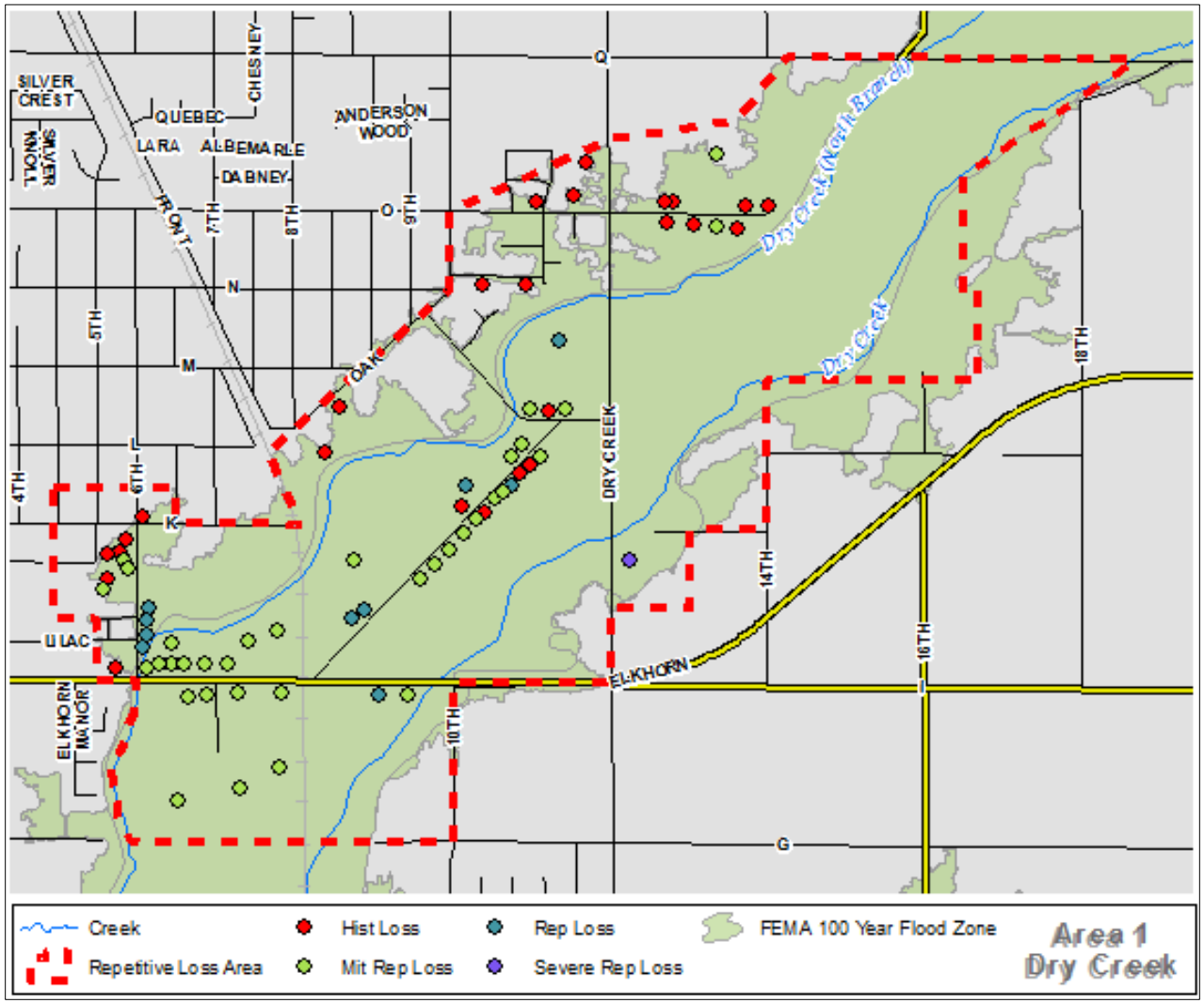
A1.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- Sacramento County Department of Transportation - Bikeway project 2009

The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

FIGURE A1
Repetitive Loss Area #1



A1.5 DATA COLLECTION

Sacramento County Plans and studies for the Dry Creek watershed were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- **Analysis of Dry Creek Alternatives to Detention** Prepared By Montgomery Watson May 26, 2000
- **The 1992 Dry Creek Watershed Flood Control Plan** (1992 Plan) and its Update; **Update to the Dry Creek Watershed Flood Control Plan** (2010)

A1.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) all properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when Dry Creek overflows into a floodplain. The Sacramento County Local Floodplain Map does not cover the Dry Creek Shed for this RLA,

A1.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that sixty-nine (69) of the overall 346 properties within the Dry Creek RLA had reported flooding.

A1.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in January 9, 1995, January 9 & 22, 1997, June 15, 1997, February 3, 1998, and June 15 & 16, 1998. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A1.5.4 Types of Foundations

The most common type of foundations within the Dry Creek RLA is slab on grade, which constitutes 79% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A1.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for acquisition of additional properties in Dry Creek Floodway for demolition to restores the natural floodplain. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

DRY CREEK WATERSHED

AREA 1

CHERRY LANE

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**28**
REPETITIVE LOSS PROPERTIES	*10*
HISTORICAL LOSS PROPERTIES	*10*
REPETITIVE LOSS AREA PROPERTIES	*8*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 4
  - SLAB ON GRADE 5
- NO STRUCTURES
  - PRIVATELY OWNED 4
  - PUBLICLY OWNED 2

MITIGATED PROPERTIES

- ACQUSITION & DEMO 10
- AQUSITION – NO STRUCTURE 1
- ELEVATED (RAISED FOUNDATION) 1

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0151-005	6433 CHERRY LN	RAISED	GOOD			**FEMA Flood Claim**: 1/10/1995 & 2/18/1986
207-0152-008	6520 CHERRY LN	N/A		Acquisition and Demolition		**1/3/2000** - This property was demolished as part of a federally funded project to remove habitable structures from the floodplain. **1/22/1997** - Owner refuses access to structure. **1/9/1995** - Owner denied access.
207-0152-009	6528 CHERRY LN	N/A		Acquisition and Demolition		**1/3/2000** - This property was demolished as part of a federally funded project to remove habitable structures from the floodplain. **6/16/1998** - House flooded undetermined depth. **1/22/1997** - Garage flooded approx. 10 inches. **1/9/1995** - House was protected by sand bag wall. 10" flooding in garage
207-0152-010	6536 CHERRY LN	N/A		Acquisition and Demolition		**1/3/2000** - This property was demolished as part of a federally funded project to remove habitable structures from the floodplain. **1/22/1997** - House flooding at floor level, garage flooding 14 inches. Owner refuses access to house. **1/9/1995** – Garage flooded a depth of 11.5".

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0151-003	6541 CHERRY LN	RAISED	GOOD			**1/22/1997** - Garage flooding 13 inches. **1/9/1995** – House flooded a depth of 13”.
207-0151-010	6549 CHERRY LN	N/A		Acquisition No Structure		**8/26/1993** - This property has no livable structure.
207-0152-012	6600 CHERRY LN	SLAB ON GRADE	GOOD			**1/12/2006** - Record from Sheriff's office states Flood damaged rug and couches, water rose about 4" in the house, lost some firewood.
207-0152-011	6606 CHERRY LN	N/A		Acquisition and Demolition		**8/26/2002** - This property was demolished as part of a federally funded project to remove habitable structures from the floodplain.. **7/30/2002** - House acquisitioned by County **1/9/1995** – Structure flooded a depth of 8.4”.
207-0311-003	6607 CHERRY LN	RAISED	GOOD			**1/9/1995** - Property flooded a depth of 2.4”. No Structural flooding
207-0312-009	6608 CHERRY LN	N/A		Acquisition and Demolition		**8/26/2002** - This property was demolished as part of a federally funded project to remove habitable structures from the floodplain. **2/15/2002** - House acquisitioned by County **1/9/1995** – Structure flooded a depth of 13.2”.
207-0312-008	6610 CHERRY LN	RAISED	GOOD			**1/9/1995** – Structure flooded a depth of 6.0”.

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0312-007	6616 CHERRY LN	N/A		Acquisition and Demolition		**2009** - This property was demolished as part of a federally funded project to remove habitable structures from the floodplain. **3/10/2008** - House acquisitioned by County **1/9/1995** – Structure flooded a depth of 7.0”.
207-0312-006	6620 CHERRY LN	N/A		Acquisition and Demolition		**1999** - This property was demolished as part of a federally funded project to remove habitable structures from the floodplain.. **1/22/1997** - Flood waters came 2 inches below house floor, 8 inches above shop/garage. **1/9/1995** – Flood waters came 2" below finished floor of Structure.
207-0312-005	6624 CHERRY LN	SLAB ON GRADE	GOOD			**6/15/1998** - House and garage flooded a depth of 11.0”. **1/9/1995 –** House and garage flooded a depth of 36.0”.
207-0311-006	6633 CHERRY LN	SLAB ON GRADE	GOOD			**1/22/1997** - Flooded a depth of 4 inches in the house, 13 inches in garage. Sand bagging effort failed. **1/9/1995 –** Residence flooded a depth of 4.0”.
207-0311-007	6637 CHERRY LN	SLAB ON GRADE	GOOD			**No Flood Reported**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0312-004	6640 CHERRY LN	SLAB ON GRADE	GOOD			**1/11/2006** - Record from Sheriff's office stated Minor damage to garage (24" flooding) and bedroom, flooding caused damage to furniture, clothing, appliances and a vehicle has major damage to engine. **1/9/1995 –** Garage flooded a depth of 18.0".
207-0312-003	6644 CHERRY LN	SLAB ON GRADE	GOOD			**1/9/1995 –** Structure flooded a depth of 13.2".
207-0312-002	6700 CHERRY LN	N/A		Acquisition and Demolition		**9/1/2010** - This property was demolished as part of a federally funded project to remove habitable structures from the floodplain. **11/21/2008** - House acquisitioned by County **1/9/1995 –** Structure flooded a depth of 3.6".
207-0311-005	6701 CHERRY LN	N/A		Acquisition and Demolition		**1999** - This property was demolished in 1999 as part of a federally funded program to remove habitable structures from the floodplain. **2/26/1999** - House acquisitioned by County **1/9/1995 –** Structure flooded a depth of 20.4".

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0311-004	6703 CHERRY LN	RAISED		Elevated		**11/20/1999** - This property was elevated as required by Floodplain Management Ordinance for Substantial Improvements. **1/9/1995 –** Structure flooded a depth of 18" in house, 4.5 to 5' in garage.
207-0312-001	6704 CHERRY LN	N/A		Acquisition and Demolition		**1999** - This property was demolished in 1999 as part of a federally funded program to remove habitable structures from the floodplain. **1/12/1998** - House acquisitioned by County **1/22/1997** - House may have flooded, 22” in garage, dog denied access. **1/9/1995 –** Garage flooded a depth of 19.0”.
207-0151-004	0 CHERRY LN	N/A	N/A	N/A	Sacramento Regional County Sanitation District	**No Structure on Property**
207-0152-005	0 CHERRY LN	N/A	N/A	N/A		**No Structure on Property**
207-0152-006	0 CHERRY LN	N/A	N/A	N/A		**No Structure on Property**
207-0152-007	0 CHERRY LN	N/A	N/A	N/A		**No Structure on Property**
207-0152-015	0 CHERRY LN	N/A	N/A	N/A		**No Structure on Property**
207-0312-016	0 CHERRY LN	N/A	N/A	N/A		**No Structure on Property**

AREA 1

O STREET

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**31**
REPETITIVE LOSS PROPERTIES	*2*
HISTORICAL LOSS PROPERTIES	*9*
REPETITIVE LOSS AREA PROPERTIES	*20*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 4
  - SLAB ON GRADE 25
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 2

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0100-008	1015 O ST	RAISED	GOOD			**No Record of Flooding**
207-0142-031	1020 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-032	1024 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-027	1027 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-033	1028 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-034	1032 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-035	1036 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-036	1040 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-002	1044 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-069	1045 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-065	1103 O ST	SLAB ON GRADE	GOOD			**1/9/1995** – Structure flooded a depth of 8" in house
207-0320-001	1106 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-053	1107 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0320-002	1112 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-054	1113 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-024	1135 O ST	SLAB ON GRADE	GOOD			**1/9/1995 –** Structure flooded a depth of 1" in house, 1.5" in garage.
207-0320-010	1138 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-011	1146 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-025	1199 O ST	RAISED	GOOD			**No Record of Flooding**
207-0160-010	1223 O ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0160-012	1249 O STREET	SLAB ON GRADE	GOOD			**1/10/1995**- FEMA Flood Claim **2/18/1986**- FEMA Flood Claim
207-0160-011	1253 O STREET	SLAB ON GRADE	GOOD			**FEMA Flood Claim**: 1/10/1995
207-0160-025	1255 O STREET	RAISED	GOOD			**No Record of Flooding**
207-0170-054	1288 O STREET	SLAB ON GRADE	GOOD			**6/22/1998** - Property flooded a depth of 2.4". No Structural flooding
207-0170-048	1300 O STREET	SLAB ON GRADE (14")	GOOD			**1/9/1995 –** Structure flooded a depth of 4" in house, 32" in garage.

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0170-062	1320 O STREET	RAISED	GOOD	Elevated		**11/20/1999 -** This property was elevated as federally funded project. **6/22/1998** - Property flooded a depth of 14". No Structural flooding **1/10/1995**- FEMA Flood Claim **2/19/1986**- FEMA Flood Claim
201-0170-061	1324 O STREET	RAISED	GOOD			**1/9/1995 –** Garage flooded a depth of 12" - 15" in garage, and flow up to back door. Permit for structure behind main house with illegal addition not completed – Foundation: Slab on Grade
201-0170-036	1328 O STREET	SLAB ON GRADE	FAIR			**No Record of Flooding**
207-0160-036	1331 O STREET	RAISED	GOOD	Elevated		**12/30/2002 –** Yard flooding due to blocked drainage. No structures flooded. **6/23/2010 –**This property was elevated as required by FMO for Substantial Improvements..
207-0160-037	1337 O STREET	SLAB ON GRADE	FAIR			**1/3/2000 –** County suggested raising structure or demolish/re-locate. **1/9/1995 –** Flooded 6" in house and 18" in garage.
207-0160-032	1345 O STREET	SLAB ON GRADE	GOOD			**1/9/1995 –** Reported flooding of buildings on property. No determined depth.

AREA 1

DRY CREEK ROAD

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**33**
REPETITIVE LOSS PROPERTIES	*2*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*30*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 9
  - SLAB ON GRADE 13
  - UNKNOWN 2
- NO STRUCTURES
  - PRIVATELY OWNED 6
  - PUBLICLY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 3
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0152-004	6411 DRY CREEK ROAD	FIELD				**No Record of Flooding**
207-0152-003	6447 DRY CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0152-002	6453 DRY CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0152-013	6501 DRY CREEK ROAD	RAISED	GOOD			**No Record of Flooding**
207-0230-001	6550 DRY CREEK ROAD	SLAB ON GRADE				**1/6/2006** - Confirmed there was 20" of water inside church. **2006** - Record from Sheriff's office states 7000 Sq Feet water throughout, minor damage, band instruments drums, organ, guitar, clarinet and cases, wall damage, seating destroyed, carpeting, kitchen tables, anything touching floor, commercial freezer and washer and dryer, double oven commercial size, all damaged not working.. **6/15/1998** - Structure flood levels were recorded as 24 and 27 inches. **1/9/1997 –** Structure flood levels were recorded as 24 and 27 inches.
207-0312-019	6601 DRY CREEK ROAD	N/A	N/A	Acquisition No Structure		**6/5/2001** - This property has no structure.
207-0142-038	6741 DRY CREEK ROAD	RAISED	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0142-041	6816 DRY CREEK ROAD	SLAB ON GRADE				**1/22/1997** - Detached house at lower elevation than main house flood levels 8”. **1/9/1995 –** Structure flood levels 48” in residence. 72” in basement.
207-0170-034	6848 DRY CREEK ROAD	N/A	N/A	Acquisition No Structure		**6/8/1994** – Acquisitioned by Sacramento County
207-0170-004	6900 DRY CREEK ROAD	RAISED				**No Record of Flooding**
207-0320-079	6901 DRY CREEK ROAD	SLAB ON GRADE				**No Record of Flooding**
207-0170-070	6908 DRY CREEK ROAD	RAISED				**No Record of Flooding**
207-0170-069	6914 DRY CREEK RD	RAISED	FAIR			**No Record of Flooding**
207-0142-019	6915 DRY CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-018	6923 DRY CREEK RD	RAISED	GOOD			**No Record of Flooding**
207-0320-013	6931 DRY CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0170-053	6936 DRY CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-012	6939 DRY CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0170-002	6948 DRY CREEK RD	RAISED	FAIR			**No Record of Flooding**
207-0160-009	7000 DRY CREEK RD	SLAB ON GRADE	FAIR			**No Record of Flooding**
207-0160-009	7009 DRY CREEK RD	SLAB ON GRADE	FAIR			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0100-026	7023 DRY CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0160-046	7028 DRY CREEK RD	RAISED	GOOD			**No Record of Flooding**
207-0160-044	7032 DRY CREEK RD	UNKNOWN	GOOD			**No Record of Flooding**
207-0160-045	7034 DRY CREEK RD	RAISED	GOOD			**No Record of Flooding**
207-0100-022	7035 DRY CREEK RD	SLAB ON GRADE	GOOD			**1/9/1995 –** Structure flood 2" in garage
207-0160-006	7036 DRY CREEK RD	UNKNOWN	UNKNOWN			**No Record of Flooding**
207-0180-001	0 DRY CREEK ROAD	N/A	N/A	Acquisition No Structure		**6/8/1994** - This property has no structure.
207-0312-015	0 DRY CREEK ROAD	N/A	N/A	N/A		**No Structure on Property**
207-0312-017	0 DRY CREEK ROAD	N/A	N/A	N/A		**No Structure on Property**
207-0142-039	0 DRY CREEK ROAD	N/A	N/A	N/A		**No Structure on Property**
207-0142-040	0 DRY CREEK ROAD	N/A	N/A	N/A		**No Structure on Property**
207-0100-016	0 DRY CREEK ROAD	N/A	N/A	N/A		**No Structure on Property**

AREA 1

10TH STREET

16TH STREET

EYE STREET

FRONT STREET

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**16**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*16*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 2
  - SLAB ON GRADE 8
  - UNKNOWN 2
- NO STRUCTURES
  - PRIVATELY OWNED 2
  - PUBLICLY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0071-021	0 10TH STREET	FIELD				**No Record of Flooding** Findings are that if the flow in Dry Creek exceeded one or more feet above top of outfall pipe without a flap gate water will travel on to 10th Street through the inlets causing road flooding.
207-0320-019	6914 10TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-018	6918 10TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-017	6922 10TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-016	6928 10TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-045	6930 10TH ST	UNKNOWN	UNKNOWN			**No Record of Flooding**
207-0142-044	6932 10TH ST	UNKNOWN	UNKNOWN			**No Record of Flooding**
207-0320-015	6936 10TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-014	6940 10TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-030	6944 10TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-029	6948 10TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0180-038	6743 16TH STREET	RAISED				**No Record of Flooding**
207-0170-008	6801 16TH STREET	RAISED				**No Record of Flooding**
207-0170-016	0 16TH STREET	N/A	N/A			**No Structure on Property**
214-0080-006	0 EYE STREET	FIELD			Sacramento Regional County Sanitation District	**No Record of Flooding**
207-0300-002	0 FRONT STREET	PARK				**No Record of Flooding** Rio Linda/Elverta Rec/Park Dist

AREA 1

FALLON WOODS WAY

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**37**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	*35*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 37
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUISITION & DEMO 0
- ACQUISITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0320-078	1000 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-077	1004 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-020	1007 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-076	1008 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-021	1011 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-075	1012 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-022	1015 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-074	1016 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**12/31/2005 –** Street Flood
207-0320-023	1019 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-039	1020 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-024	1023 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-072	1024 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-025	1027 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-071	1028 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0320-026	1031 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-070	1032 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-027	1035 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-069	1036 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-028	1039 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-068	1040 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-029	1043 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-067	1044 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**12/15/2006 –** Street Flood
207-0320-066	1048 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**12/15/2006 –** Street Flood
207-0320-065	1052 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-064	1058 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-063	1064 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-030	1101 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-031	1105 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0320-054	1114 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-053	1118 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-046	1119 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-052	1124 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-047	1125 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-051	1128 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-048	1129 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-050	1132 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-049	1133 FALLON WOODS WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**

AREA 1

CURVED BRIDGE ROAD

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**9**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*3*
REPETITIVE LOSS AREA PROPERTIES	*6*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 3
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO 2
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0142-016	1101 CURVED BRIDGE ROAD	N/A		Acquisition and Demolition		**6/25/2008** - House acquisitioned by County. This property was demolished as part of a federally funded project. **6/15/1998** - Structure flooded a depth of 2" in house, 22" in garage. **1/22/1997** - The water surfaces was approx. 3 inches below house floor.
207-0142-009	1129 CURVED BRIDGE ROAD	N/A		Acquisition and Demolition		**6/25/2008** - House acquisitioned by County. This property was demolished as part of a federally funded project to remove habitable structures from the floodplain.. **6/15/1997** - Structure flooded a depth of 2" in house, 22" in garage. **1/9/1995** - Structure flooded a depth of 2" in house, 14" in garage.
207-0142-008	1133 CURVED BRIDGE ROAD	SLAB ON GRADE	GOOD			**1/22/1997** - No access by owner, estimated 20 inches in garage. **1/9/1995** - Structure flooded a depth of 18" in garage.

DATA ANALYSIS TABLE (continue)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0141-006	6721 CURVED BRIDGE ROAD	RAISED	GOOD			**No Record of Flooding**
207-0142-042	6760 CURVED BRIDGE ROAD	RAISED	GOOD			**No Record of Flooding**
207-0142-042	6800 CURVED BRIDGE ROAD	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0142-015	6810 CURVED BRIDGE RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0141-011	6821 CURVED BRIDGE RD	RAISED	GOOD			**No Record of Flooding**
207-0142-037	0 CURVED BRIDGE ROAD	N/A	N/A			**No Structure**

AREA 1

ELKHORN BOULEVARD

DRY CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**24**
REPETITIVE LOSS PROPERTIES	*9*
HISTORICAL LOSS PROPERTIES	*8*
REPETITIVE LOSS AREA PROPERTIES	*7*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 2
  - SLAB ON GRADE 4
- NO STRUCTURES
  - PRIVATELY OWNED 1
  - PUBLICLY OWNED 3

MITIGATED PROPERTIES

- ACQUSITION & DEMO 1
- AQUSITION – NO STRUCTURE 12
- ELEVATED (RAISED FOUNDATION) 1

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0063-017	529 ELKHORN BLVD	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0062-016	549 ELKHORN BOULEVARD	SLAB ON GRADE	GOOD			**1/9/1995** - Flooded 6” in garage.
214-0062-030	609 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**4/2/2007** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **4/2/2000** - House acquisitioned by County **1/22/1997** – Garage flooded 20 inches in garage. **1/9/1995** - Flooded 8" in house, and 36” in garage and 2 out building flooded 36”.
214-0062-029	615 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**2/18/1999** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **2/18/1999** - House acquisitioned by County **1/22/1997** – Garage flooded 2” in garage. **1/9/1995** - Flooded 2" in garage.

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0062-027	625 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**2/16/1999** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **2/16/1999** - House acquisitioned by County **1/22/1997** – Detached Garage flooded 2”. **1/9/1995** - Flooded 2" in garage.
214-0080-007	630 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**9/4/2002** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **5/17/2002** - House acquisitioned by County **1/22/1997** – Garage flooded 20 inches in garage. **1/9/1995** - Depth information cited in confidential flood site listings.
214-0062-013	633 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**8/26/2002** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **5/9/2002** - House acquisitioned by County **1/22/1997** – House flooded 3”. **1/9/1995** - Depth information cited in confidential flood site listings.

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0080-033	640 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**5/21/2000** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **2/16/1999** - House acquisitioned by County **1/22/1997** – House flooded 12". **1/9/1995** - House flooded 12".
214-0062-012	641 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**1999** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **12/4/1998** - House acquisitioned by County **1/22/1997** – Garage flooded 15". **1/9/1995** - Garage flooded 15".
214-0062-026	701 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**2/26/2003** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **10/11/2002** - House acquisitioned by County **1/22/1997** – Garage flooded 12". **1/9/1995** - Garage flooded 12".

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0062-031	709 ELKHORN BOULEVARD	RAISED	GOOD	Elevated		**11/20/1999** - This property was elevated as part of a federally funded program. **1/9/1995** - Garage flooded 36".
214-0080-011	748 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**1999** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **4/6/1999** - House acquisitioned by County **6/16/1998** – Flooded 13.5 inches. **1/22/1997** – Flooded 26 inches. **1/9/1995** - Flooded 26 inches.
214-0071-016	800 ELKHORN BOULEVARD	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0071-031	848 ELKHORN BOULEVARD	SLAB ON GRADE				**1/9/1995** - Flooded 20 inches.
214-0071-014	936 ELKHORN BOULEVARD	RAISED				SAFCA improvements may help, otherwise raise structure, floodwall, or demolish. **1/22/1997** – House flooded 12". **1/9/1995** - House flooded 12".

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0071-013	940 ELKHORN BOULEVARD	N/A	N/A	Acquisition and Demolition		**8/26/2002** - This property was demolished in as part of a federally funded program to remove habitable structures from the floodplain. **10/18/2003** - House acquisitioned by County **1/22/1997** – House flooded 15 to 18 inches. **1/9/1995** – No recorded flood depths.
214-0062-028	0 ELKHORN BOULEVARD	N/A	N/A	Acquisition		**4/20/2000** – Land acquisitioned by County. No Structure
214-0062-032	0 ELKHORN BOULEVARD	N/A	N/A	Acquisition		**7/31/1998** - Land acquisitioned by County. No Structure
214-0071-029	0 ELKHORN BOULEVARD	N/A	N/A	N/A		**No Structure on Property**
214-0080-034	0 ELKHORN BOULEVARD	N/A	N/A	Acquisition		**4/16/1999** – Land acquisitioned by County. No Structure
214-0080-036	0 ELKHORN BOULEVARD	N/A	N/A	Acquisition		**4/16/1999** – Land acquisitioned by County. No Structure
214-0080-015	0 ELKHORN BOULEVARD	N/A	N/A	Acquisition		**10/15/2007** – Land acquisitioned by County. No Structure
214-0080-035	0 ELKHORN BOULEVARD	N/A	N/A	Acquisition	SACRAMENTO COUNTY	**4/16/1999** – Land acquisitioned by County. No Structure
214-0210-009	0 ELKHORN BOULEVARD	N/A	N/A		SACRAMENTO COUNTY	**No Structure**
214-0210-011	0 ELKHORN BOULEVARD	N/A	N/A		SACRAMENTO COUNTY	**No Structure**

AREA 1

JAMIE COURT

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**11**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*11*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 11
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0310-008	513 JAMIE COURT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-007	519 JAMIE COURT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-006	523 JAMIE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-013	528 JAMIE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-005	529 JAMIE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-004	533 JAMIE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-014	538 JAMIE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-003	539 JAMIE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-002	543 JAMIE COURT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-015	548 JAMIE COURT	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-001	549 JAMIE COURT	SLAB ON GRADE	GOOD			**No Record of Flooding**

AREA 1

K STREET

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**25**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*24*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 10
  - SLAB ON GRADE 14
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0061-005	448 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0061-047	500 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0061-081	504 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0242-028	505 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0242-027	509 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0242-026	513 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0061-088	526 K STREET	SLAB ON GRADE	GOOD			**7/31/2003** - Roadside drainage is entering driveway and running down into garage.
206-0243-011	527 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0061-087	528 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0243-010	531 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0061-076	532 K STREET	RAISED	GOOD			**No Record of Flooding**
214-0061-076	535 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0061-064	536 K STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0062-003	634 K STREET	RAISED	GOOD			**No Record of Flooding**
214-0062-002	636 K ST	RAISED	GOOD			**No Record of Flooding**
214-0062-004	640 K ST	RAISED	GOOD			**No Record of Flooding**
214-0062-005	644 K ST	RAISED	GOOD			**No Record of Flooding**
214-0062-039	700 K ST	RAISED	GOOD			**No Record of Flooding**
214-0062-035	712 K ST	RAISED	GOOD			**No Record of Flooding**
214-0062-036	720 K ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0062-043	734 K ST	RAISED	GOOD			**No Record of Flooding**
214-0062-042	738 K ST	RAISED	GOOD			**No Record of Flooding**
214-0062-034	740 K ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0062-009	744 K ST	RAISED	GOOD			**No Record of Flooding**
214-0062-040	0 K ST	N/A	N/A			**No Structure**

AREA 1

VICKREY COURT

VICKIE THERESA LA NE

LINDA LANE

LILAC LANE

14TH STREET

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**17**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*17*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 15
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 1
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0320-062	1100 VICKREY CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-055	1101 VICKREY CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-061	1104 VICKREY CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-056	1105 VICKREY CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-060	1108 VICKREY COURT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-057	1109 VICKREY COURT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-059	1114 VICKREY COURT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-058	1115 VICKREY COURT	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0340-001	503 VICKIE THERESA LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0340-002	509 VICKIE THERESA LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0340-003	515 VICKIE THERESA LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0340-004	521 VICKIE THERESA LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0340-005	527 VICKIE THERESA LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0080-009	6325 LINDA LANE	N/A	N/A	Acquisition		**4/6/1999** – Land acquisitioned by County. No Structure
214-0080-013	0 LINDA LN	N/A	N/A			**No Record of Flooding**
214-0080-014	0 LINDA LN	N/A	N/A			**No Record of Flooding**
207-0180-014	6651 14TH STREET	N/A	N/A			**No Structure**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0061-092	507 LILAC LN	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-012	529 LILAC LN	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-016	539 LILAC LN	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-018	547 LILAC LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0310-019	549 LILAC LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0180-014	6651 14TH STREET	N/A	N/A			**No Structure**

AREA 1

6TH STREET

5TH STREET

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**28**
REPETITIVE LOSS PROPERTIES	*11*
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	*15*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 8
  - SLAB ON GRADE 18
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 2

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0062-017	6400 6TH STREET	SLAB ON GRADE	GOOD			**1/3/2000** – Immediately adjacent to Dry Creek, recommend Raise structure. **2/3/1998** – Flood depth 12" in house. **11/22/1997** – Flood depth 12" in house. **1/9/1995** – Flood depth 14" in house.
214-0063-015	6421 6TH STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0062-018	6434 6TH STREET	SLAB ON GRADE	GOOD			**11/22/1997** – Flood depth 9" in house. **1/9/1995** – Flood depth 12" in house.
214-0062-018	6438 6TH STREET	SLAB ON GRADE	GOOD			**11/22/1997** – Flood depth 9" in house. **1/9/1995** – Flood depth 12" in house.
214-0062-019	6444 6TH STREET	RAISED	GOOD			**12/31/2005** – Homeowner says she had 60” of water in basement and water went up to driveway about 12”. Some water went underneath house too. **6/16/1998** – Flood depth 9" in house. **11/22/1997** – Flood depth 9" in house.

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0062-041	6446 6TH STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0062-022	6448 6TH STREET	SLAB ON GRADE	GOOD			**11/22/1997** – Flood depth 9" in house. **1/9/1995** – Flood depth 10" in house.
214-0061-013	6509 6TH STREET	RAISED	GOOD			**2/23/2004** – Barn constructed as required by Floodplain Management Ordinance. **3/26/2001** – Mobile home elevated as required by Floodplain Management Ordinance. **11/20/1999** – Demolition of existing home. **1/9/1995** – Flood depth unavailable due to lack of information cited in confidential flood site listings.
214-0061-012	6521 6TH STREET	SLAB ON GRADE				**1/9/1995** - Garage flooded 12”.
214-0061-011	6533 6TH STREET	RAISED	GOOD	Elevated		**4/27/2005** - This property was elevated as federally funded project. **1/9/1995** - Garage flooded 12”.

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0061-009	6541 6TH STREET	RAISED	GOOD	Demolition and Elevated		**1/12/2001** – Constructed new single family dwelling elevated as required by Floodplain Management Ordinance. **11/20/1999** – Demolition of existing home. **1/9/1995** - Garage flooded 7.2".
214-0062-001	6544 6TH STREET	RAISED	GOOD			**1/9/1995** - Barn flooded 36".
214-0061-078	6553 6TH STREET	SLAB ON GRADE	GOOD			**6/19/1998** - Flood depth unavailable due to lack of information cited in confidential flood site listings
214-0061-057	6557 6TH STREET	SLAB ON GRADE	GOOD			**1/9/1995** – Flood depth unavailable due to lack of information cited in confidential flood site listings.
214-0061-058	6559 6TH STREET	RAISED	GOOD			**No Record of Flooding**
206-0251-005	6600 6TH STREET	SLAB ON GRADE	GOOD			**1/9/1995** – Flood depth unavailable due to lack of information cited in confidential flood site listings.
206-0243-008	6601 6TH STREET	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0251-006	6612 6TH ST	RAISED	FAIR			**No Record of Flooding**
206-0243-007	6613 6TH ST	SLAB ON GRADE	FAIR			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
206-0243-006	6615 6TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0251-007	6616 6TH ST	RAISED	GOOD			**No Record of Flooding**
206-0243-005	6623 6TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0251-008	6624 6TH ST	RAISED	GOOD			**No Record of Flooding**
206-0242-029	6600 5TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0241-014	6601 5TH ST	RAISED	GOOD			**No Record of Flooding**
206-0242-030	6606 5TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0242-031	6612 5TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0242-032	6618 5TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**

AREA 1

5TH AVENUE

6TH AVENUE

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**10**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*10*
• EXISTING STRUCTURES (UNMITIGATED)	
o RAISED FOUNDATIONS	0
o SLAB ON GRADE	10
• NO STRUCTURES	
o PRIVATELY OWNED	0
MITIGATED PROPERTIES	
• ACQUSITION & DEMO	0
• AQUSITION – NO STRUCTURE	0
• ELEVATED (RAISED FOUNDATION)	0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
214-0061-010	6552 5TH AVENUE	SLAB ON GRADE	GOOD			**6/22/1998** - Garage flooded 17".
214-0340-006	6561 5TH AVENUE	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0242-025	6601 5TH AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0243-012	6606 5TH AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0242-024	6607 5TH AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0243-013	6612 5TH AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0242-023	6613 5TH AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0243-014	6618 5TH AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0242-022	6619 5TH AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0251-004	6619 6TH AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**

AREA 1

OAK LANE

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**16**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	*14*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 4
  - SLAB ON GRADE 12
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0300-001	740 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0300-003	800 OAK LANE	RAISED	GOOD			**No Record of Flooding**
207-0300-004	804 OAK LANE	RAISED	GOOD			**6/22/1998** – Flood Depth 1" from CONFIDENTIAL flood site list**.**
207-0300-005	812 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0300-006	820 OAK LANE	RAISED	GOOD			**No Record of Flooding**
207-0300-007	830 OAK LANE	SLAB ON GRADE	GOOD			**6/22/1998** – Flood Depth 7" from CONFIDENTIAL flood site list**.**
207-0300-008	850 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0300-009	864 OAK LANE	RAISED	GOOD			**No Record of Flooding**
207-0141-007	902 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0300-008	904 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0300-008	970 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0330-001	1002 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-002	1006 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-003	1010 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-004	1014 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-005	1018 OAK LANE	SLAB ON GRADE	GOOD			**No Record of Flooding**

AREA 1

FALLON PLACE COURT

JC COURT

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**17**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*17*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 17
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0320-039	1020 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-040	1021 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-038	1024 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-041	1025 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-037	1028 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-042	1029 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-036	1032 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-043	1033 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-035	1036 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-044	1037 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0320-034	1040 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-045	1041 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-033	1044 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-032	1048 FALLON PLACE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-012	1010 JC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-013	1011 JC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-011	1014 JC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**

AREA 1

ALVILDE COURT

CASTLE CREEK WAY

Q STREET

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**21**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*21*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 2
  - SLAB ON GRADE 19
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0320-005	6931 ALVILDE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-006	6932 ALVILDE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-004	6937 ALVILDE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-007	6938 ALVILDE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-003	6943 ALVILDE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-008	6944 ALVILDE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0320-009	6950 ALVILDE CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-028	7001 CASTLE CREEK WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-029	7007 CASTLE CREEK WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-030	7013 CASTLE CREEK WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0100-047	7105 CASTLE CREEK WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-048	7109 CASTLE CREEK WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-049	7113 CASTLE CREEK WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-050	7117 CASTLE CREEK WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-051	7121 CASTLE CREEK WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-052	7125 CASTLE CREEK WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0160-029	1400 Q ST	SLAB ON GRADE	GOOD		STORAGE FACILITY	**No Record of Flooding**
207-0160-035	1430 Q ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0160-020	1460 Q ST	RAISED	GOOD			**No Record of Flooding**
207-0160-041	1500 Q ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0160-042	1522 Q ST	RAISED	GOOD			**No Record of Flooding**

AREA 1

RADALYAC COURT

WOODWRIGHT WAY

DRY CREEK WATERSHED

DATA ANALYSIS SUMMARY

PROPERTIES	**17**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*17*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 13
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 4
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0330-006	6814 RADALYAC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-007	6818 RADALYAC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-008	6822 RADALYAC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-009	6826 RADALYAC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-010	6830 RADALYAC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-015	6836 RADALYAC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-016	6840 RADALYAC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-017	6844 RADALYAC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0330-018	6848 RADALYAC CT	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
207-0100-068	1100 WOODWRIGHT WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-071	1108 WOODWRIGHT WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-070	1116 WOODWRIGHT WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
207-0100-064	1117 WOODWRIGHT WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
214-0071-030	0	N/A	N/A			**No Structure**
207-0152-014	0	N/A	N/A			**No Structure**
214-0071-027	0	N/A	N/A			**No Structure**
214-0071-028	0	N/A	N/A			**No Structure**

Appendix 2

REPETITIVE LOSS AREA 2

LAGUNA CREEK

(Inter-basin transfer)

GERBER CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 2

TABLE OF CONTENTS

A2.1 REPETITIVE LOSS AREA 2

This Report focuses on Area 2, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 2 analysis includes properties on Bar Du Lane, Bradshaw Road, Carmencita Avenue, Gerber Road, Wildhawk West Drive and Vineyard Road and is defined by **Figure 1**.

A2.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A2.3 PROBLEM STATEMENT

The location of Area 2 is generally Bradshaw Road west of Vineyard Road. The character of the Inter-basin Transfer flow in general, the flow leaving Laguna Creek remains on the east side of Bradshaw Road and ponds behind Bradshaw Road, overtopping the roadway at the lowest crown elevations just south of Gerber Road, once the capacity of smaller roadside ditches are exceeded. Once flow overtops the roadway, the majority of the spill would flow westward overland across the intersection of Gerber Road and across the properties south of Gerber Road. The inundation of properties just south of Gerber Road is significant, as they convey the majority of the Inter-basin Transfer. This Inter-basin transfer has an extensive record of flood conditions.

This RLAA consists of 103 properties which include buildings on FEMA's repetitive loss list and nearby buildings that may have the same or similar flooding conditions. The flood hazard in this area is Laguna Creek inter-basin transfer to Gerber Creek.

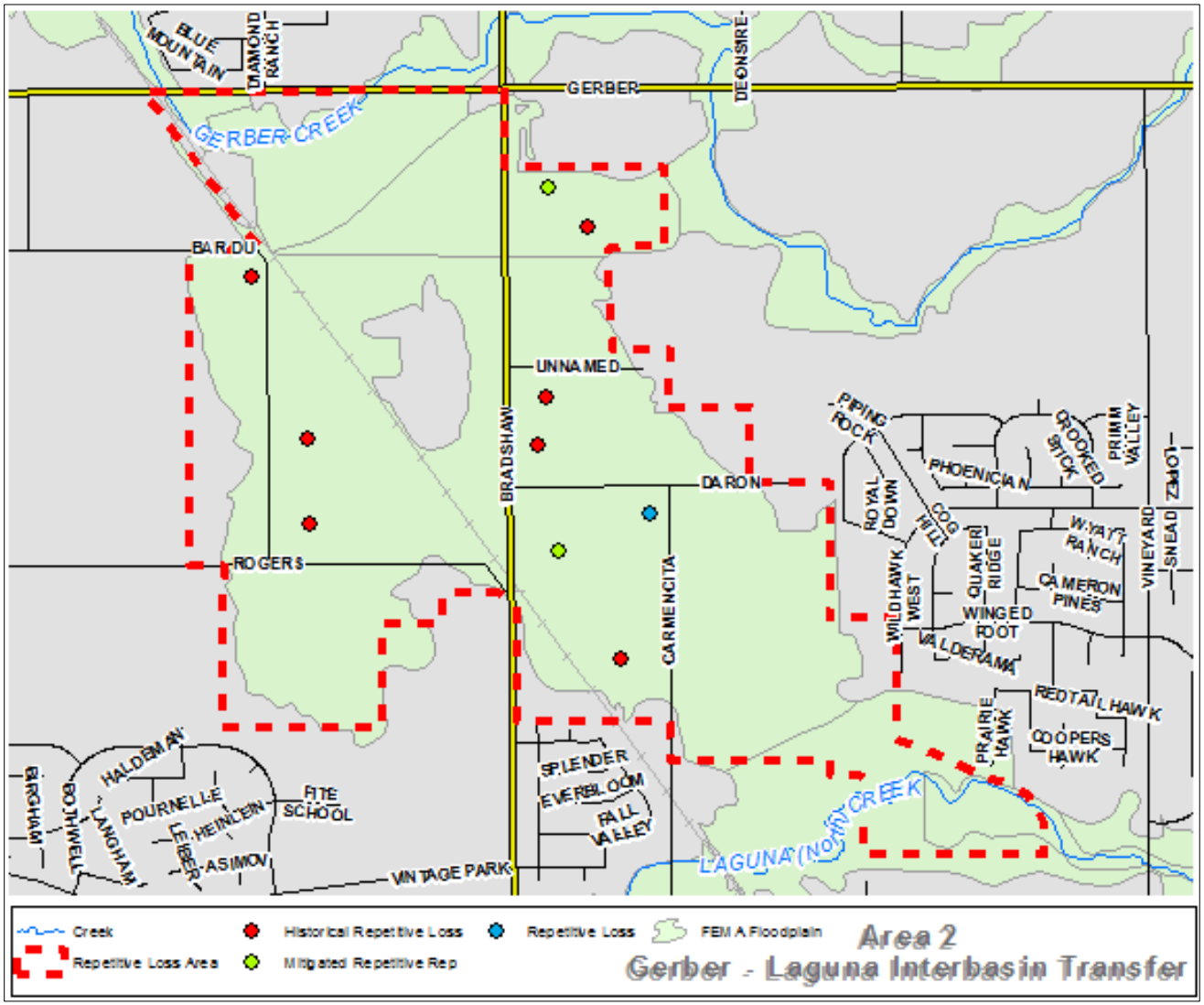
A2.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- The Upper Laguna Creek Drainage Improvement and Trail System (ULCDITS)
- Sacramento County Department of Water Resources' comprehensive drainage improvement plan from Vineyard Road to Calvine Road in southern Sacramento County.
- Southgate Recreation and Park District's construction of a pedestrian/bicycle/equestrian trail system along this portion of Laguna Creek.
- Multi-use flood control detention basin, and three water quality treatment basins
- Flood control detention basin at Triangle Rock's Vulcan pit, west of Folsom South Canal.
- Sacramento County is working on a flood control project (known as Triangle basin).

The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

FIGURE A2
Repetitive Loss Area #2



A2.5 DATA COLLECTION

Sacramento County Plans and studies for the Dry Creek watershed were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

A2.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) all properties within the RLA are within the 100-year FEMA floodplain. The flood hazard in this area is Laguna Creek inter-basin transfer to Gerber Creek. The Sacramento County Local Floodplain Map indicates this entire RLA falls within the Local Flood Plain with a flood elevation of 86.83' NGVD 29 or 89.13' NAVD 88,

A2.5.2 Flooding Experiences of Property Owners

Drainage Operation and Maintenance Service Request Tracking System (DOMS-SRTS) indicates that nine of the overall 103 properties within the Laguna Creek (Inter-Basin Transfer) RLA had reported flooding.

A2.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A2.5.4 Types of Foundations

The most common type of foundations within the Laguna Creek (Inter-Basin Transfer) RLA is raised foundations, which constitutes 74% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A2.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for acquisition of additional properties in Dry Creek Floodway for demolition to restores the natural floodplain. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

LAGUNA CREEK to GERBER CREEK
(Inter-Basin Transfer)

AREA 2

BAR DU LANE

LAGUNA CREEK to GERBER CREEK
(Inter-Basin Transfer)

DATA ANALYSIS SUMARY

PROPERTIES	**16**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	*14*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 13
  - SLAB ON GRADE 2
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
121-0050-030	7720 BAR DU LN	RAISED	GOOD			**1/9/1995** - depth information CONFIDENTIAL flood site list.
121-0050-023	7721 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0050-023	7725 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0050-029	7740 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0050-025	7793 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0080-018	7823 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0080-019	7835 BAR DU LN	RAISED	GOOD			**1/9/1995** - depth 2 inches in the house
121-0080-014	7840 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0080-020	7841 BAR DU LN	SLAB ON GRADE	GOOD			**No Report of Flooding**
121-0080-021	7845 BAR DU LN	SLAB ON GRADE	GOOD			**No Report of Flooding**
121-0080-015	7920 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0080-016	7950 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0080-017	7960 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0050-032	9476 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0050-031	9478 BAR DU LN	RAISED	GOOD			**No Report of Flooding**
121-0050-024	9478 BAR DU LN	RAISED	GOOD			**No Report of Flooding**

AREA 2

BRADSHAW ROAD

LAGUNA CREEK to GERBER CREEK
(Inter-Basin Transfer)

DATA ANALYSIS SUMARY

PROPERTIES	**33**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*4*
REPETITIVE LOSS AREA PROPERTIES	*29*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 13
  - SLAB ON GRADE 8
  - UNKNOWN 5
- NO STRUCTURES
  - PRIVATELY OWNED 5

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 1
- ELEVATED (RAISED FOUNDATION) 1

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
121-0060-021	7768 BRADSHAW RD	UNKNOWN	GOOD			**No Report of Flooding**
122-0010-019	7669 BRADSHAW RD	RAISED (Mobile Home)	GOOD			**No Report of Flooding**
121-0060-002	7672 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
121-0010-011	7691 BRADSHAW RD	RAISED	GOOD			**1/9/1995** - depth information CONFIDENTIAL flood site list.
121-0060-003	7714 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
121-0060-004	7718 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
121-0060-017	7724 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
121-0020-011	7731 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
121-0060-009	7732 BRADSHAW RD	UNKOWN				**No Report of Flooding**
122-0020-008	7739 BRADSHAW RD	UNKOWN				**No Report of Flooding**
121-0060-008	7740 BRADSHAW RD	UNKOWN				**No Report of Flooding**
122-0020-005	7745 BRADSHAW RD	SLAB ON GRADE	GOOD			**No Report of Flooding**
121-0060-007	7746 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
121-0060-006	7748 BRADSHAW RD	SLAB ON GRADE	GOOD			**No Report of Flooding**
122-0020-003	7749 BRADSHAW RD	SLAB ON GRADE	GOOD			**1/9/1995** - depth information CONFIDENTIAL flood site list.
121-0060-016	7750 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
121-0060-011	7760 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**

DATA ANALYSIS TABLE (Continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
121-0060-018	7764 BRADSHAW RD	SLAB ON GRADE	GOOD			**No Report of Flooding**
121-0060-013	7784 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
121-0070-014	7800 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
122-0030-019	7841 BRADSHAW RD	SLAB ON GRADE	GOOD			**FEMA Flood Claim**
121-0070-015	7850 BRADSHAW RD	SLAB ON GRADE	GOOD			**No Report of Flooding**
121-0070-016	7870 BRADSHAW RD	SLAB ON GRADE	GOOD			**No Report of Flooding**
121-0070-002	7880 BRADSHAW RD	RAISED	GOOD			**No Report of Flooding**
121-0030-010	7881 BRADSHAW RD	UNKNOWN	GOOD			**No Report of Flooding**
122-0030-011	7891 BRADSHAW RD	RAISED	GOOD	Elevated		**12/10/1999** – Raised structure garage and addition. **1/2/1999** – This property was elevated as required by Floodplain Management Ordinance for Substantial Improvements (**CBN1999-00337**). **1/9/1995** - depth information CONFIDENTIAL flood site list.
122-0040-022	7933 BRADSHAW RD	SLAB ON GRADE	GOOD			**No Report of Flooding**

DATA ANALYSIS TABLE (Continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
122-0010-018	0 BRADSHAW RD	N/A	N/A	Acquisition		**8/10/2013** – Land acquisitioned by County. No Structure
121-0060-015	0 BRADSHAW RD	N/A	N/A			**No Report of Flooding**
121-0070-013	0 BRADSHAW RD	N/A	N/A			**No Report of Flooding**
122-0020-013	0 BRADSHAW RD	N/A	N/A			**No Report of Flooding**
122-0030-008	0 BRADSHAW RD	N/A	N/A			**No Report of Flooding**
121-0040-015	0 BRADSHAW RD	N/A	N/A			**No Report of Flooding**

AREA 2

CARMENCITA AVENUE

LAGUNA CREEK to GERBER CREEK
(Inter-Basin Transfer)

DATA ANALYSIS SUMARY

PROPERTIES	**29**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*27*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 18
  - SLAB ON GRADE 8
- NO STRUCTURES 2
-
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
122-0030-021	7851 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0030-009	7856 CARMENCITA AV	UNKNOWN	GOOD			**FEMA Flood Claim** – 1/22/1997 and 01-10-1995
122-0030-022	7863 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0030-015	7883 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0030-012	7890 CARMENCITA AV	N/A	N/A			**Barn**
122-0040-007	7909 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0040-002	7910 CARMENCITA AV	SLAB ON GRADE	GOOD			**No Report of Flooding**
122-0040-003	7926 CARMENCITA AV	SLAB ON GRADE	GOOD			**No Report of Flooding**
122-0040-004	7932 CARMENCITA AV	SLAB ON GRADE	GOOD			**No Report of Flooding**
122-0040-005	7938 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0040-006	7946 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0040-008	7949 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0040-011	7955 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0040-018	7958 CARMENCITA AV	RAISED	GOOD			**1/9/1995** – flood depth information unknown
122-0040-018	7973 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0040-019	7990 CARMENCITA AV	SLAB ON GRADE	GOOD			**No Report of Flooding**
122-0040-012	7991 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
122-0130-011	8021 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0030-020	9767 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0030-007	9770 CARMENCITA AV	SLAB ON GRADE	GOOD			**No Report of Flooding**
122-0030-018	9771 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0030-006	9774 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0030-005	9778 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0030-016	9779 CARMENCITA AV	SLAB ON GRADE	GOOD			**No Report of Flooding**
122-0030-004	9784 CARMENCITA AV	SLAB ON GRADE	GOOD			**No Report of Flooding**
122-0030-023	9791 CARMENCITA AV	SLAB ON GRADE	GOOD			**No Report of Flooding**
122-0030-003	9794 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0030-002	9798 CARMENCITA AV	RAISED	GOOD			**No Report of Flooding**
122-0040-001	0 CARMENCITA AV	N/A	N/A			**No Structure**

AREA 2

ROGERS ROAD

GERBER ROAD

VINEYARD ROAD

WILDHAWK WEST DRIVE

LAGUNA CREEK to GERBER CREEK
(Inter-Basin Transfer)

DATA ANALYSIS SUMARY

PROPERTIES	**25**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*24*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 15
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PRIVATELY OWNED 7

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
121-0080-041	9530 ROGERS RD	SLAB ON GRADE	GOOD			**No Report of Flooding**
121-0080-054	9560 ROGERS RD	RAISED	GOOD			**No Report of Flooding**
121-0080-052	9570 ROGERS RD	SLAB ON GRADE	GOOD			**No Report of Flooding**
121-0080-022	9585 ROGERS RD	SLAB ON GRADE	GOOD			**1/9/1995 -** Depth unavailable due to lack of information from CONFIDENTIAL flood site list.
121-0080-023	9590 ROGERS RD	N/A	N/A			**No Structure**
121-0070-010	9596 ROGERS RD	RAISED	GOOD			**No Report of Flooding**
121-0070-028	9620 ROGERS RD	RAISED	GOOD			**No Report of Flooding**
121-0070-017	9632 ROGERS RD	RAISED	GOOD			**No Report of Flooding**
121-0070-003	9661 ROGERS RD	RAISED	GOOD			**No Report of Flooding**
121-0070-022	9670 ROGERS RD	RAISED	GOOD			**No Report of Flooding**
121-0080-053	0 ROGERS RD	N/A	N/A			**No Structure**

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
121-0050-012	9510 GERBER RD	RAISED	GOOD			**No Report of Flooding**
121-0050-014	9538 GERBER RD	RAISED	GOOD			**No Report of Flooding**
121-0050-015	9540 GERBER RD	RAISED	GOOD			**No Report of Flooding**
121-0050-016	9544 GERBER RD	RAISED	GOOD			**No Report of Flooding**
121-0050-017	9548 GERBER RD	RAISED	GOOD			**No Report of Flooding**
121-0050-021	9550 GERBER RD	RAISED	GOOD			**No Report of Flooding**
121-0050-018	9550 GERBER RD	RAISED	GOOD			**No Report of Flooding**
121-0050-019	9550 GERBER RD	RAISED	GOOD			**No Report of Flooding**
121-0050-020	9558 GERBER RD	RAISED	GOOD			**No Report of Flooding**
121-0060-022	9670 GERBER RD	N/A	N/A			**Open Space**
121-0050-047	0 GERBER RD	N/A	N/A			**No Structure**
121-0050-013	0 GERBER RD	N/A	N/A			**No Structure**
121-0120-049	0 VINEYARD RD	N/A	N/A			**Park**
122-0050-026	0 WILDHAWK WEST DR	N/A	N/A			**Open Space**

Appendix 3

REPETITIVE LOSS AREA 3

LOCAL DRAINAGE

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 1

TABLE OF CONTENTS

A3.1 REPETITIVE LOSS AREA 3- Andrew Alan Lane

This Report focuses on Area 3, one of the twenty-eight (28) designated RLAs within the Sacramento County. The subject homes, constructed in 1990, flooded several times due to an unforeseen local shed jump and lack of overland release. Overland release was constructed in the mid1990's and the homes have not flooded since. See **Figure A3**.

A3.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the repetitive loss areas.

A3.3 PROBLEM STATEMENT

The location of Area 3 is Andrew Alan Lane north east of the intersection of San Juan Avenue and Winding Way. The small (two acre) subdivision was constructed in a low area with one storm drain inlet and no overland release. The homeowners filed flood insurance claims in 1995, 1996, and 1997 when the County was hit by a series of significant storms. Once the problem was recognized, an engineered solution was designed and constructed and the homes have not flooded since that time.

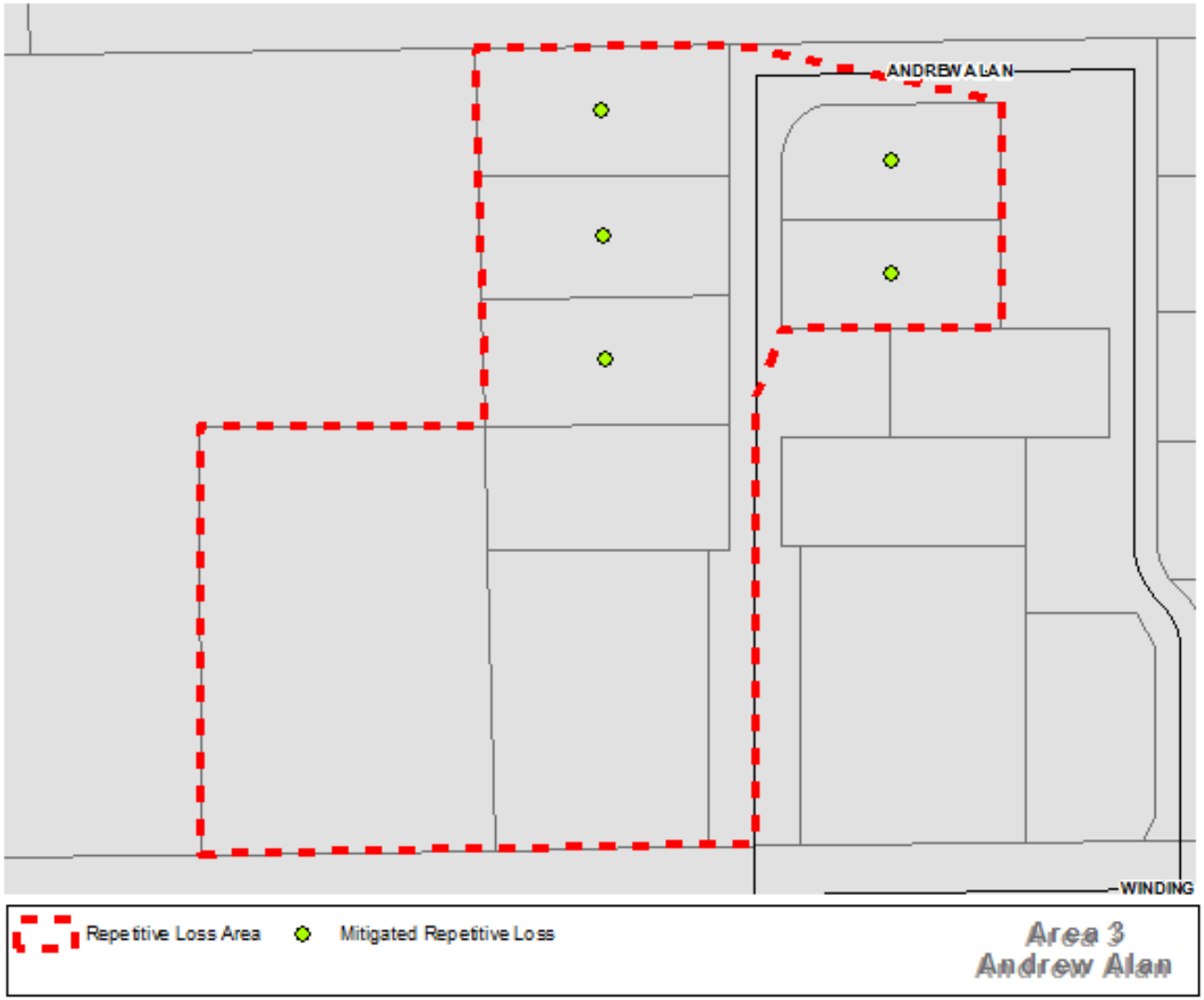
There are two properties included on FEMA's repetitive loss list, one other flood victim that is not listed on the repetitive loss list possibly due to not having flood insurance, and two other homes that would be in jeopardy had the engineered solution not been constructed.

A3.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

> This was a local drainage issue solved by the local agency. No state of federal agencies participated in the flood control solution.
>
> The primary method of property protection is overland release.

FIGURE A3
Repetitive Loss Area #3



A3.5 DATA COLLECTION

The issue was caused by an engineering oversight at the time of development. The error included a misunderstanding of the contributing watershed area. The solution included establishing an overland release path to assure storm water runoff from significant storm events, exceeding the capacity of the piped storm drain system, would safely release downstream. Sacramento County prepared the study and plans and assured construction was completed.

A3.5.1 Flood Insurance and Flood Event Data

Area 3 is in Zone X, on the FEMA Flood Insurance Rate Map 06067C0093H. The local flooding occurred in this area in 1993, 1995, 1996, and 1997. The repair was completed shortly after the 1997 storm event, and the area has not flooded since that time.

A3.5.2 Flooding Experiences of Property Owners

After flooding up to four times in a three year period with these homes were quite new, these property owners have enjoyed seventeen years without any flooding problems. Water Resources Service Request Tracking System (WR-SRTS) shows no complaints or questions after 1997.

A3.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in January 10, 1995. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A3.5.4 Types of Foundations

The most common type of foundations within the Andrew Alan Lane RLA is Slab on Grade which constitutes 100% of the two common foundations found in this RLA within Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types

mentioned).

A3.6 FUTURE MITIGATION MEASURES

The overland release must be inspected periodically and kept clear. The County does periodic outreach to ten properties in Area 3. The local flooding problem was mitigated by a project constructed under the direction of the County. There is no remaining construction action necessary. The overland release must be kept clear and functioning.

DATA ANALYSIS SUMMARY

ANDREW ALAN LANE LOCAL FLOODPLAIN

AREA 3

ANDREW ALAN LANE

WINDING WAY

ANDREW ALAN LANE LOCAL FLOODPLAIN

DATA ANALYSIS SUMARY

PROPERTIES	**8**
REPETITIVE LOSS PROPERTIES	*2*
HISTORICAL LOSS PROPERTIES	*3*
REPETITIVE LOSS AREA PROPERTIES	*3*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- OVERLAND RELEASE 5

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
242-0600-013	4407 ANDREW ALAN LN	SLAB ON GRADE	GOOD			**No Record of Flooding**
242-0600-014	4411 ANDREW ALAN LN	SLAB ON GRADE	GOOD	Overland Release Installed		**1/9/1995 –** House flooded a depth of 30". Garage depth of flooding 12".
242-0600-010	4414 ANDREW ALAN LN	SLAB ON GRADE	GOOD	Overland Release Installed		**1/9/1995 –** House flooded a depth of 1". Garage depth of flooding 2".
242-0600-015	4415 ANDREW ALAN LN	SLAB ON GRADE	GOOD	Overland Release Installed		**1/22/1997 –** House flooded a depth of 2". Garage depth of flooding 9". **1/9/1995 –** House flooded a depth of 23". Garage depth of flooding 30".
242-0600-009	4418 ANDREW ALAN LN	SLAB ON GRADE	GOOD	Overland Release Installed		**1/9/1995 –** House flooded a depth of 1". Garage depth of flooding 2".
242-0600-016	4419 ANDREW ALAN LN	SLAB ON GRADE	GOOD	Overland Release Installed		**1/22/1997 –** House flooded a depth of 5". Garage depth of flooding 17". **1/9/1995 –** House flooded a depth of 24". Garage depth of flooding 36".
242-0101-021	7425 WINDING WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**
242-0600-001	7433 WINDING WAY	SLAB ON GRADE	GOOD			**No Record of Flooding**

Appendix 4

REPETITIVE LOSS AREA 4

NORTH AVENUE

East of Mission Avenue

Chicken Ranch Slough Floodplain

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 4
TABLE OF CONTENTS

A4.1 REPETITIVE LOSS AREA 4 North Ave (Chicken Ranch Slough)

This Report focuses on Area 4, one of the twenty-eight (28) designated RLAs within the Sacramento County. Repetitive loss area #4 has experienced flooding due to Chicken Ranch Slough and ponding water in the street caused by backwater from the high creek level. Two properties protected themselves with an on-site floodwall, one established sideyard overland release.

A4.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the repetitive loss area.

A4.3 PROBLEM STATEMENT

The location of Area 4 is Chicken Ranch Slough upstream of Mission Avenue. The measured water surface elevation in 1986 approximately matched the FEMA flood insurance base flood elevation and the 1995 high water was about 8 inches below the BFE. Flood insurance claims were filed in 1986, 1995, 1996, 1997, 2005; although, some only filed two claims, others filed three or four.

The problem is Chicken Ranch Slough and the fact that the PreFIRM homes were constructed too low.

A4.4 BASIC INFORMATION

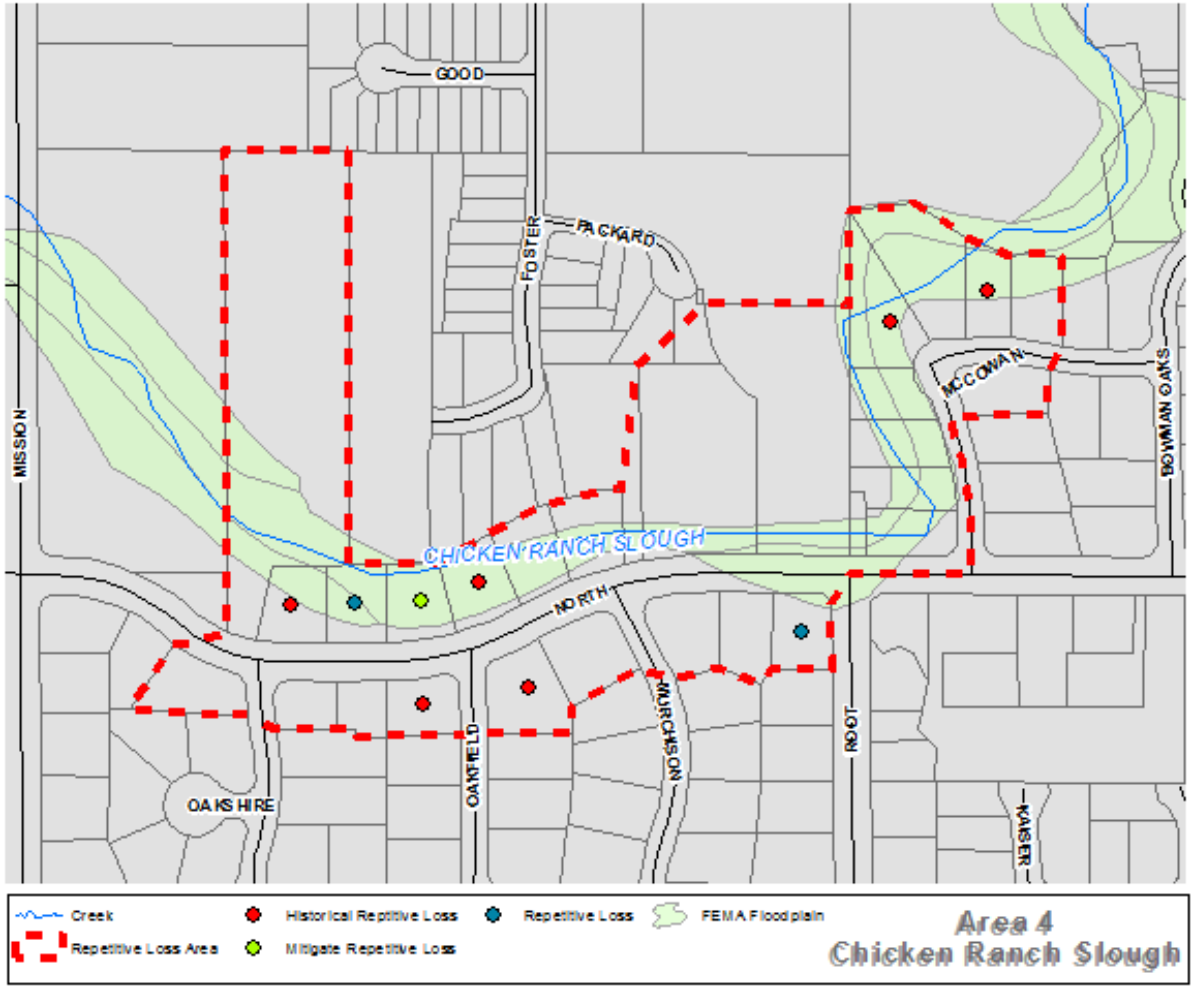
The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

A4.5 DATA COLLECTION

Sacramento County and FEMA flood insurance studies for Chicken Ranch Slough were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the repetitive loss area (RLA):

- FEMA Flood Insurance Rate Map
- Sacramento County 2006 hydrology and hydraulics model
- Sacramento County Drainage Engineering

FIGURE A4
Repetitive Loss Area #4



A4.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) the repetitive loss area properties are affected by the 100-year FEMA floodplain. The flooding occurs when the creek is high, and local storm drains cannot drain water from the street due to that tail-water condition.

A4.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that only a small handful of the overall properties within the Area 4 RLA had reported flooding.

A4.5.3 Structure Inspections

There have been numerous communications between the property owners in the subject area as shown on the SRTS map below. There are only a handful of properties who have filed flood insurance claims. The repetitive loss properties have experienced several floods, but local on-site mitigation may reduce the number of such claims.

FEMA hazard mitigation home elevation program benefit versus cost analyses would not support home elevation due to the depth of flooding. Consequently, it would seem that the on-site floodwalls and overland release are the best solution.

The County drainage engineering staff stands ready to assist property owners with on-site flood protection solutions.

A4.5.4 Types of Foundations

The homes in this area are a mix of slab on grade and raised foundation.

A4.6 FUTURE MITIGATION MEASURES

The most common type of foundations within the Dry Creek RLA is slab on grade, which constitutes 71% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

There does not appear to be an urgent project in Area 4.

- **Responsible Office:** Department of Water Resources through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** FEMA grant

DATA ANALYSIS SUMMARY

Chicken Ranch Slough Floodplain

AREA 4

NORTH AVENUE

CHICKEN RANCH SLOUGH FLOODPLAIN

DATA ANALYSIS SUMARY

PROPERTIES	**17**
REPETITIVE LOSS PROPERTIES	*3*
HISTORICAL LOSS PROPERTIES	*4*
REPETITIVE LOSS AREA PROPERTIES	*10*
• EXISTING STRUCTURES (UNMITIGATED)	
o RAISED FOUNDATIONS	10
o SLAB ON GRADE	3
• NO STRUCTURES	
o PRIVATELY OWNED	2
MITIGATED PROPERTIES	
• OVERLAND RELEASE	
• FLOODWALL *(Slab On Grade)*	1
• ELEVATED (RAISED FOUNDATION)	

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
256-0160-055	0 NORTH AV	N/A	N/A			**No Structure on Property**
256-0221-017	0 NORTH AV	N/A	N/A			**No Structure on Property**
271-0323-009	4720 NORTH AV	RAISED	GOOD			**No Record of Flooding**
271-0321-001	4733 NORTH AV	SLAB ON GRADE	GOOD			**1/22/1997** - FEMA Flood Claim:
271-0321-002	4739 NORTH AV	SLAB ON GRADE	GOOD			**12/31/2005** - FEMA Flood Claim: **1/22/1997** - FEMA Flood Claim: **1/10/1995 –** House flooded undetermined depth. Main floor is 3" below BFE. (FEMA Flood Claim)
271-0322-009	4740 NORTH AV	RAISED	GOOD			**No Record of Flooding**
271-0322-002	4746 NORTH AV	RAISED	GOOD			**7/8/1998 –** House flooded undetermined depth.
271-0321-003	4747 NORTH AV	SLAB ON GRADE	GOOD	Existing Floodwall		**12/31/2005 –** Street Flooding **1/9/1998 -** Flood Wall Constructed **1/22/1997** - FEMA Flood Claim: **4/1/1996** - FEMA Flood Claim: **1/10/1995 –** House flooded undetermined depth. (FEMA Flood Claim) **2/17/1986** - FEMA Flood Claim:
271-0323-025	4800 NORTH AV	RAISED	GOOD			**7/8/1998 –** House flooded undetermined depth. **2/18/1986** - FEMA Flood Claim:
271-0321-004	4801 NORTH AV	RAISED	GOOD			**7/8/1998 –** Flooded undetermined depth.

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
271-0321-005	4807 NORTH AV	RAISED	GOOD			**No Record of Flooding**
271-0323-026	4810 NORTH AV	RAISED	GOOD			**No Record of Flooding**
271-0321-006	4813 NORTH AV	RAISED	GOOD			**No Record of Flooding**
271-0324-002	4826 NORTH AV	RAISED	GOOD			**No Record of Flooding**
271-0324-003	4832 NORTH AV	SLAB ON GRADE	GOOD			**11/20/1999 –** Flood Repair (Permit No.: RB0588630) **1/10/1995 –** House flooded undetermined depth. (FEMA Flood Claim) **10/4/1994** - FEMA Flood Claim:
256-0160-049	4833 NORTH AV	UNKNOWN	UNKNOWN			**7/18/2000** - Street, driveway & yard flooding in large storms
256-0221-016	4901 NORTH AV	RAISED	GOOD			**No Record of Flooding**

AREA 4

MCCOWAN WAY

MURCHISON WAY

OAKFIELD DRIVE

CHICKEN RANCH SLOUGH FLOODPLAIN

DATA ANALYSIS SUMARY

PROPERTIES	**17**
REPETITIVE LOSS PROPERTIES	*3*
HISTORICAL LOSS PROPERTIES	*4*
REPETITIVE LOSS AREA PROPERTIES	*10*
• EXISTING STRUCTURES (UNMITIGATED)	
o RAISED FOUNDATIONS	10
o SLAB ON GRADE	3
• NO STRUCTURES	
o PRIVATELY OWNED	2
MITIGATED PROPERTIES	
• OVERLAND RELEASE	
• FLOODWALL *(Slab On Grade)*	1
• ELEVATED (RAISED FOUNDATION)	

Department of Water Resources
Repetitive Loss Area Analysis

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
256-0221-015	3305 MCCOWAN WY	RAISED	GOOD			**No Record of Flooding**
256-0221-014	3309 MCCOWAN WY	RAISED	GOOD			**No Record of Flooding**
256-0221-013	3313 MCCOWAN WY	RAISED	GOOD			**No Record of Flooding**
256-0222-001	3314 MCCOWAN WY	RAISED	GOOD			**No Record of Flooding**
256-0221-012	3317 MCCOWAN WY	RAISED	GOOD			**2/02/2012** - Street flooding **12/31/2005** - FEMA Flood Claim: **2/18/2004** - Street flooding **1/10/1995** - FEMA Flood Claim:
256-0221-011	3321 MCCOWAN WY	RAISED	GOOD			**7/8/1998 –** House flooded undetermined depth.
256-0221-010	3325 MCCOWAN WY	RAISED	GOOD			**1/10/1995** - FEMA Flood Claim: **1/9/1995** - FEMA Flood Claim:
256-0221-009	3329 MCCOWAN WY	RAISED	GOOD			**No Record of Flooding**
271-0324-001	3238 MURCHISON WY	SLAB ON GRADE	GOOD			**No Record of Flooding**
271-0322-008	4703 OAKFIELD CR	SLAB ON GRADE	GOOD			**No Record of Flooding**

Appendix 5

REPETITIVE LOSS AREA 5

TWIN CITIES ROAD

LOWER COSUMNES RIVER / BEACH-STONE

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 5
TABLE OF CONTENTS

A5.1 REPETITIVE LOSS AREA 5

This Report focuses on Area 5, one of the twenty-eight (28) designated RLAs within the Sacramento County. Repetitive Loss Area 5 has experienced flooding due to the Cosumnes River and backwater Beach-Stone Lake floodplains as described on the FEMA Flood Insurance Rate Map. Area 5 analysis includes properties on Twin Cities Road and is defined by **Figure A5**.

A5.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the repetitive loss area.

A5.3 PROBLEM STATEMENT

This area is in a FEMA floodplain, the lot sizes and use are typically agricultural throughout this region of the County. The location of Area 5 is outside of the urban stormwater utility; however, the County floodplain management section stands ready to offer technical assistance and hazard mitigation as grant funds are available. Flooding was reported in this area January 1982, February 1986, January 1997.

Post-FIRM structures are constructed safely above the flood hazard elevation; however, some preFIRM structures were not elevated properly.

The one known repetitive loss home was elevated after it flooded in 1997, partially paid by HMGP grant funds.

A5.4 BASIC INFORMATION

See maps an table at the end of this document.

A5.5 DATA COLLECTION

Sacramento County and FEMA flood insurance studies, for the floodplain affecting the area, were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the repetitive loss area (RLA):

- FEMA Flood Insurance Rate Map
- County BFE analysis for unnumbered A-Zone

A5.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) the repetitive loss area properties are affected by the 100-year FEMA floodplain. The flooding occurs when the Cosumnes River breaches its uncertified rural levee system combined with Beach-Stone Lake floodwater and contributions from the Morrison Creek watershed.

FIGURE A5
Repetitive Loss Area #5

A5.5.1 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that only a small handful of the overall properties within the Area 5 RLA reported flooding.

A5.5.2 Structure Inspections

There have been numerous communications between the property owners in the subject area as shown on the SRTS map below. There are only a handful of properties who have filed flood insurance claims. The repetitive loss properties have experienced several floods, but local on-site mitigation may reduce the number of such claims.

FEMA hazard mitigation home elevation program benefit versus cost analyses would not support home elevation due to the depth of flooding. Consequently, it would seem that the on-site floodwalls and overland release are the best solution.

The County drainage engineering staff stands ready to assist property owners with on-site flood protection solutions.

A5.5.3 Types of Foundations

The homes in this area are a mix of slab on grade and raised foundation.

A5.6 FUTURE MITIGATION MEASURES

There is no project proposed.

There does not appear to be an urgent project in Area 4.

- **Responsible Office:** individual property owners must request mitigation
- **Timeline:** not urgent
- **Potential Funding:** FEMA grant

DATA ANALYSIS SUMMARY

Lower Cosumnes River / Beach-Stone

AREA 5

BRUCEVILLE ROAD

FRANKLIN BOULEVARD

TWIN CITIES ROAD

LOWER COSUMNES RIVER / BEACH-STONE

DATA ANALYSIS SUMARY

PROPERTIES	**10**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	
REPETITIVE LOSS AREA PROPERTIES	*9*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 2
  - SLAB ON GRADE 3
  - UNKNOWN 2
- NO STRUCTURES
  - PRIVATELY OWNED 3

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)
- Flood Wall

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
146-0210-021	0 BRUCEVILLE RD	SLAB ON GRADE	POOR			**No Record of Flooding -** Communication Trailer
146-0210-020	12950 BRUCEVILLE RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
146-0080-034	0 FRANKLIN BL	N/A	N/A			**No Structure**
146-0080-011	12629 FRANKLIN BL	UNKNOWN	GOOD			**No Record of Flooding**
146-0050-060	7065 TWIN CITIES RD	RAISED	GOOD			**No Record of Flooding**
146-0210-006	0 TWIN CITIES RD	N/A	N/A			**No Structure**
146-0210-007	0 TWIN CITIES RD	N/A	N/A			**No Structure**
146-0050-061	0 TWIN CITIES RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
146-0210-023	5902 TWIN CITIES RD	RAISED	GOOD			**1/03/1997** – FEMA Flood Claim **2/16/1982** – FEMA Flood Claim **1/04/1982** – FEMA Flood Claim
146-0210-019	6600 TWIN CITIES RD	UNKNOWN	GOOD			EC in file, floor is 1.3’ above BFE **08/26/2008 -** Demo Detached 2 Car Garage **07/17/2000** – Pool House Lift FEMA / HMGP **11/20/1999** – Flood Repair

Appendix 6

REPETITIVE LOSS AREA 6
BROOKTREE CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 6

TABLE OF CONTENTS

A6.1 REPETITIVE LOSS AREA 6

This Report focuses on Area 6, one of the twenty eight (28) designated RLAs within the Sacramento County. Area 6 analysis includes Elsinore Way, Leavitt Way, Northbrook Way, and Southbrook Way as defined by **Figure A6**.

A6.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the repetitive loss areas.

A6.3 PROBLEM STATEMENT

The location of Area 6 is along Coyle Creek, upstream of Madison Avenue.

The source of flooding was primarily identified as the residences being in low lying areas, in some instances adjacent to a creek that is over capacity, and most of the homes having slab-on-grade foundations.

There are 18 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions.

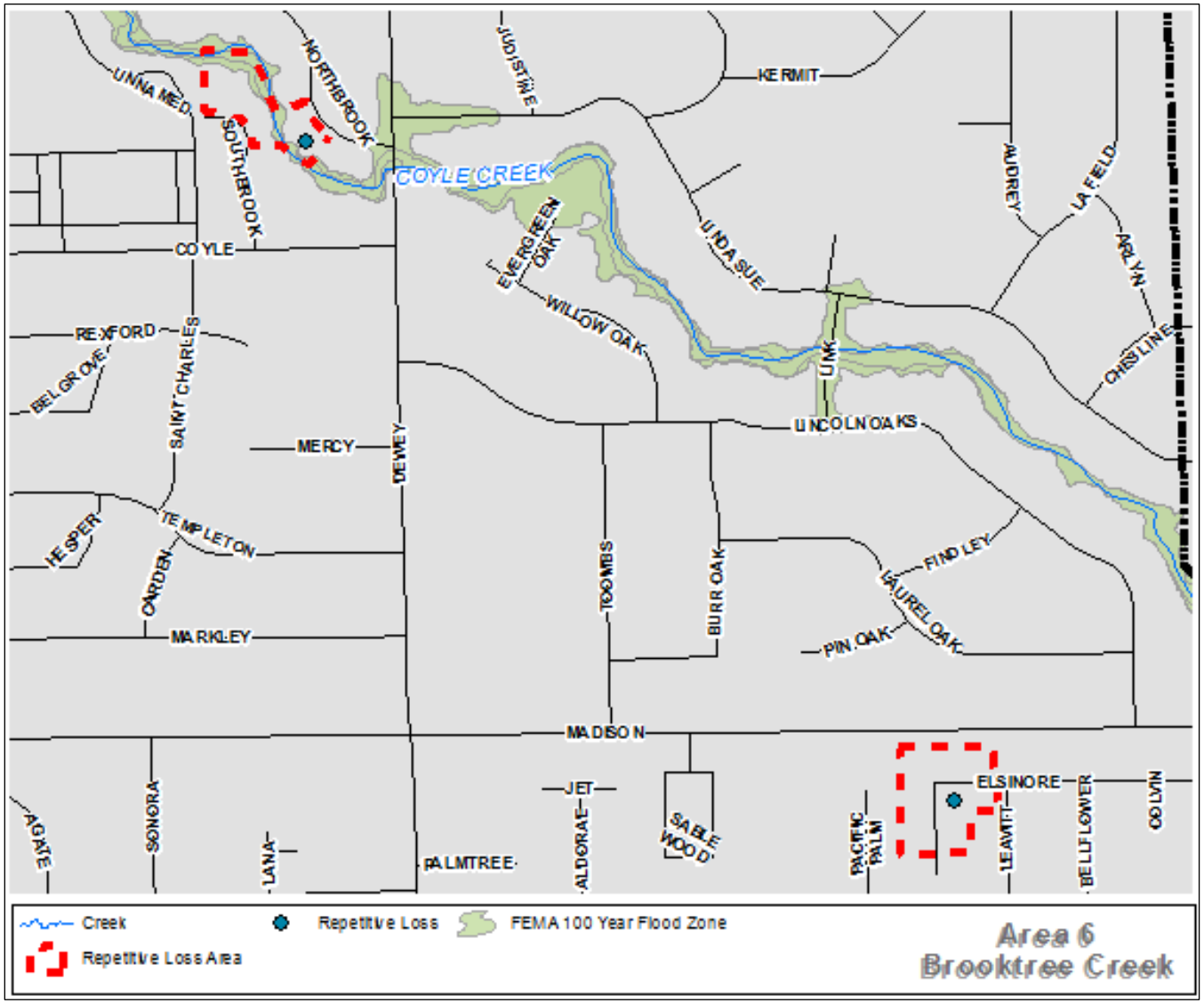
A6.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), plans or studies that could affect the cause or impacts to flooding were not available.

The primary methods of property protection are:

- Home Elevation – Is your floor below the elevation of the floodplain? If so, it may be prudent to elevate the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, the County has utilized FEMA grant money for dozens of qualified elevation projects.
- Site Modification – Would a small wall, berm, or other site specific grading help keep water out of your house? Often, modification of the area around your home may be appropriate to minimize flooding depending on the depth of floodwater and site specific constraints.
- Temporary Flood Barriers – Perhaps sandbags or other barriers could be employed on site in advance of a storm to help keep water out.
- Home Removal – If necessary, it may be recommended that the County purchase the property and remove the home from the lot.

FIGURE A6
Repetitive Loss Area #6



A6.5 DATA COLLECTION

Sacramento County Plans and studies for Brooktree Creek were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- Improvement plans for 5334 Elsinore Way
- Palm Avenue Subdivision
- Orange Estates
- Pacific Palm Estates
- Oak Brook Park
- Oak Brook Park Unit 2
- Oak Brook Park Unit 3
- 6551 – 6599 Coyle Avenue

A6.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012), 7 properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs on Northbrook Way and Southbrook Way when flows exceed the capacity of Coyle Creek. The Sacramento County Local Floodplain on Elsinore Way for this RLA floods due to it being a low lying area.

A6.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 3 of the overall 18 properties within the Brooktree Creek RLA had reported flooding.

A6.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed on February 23, 2015. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.

- High-water marks and debris mark levels

A6.5.4 Types of Foundations

The most common type of foundations within the Dewey Drive RLA is slab-on-grade.

A6.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for future mitigation measures. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

BROOKTREE CREEK
(Overland Release)

AREA 6

ELSINORE WAY

LEAVITT WAY

BROOKTREE CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**11**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*10*

- EXISTING STRUCTURES (UNMITIGATED)
  - o RAISED FOUNDATIONS 0
  - o SLAB ON GRADE 11
- NO STRUCTURES
  - o PUBLICALLY OWNED 0

MITIGATED PROPERTIES

- AQUISITION & DEMO 0
- AQUISITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0
- IMPROVED DRAINAGE FACILITIES 1

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
239-0021-037	5333 LEAVITT WAY	SLAB ON GRADE	GOOD			**No Report of Flooding**
239-0021-033	5418 ELSINORE WAY	SLAB ON GRADE	GOOD	New Storm Drainage Pipe installed		**6/1998 -** Contract number 60185 New Storm Drainage Pipe installed **1/9/1995 -** Depth unavailable due to lack of information from CONFIDENTIAL flood site list.
239-0021-032	5422 ELSINORE WAY	SLAB ON GRADE	GOOD	New Storm Drainage Pipe installed		**6/1998 -** Contract number 60185 New Storm Drainage Pipe installed **1/9/1995 -** Depth unavailable due to lack of information from CONFIDENTIAL flood site list.
239-0021-031	5424 ELSINORE WAY	SLAB ON GRADE	GOOD			**No Report of Flooding**
239-0021-030	5428 ELSINORE WAY	SLAB ON GRADE	GOOD			**No Report of Flooding**
239-0021-029	5432 ELSINORE WAY	SLAB ON GRADE	GOOD			**No Report of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
239-0021-036	5433 ELSINORE WAY	SLAB ON GRADE	GOOD	New Storm Drainage Pipe installed		**6/1998 -** Contract number 60185 New Storm Drainage Pipe installed **3/16/1992** – FEMA Flood Claim **2/18/1986** – FEMA Flood Claim
239-0021-028	5436 ELSINORE WAY	SLAB ON GRADE	GOOD			**No Report of Flooding**
239-0021-039	5437 ELSINORE WAY	SLAB ON GRADE	GOOD			**No Report of Flooding**
239-0021-027	5440 ELSINORE WAY	SLAB ON GRADE	GOOD			**No Report of Flooding**
239-0021-040	5441 ELSINORE WAY	SLAB ON GRADE	GOOD	New Storm Drainage Pipe installed		**6/1998 -** Contract number 60185 New Storm Drainage Pipe installed **1/27/1997** – Yard flooding **1993** - Reported Flooding **1986 -** Reported Flooding

AREA 6

SOUTHBROOK WAY

NORTHBROOK WAY

BROOKTREE CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**7**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*6*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 3
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PUBLICALLY OWNED 1

MITIGATED PROPERTIES

- AQUISITION & DEMO 0
- AQUISITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0
- IMPROVED DRAINAGE FACILITIES

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
232-0023-016	5718 SOUTHBROOK WAY	RAISED	GOOD			**No Report of Flooding**
232-0023-017	5724 SOUTHBROOK WAY	SLAB	GOOD			**No Report of Flooding**
232-0023-018	5730 SOUTHBROOK WAY	SLAB	GOOD			**10/2/1998** - depth information CONFIDENTIAL flood site list. Garage flooding.
232-0023-019	5732 SOUTHBROOK WAY	N/A	N/A			**No Structure**
232-0023-020	5736 SOUTHBROOK WAY	SLAB ON GRADE	GOOD			**10/9/1998** - depth information CONFIDENTIAL flood site list. Garage flooding.
232-0023-008	6628 NORTHBROOK WAY	RAISED	GOOD			**No Report of Flooding**
232-0023-009	6632 NORTHBROOK WAY	RAISED	GOOD			**5/30/1997** – Street flooding between 6620 & 6644 Northbrook way as a result of creek overtopping its banks. Yard flooding only. **1/9/1995** – Storage Bldg flooded a depth of 36". **1/10/1995** - FEMA Flood Claim **1986** – Sub-floor and garage and shed flooding. **2/18/1986** - FEMA Flood Claim

Appendix 7

REPETITIVE LOSS AREA 7

MORRISON CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 7

TABLE OF CONTENTS

A7.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 7, one of the twenty-eight (28) designated RLAs within the Sacramento County. The Area 7 analysis includes a single property as seen in **Figure A7**.

A7.2 ADVICE FOR RESIDENTS

Resident have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A7.3 PROBLEM STATEMENT

The location of Area 7 is in a rural portion of the County with limit improvements. However, for the past two decades intense mining has occurred east of the concerned area, which has provided flood storage.

The source of flooding was primarily identified has high flood waters spreading out over a wide floodplain.

There is one property which includes a building on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions. None of the properties have been mitigated.

A7.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- West Jackson Highway – Master Drainage Study (Dated: 2012)

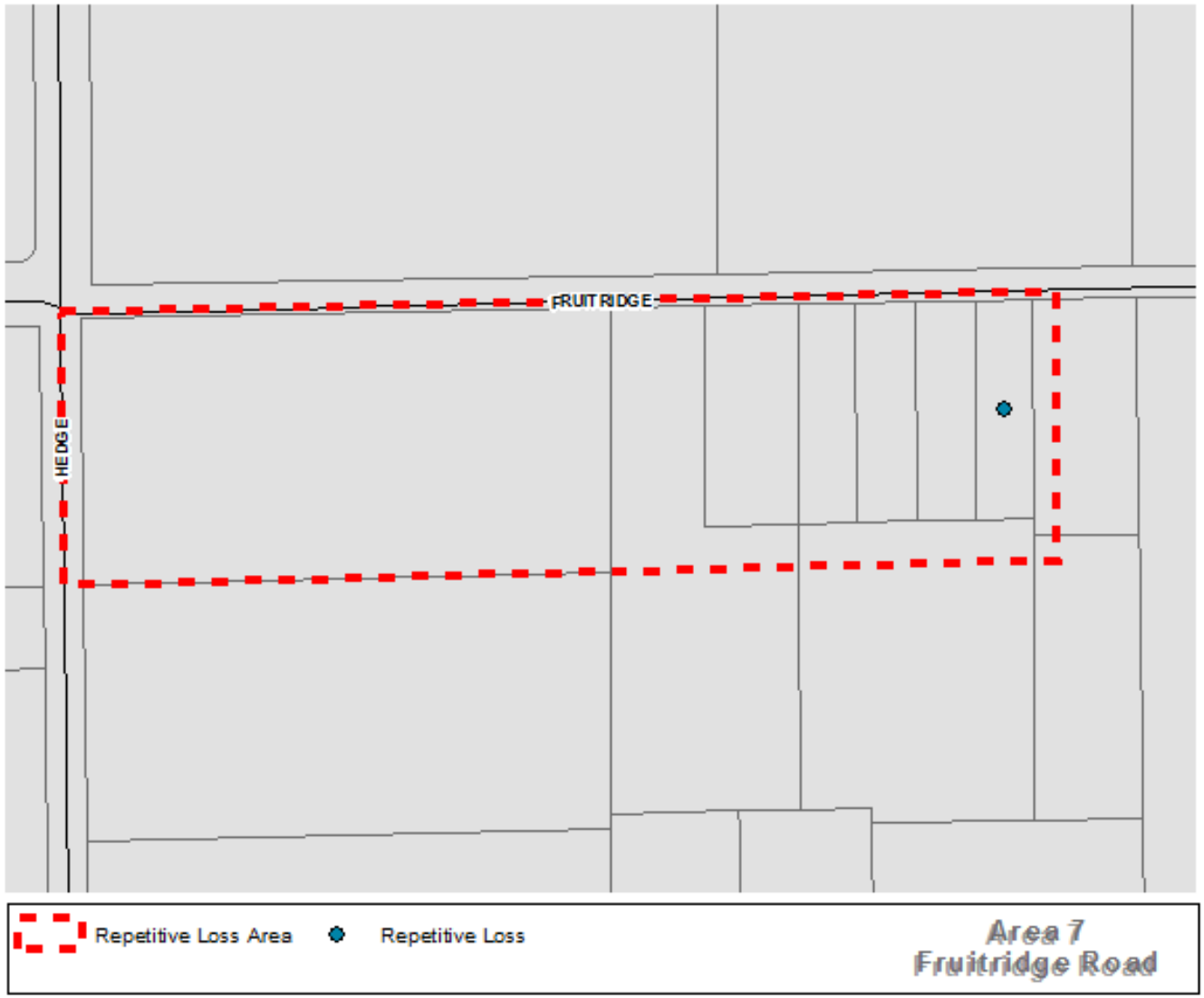
The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

A7.5 DATA COLLECTION

Sacramento County Plans and studies for Morrison Creek were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- West Jackson Highway – Master Drainage Study (2012)

FIGURE A7
Repetitive Loss Area #A7



A7.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) no properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when high stages experienced in Morrison Creek. The Sacramento County Local Floodplain identifies no properties from this RLA.

A7.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that one of the overall eight properties within the Morrison Creek RLA had reported flooding.

A7.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in May 2015. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A7.5.4 Types of Foundations

The most common type of foundations within Area 7 is a slab on grade foundation, which constitutes 100% of the 2 common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A7.6 FUTURE MITIGATION MEASURES

Based on the West Jackson Highway – Master Drainage Study, no further mitigation is required for Area 7.

DATA ANALYSIS SUMMARY

MORRISON CREEK WATERSHED

AREA 7

FRUITRIDGE ROAD

MORRISON CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES

REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*7*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 5
  - SLAB ON GRADE 2
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
063-0080-001	5619 HEDGE AV	RAISED	GOOD			**No Record of Flooding**
063-0080-005	9108 FRUITRIDGE RD	RAISED	GOOD			**No Record of Flooding**
063-0080-027	9112 FRUITRIDGE RD	RAISED	GOOD			**No Record of Flooding**
063-008-0022	9120 FRUITRIDGE RD.	SLAB ON GRADE	GOOD			Flood risk may have been decreased due to mining operation east of property **7/8/2005 –** Flooding within structure during intense storms. **1/22/1997 –** FEMA Flood Claim **2/4/1996 –** FEMA Flood Claim
063-0080-024	9126 FRUITRIDGE RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
063-0080-003	9150 FRUITRIDGE RD	RAISED	GOOD			**No Record of Flooding**
063-0080-004	9164 FRUITRIDGE RD	RAISED	GOOD			**No Record of Flooding**
063-0080-026	9186 FRUITRIDGE RD	RAISED	GOOD			**No Record of Flooding**

Appendix 8

REPETITIVE LOSS AREA 8
COSUMNES RIVER

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 8

TABLE OF CONTENTS

A8.1 REPETITIVE LOSS AREA 8

This Report focuses on Area 8, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 8 analyses include properties on Green Road and Jeffcott Road and are defined by **Figure A8**.

A8.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A8.3 PROBLEM STATEMENT

The location of Area 8 is generally area bounded by Wilton Road to the east, the Cosumnes River to the south, Green Road to the north and along the west side of Jeffcott Road. The source of flooding was primarily identified has been determined to be low lying areas around Cosumnes River. Out of bank flooding may occur in older residential areas constructed prior to NFIP requirements.

There are 33 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions.

A8.4 BASIC INFORMATION

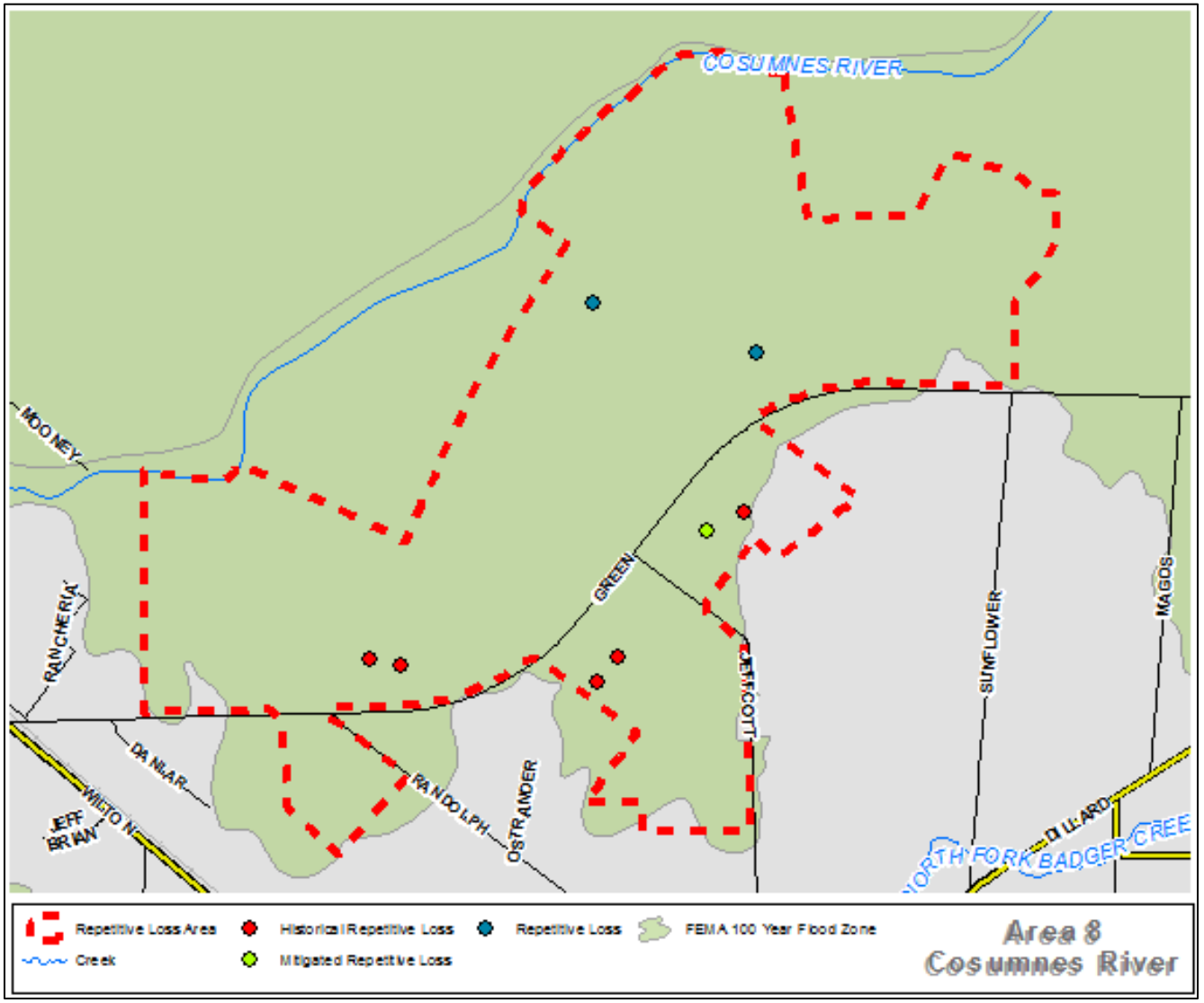
From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- 9500 Jeffcott Road – Rose's Engineering
- 11375 Green Road – Rose's Engineering

The primary methods of property protection are:

- Home Elevation – Is your floor below the elevation of the floodplain? If so, it may be prudent to elevate the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, the County has utilized FEMA grant money for dozens of qualified elevation projects.
- Site Modification – Would a small wall, berm, or other site specific grading help keep water out of your house? Often, modification of the area around your home may be appropriate to minimize flooding depending on the depth of floodwater and site specific constraints.
- Temporary Flood Barriers – Perhaps sandbags or other barriers could be employed on site in advance of a storm to help keep water out.

FIGURE A8
Repetitive Loss Area #8



A8.5 DATA COLLECTION

- Sacramento County Plans and studies for Cosumnes River were utilized in this analysis.

A8.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) thirty-three (33) properties in the RLA are within the 100-year FEMA floodplain. The flooding occurs when low lying areas around Cosumnes River are inundated by out of bank flooding in the older residential areas.

A8.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 2 of the overall thirty-three (33) properties had reported flooding and seven (7) reported to FEMA for insurance purposes are within the Cosumnes River RLA.

A8.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in January 9, 1995, January 9 & 22, 1997. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A8.5.4 Types of Foundations

The most common type of foundations within the Cosumnes River RLA is both raised and slab on grade, which constitutes 71% of the known foundations found in this RLA in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A8.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for elevating homes. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP & FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

COSUMNES RIVER WATERSHED

AREA 8

GREEN ROAD

JEFFCOTT ROAD

COSUMNES RIVER

DATA ANALYSIS SUMARY

PROPERTIES	**33**
REPETITIVE LOSS PROPERTIES	*2*
HISTORICAL LOSS PROPERTIES	*5*
REPETITIVE LOSS AREA PROPERTIES	*26*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 9
  - SLAB ON GRADE 8
  - UNKNOWN 7
- NO STRUCTURES
  - PRIVATELY OWNED 9

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
126-0200-023	0 GREEN RD	N/A	N/A			**No Structure**
126-0200-025	0 GREEN RD	N/A	N/A			**No Structure**
126-0200-026	0 GREEN RD	N/A	N/A			**No Structure**
126-0200-027	0 GREEN RD	N/A	N/A			**No Structure**
126-0200-048	0 GREEN RD	N/A	N/A			**No Structure**
126-0200-050	0 GREEN RD	N/A	N/A			**No Structure**
126-0200-058	0 GREEN RD	N/A	N/A			**No Structure**
126-0210-001	0 GREEN RD	N/A	N/A			**No Structure**
126-0210-025	0 GREEN RD	N/A	N/A			**No Structure**
126-0210-024	11031 GREEN RD	RAISED	GOOD			**No Record of Flooding**
126-0210-033	11115 GREEN RD	UNKNOWN	UNKNOWN			**1/2/1997** – FEMA Flood Claim
126-0210-032	11129 GREEN RD	UNKNOWN	UNKNOWN			**1/2/1997** – FEMA Flood Claim
126-0210-031	11175 GREEN RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
126-0210-007	11201 GREEN RD	RAISED	GOOD			**No Record of Flooding**
136-0040-032	11234 GREEN RD	UNKNOWN	UNKNOWN			**1/2/1997** – FEMA Flood Claim
136-0040-031	11248 GREEN RD	UNKNOWN	UNKNOWN			**1/2/1997** – FEMA Flood Claim
126-0210-005	11255 GREEN RD	RAISED	GOOD			**No Record of Flooding**
136-0040-004	11286 GREEN RD	RAISED	GOOD			**No Record of Flooding**
136-0060-048	11340 GREEN RD	RAISED	GOOD			**12/31/1996** – FEMA Flood Claim **3/21/1995** – FEMA Flood Claim
126-0200-024	11375 GREEN RD	UNKNOWN	UNKNOWN			**No Record of Flooding**
136-0060-068	11400 GREEN RD	UNKNOWN	UNKNOWN			**1/3/1997** – FEMA Flood Claim

DATA ANALYSIS TABLE (Continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
136-0060-064	11430 GREEN RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
136-0060-069	11454 GREEN RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
126-0200-015	11455 GREEN RD	UNKNOWN	UNKNOWN			**12/31/2005** – FEMA Flood Claim **1/1/1997** – FEMA Flood Claim
126-0200-047	11549 GREEN RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
126-0200-063	11595 GREEN RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
136-0040-022	9500 JEFFCOTT RD	RAISED	GOOD			**No Record of Flooding**
136-0040-023	9510 JEFFCOTT RD	RAISED	GOOD			**1/2/1997** – FEMA Flood Claim
136-0040-025	9560 JEFFCOTT RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
136-0040-026	9580 JEFFCOTT RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
136-0040-019	9590 JEFFCOTT RD	RAISED	GOOD			**12/31/1996** – FEMA Flood Claim
136-0040-028	9608 JEFFCOTT RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
136-0060-049	9439 JEFFCOTT RD	RAISED	GOOD			**No Record of Flooding**

Appendix 9

REPETITIVE LOSS AREA 9

SOUTH BRANCH
OF
ARCADE CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 9

TABLE OF CONTENTS

A9.1 REPETITIVE LOSS AREA 9

This Report focuses on Area 9, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 9 analysis includes properties on Hoffman Lane, Long Acres Court and Manana Way defined by **Figure A9**.

A9.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A9.3 PROBLEM STATEMENT

The location of Area 9 is generally Hoffman Lane south of Greenback Lane.

The source of flooding has been determined to be South Branch of Arcade Creek in low lying area or low floors with a constrained drainage system. Out of bank flooding may occur in older residential areas constructed prior to NFIP requirements.

There are 21 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions. There was one property that was mitigated by elevation.

A9.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- South Branch Arcade Creek Drainage studies were performed as referenced in the approved environmental impact reports for the Gum Ranch and Sheltonham developments. Hydrologic models were developed to analyze development impacts and mitigation measures.

The primary methods of property protection are:

- Home Elevation – Is your floor below the elevation of the floodplain? If so, it may be prudent to elevate the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, the County has utilized FEMA grant money for dozens of qualified elevation projects.
- Site Modification – Would a small wall, berm, or other site specific grading help keep water out of your house? Often, modification of the area around your home may be appropriate to minimize flooding depending on the depth of floodwater and site specific constraints.
- Temporary Flood Barriers – Perhaps sandbags or other barriers could be employed on site in advance of a storm to help keep water out.

FIGURE A9
Repetitive Loss Area #9

A9.5 DATA COLLECTION

Sacramento County Plans and studies for South Branch of Arcade Creek were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- Gum Ranch Drainage Study prepared by Morton & Pitalo, May 2005

A9.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) all properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when Out of bank flooding may occur in older residential areas. The Sacramento County Local Floodplain follows the FEMA floodplain for this RLA,

A9.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that seven of the overall 20 properties within the South Branch of Arcade Creek RLA had reported flooding.

A9.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in June 15 & 16, 1998.. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A9.5.4 Types of Foundations

The most common type of foundations within the South Branch of Arcade Creek RLA is Raised Foundation which constitutes 100% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A9.6 FUTURE MITIGATION MEASURES

The County continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

SOUTH BRANCH OF ARCADE CREEK

AREA 9

HOFFMAN LANE

SOUTH BRANCH OF ARCADE CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**10**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*6*
REPETITIVE LOSS AREA PROPERTIES	*4*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 9
  - SLAB ON GRADE
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION) 1

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
261-0061-003	5764 HOFFMAN LN	RAISED	GOOD			**1/22/1999** - Fill at that time was in separate piles, not a continuous berm. **1/1/1995** – House flooded a depth of 24". Flood depth pursuant to conversation with homeowner .
261-0061-005	5768 HOFFMAN LN	RAISED	GOOD			**No Flood Reported**
261-0061-004	5770 HOFFMAN LN	RAISED	GOOD			**No Flood Reported**
261-0062-006	5771 HOFFMAN LN	RAISED	GOOD			**3/20/1995 –** House flooded a depth of 10". Garage depth of flooding 36". **3/9/1995** – House flooded a depth of 10". Garage depth of flooding 36".
261-0070-017	5777 HOFFMAN LN	RAISED	GOOD			**No Flood Reported**
261-0070-018	5781 HOFFMAN LN	RAISED	GOOD			**1/10/1995** - FEMA Flood Claim
261-0070-001	5832 HOFFMAN LN	RAISED	GOOD			**1/10/1995** - FEMA Flood Claim
261-0070-016	5841 HOFFMAN LN	RAISED	GOOD			**No Flood Reported**
261-0063-005	5900 HOFFMAN LN	RAISED	GOOD			**5/19/2004 -** Raise existing house 36" through County HMGP **6/15/1998 –** depth and other fields may not appear due to lack of information cited in confidential flood site listings.
261-0062-005	5901 HOFFMAN LN	RAISED	GOOD			**No Flood Reported**

AREA 9

LONG ACRES COURT

MANANA WAY

SOUTH BRANCH OF ARCADE CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**11**
REPETITIVE LOSS PROPERTIES	
HISTORICAL LOSS PROPERTIES	*4*
REPETITIVE LOSS AREA PROPERTIES	*7*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 4
  - SLAB ON GRADE 7
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
261-0340-015	5930 LONG ACRES CT	SLAB ON GRADE	GOOD			**5/25/1999** - Water from properties on the west side of Trajan Dr. overwhelmed the ditch 6 to 10 inches at the patio area against the house. Sand bags were stacked approx. 4 bags high to prevent water from entering the home. **1/9/1995** – House flooded a depth of 1". Garage flooded 5"
261-0330-010	5941 LONG ACRES CT	SLAB ON GRADE	GOOD			**1/9/1995** – House flooded a depth of 1". Garage flooded 5"
261-0330-009	5945 LONG ACRES CT	SLAB ON GRADE	GOOD			**No Flood Reported**
261-0330-008	5949 LONG ACRES CT	RAISED	GOOD			**No Flood Reported**
261-0330-007	5953 LONG ACRES CT	RAISED	GOOD			**No Flood Reported**
261-0080-015	8410 MANANA WY	RAISED	GOOD			**1/9/1995** – House flooded a depth of 3". Garage flooded 12"
261-0080-016	8411 MANANA WY	SLAB ON GRADE	GOOD			**No Flood Reported**
261-0080-014	8420 MANANA WY	RAISED	GOOD			**No Flood Reported**
261-0080-017	8421 MANANA WY	SLAB ON GRADE	GOOD			**No Flood Reported**
261-0080-013	8430 MANANA WY	SLAB ON GRADE	GOOD			**FEMA Flood Claim**: 1/10/1995
261-0080-018	8431 MANANA WY	SLAB ON GRADE	GOOD			**No Flood Reported**

Appendix 10

REPETITIVE LOSS AREA 10
STRONG RANCH SLOUGH

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 10

TABLE OF CONTENTS

A10.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 10, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 10 analyses include properties on Maple Glen Road, Kubel Circle, Lading Road, Rockwood Drive, Winding Creek Road and Riding Club Lane and are defined by **Figure A10**.

A10.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs.

A10.3 PROBLEM STATEMENT

The location of Area 10 is generally area bounded by Fulton Avenue to the east, Arden Way to the south, El Camino Avenue to the north and Eastern Avenue to the east. The source of flooding was primarily identified has been determined to be low lying areas around Strong Ranch Slough. Out of bank flooding may occur in older residential areas constructed prior to NFIP requirements.

There are 53 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions.

A10.4 BASIC INFORMATION

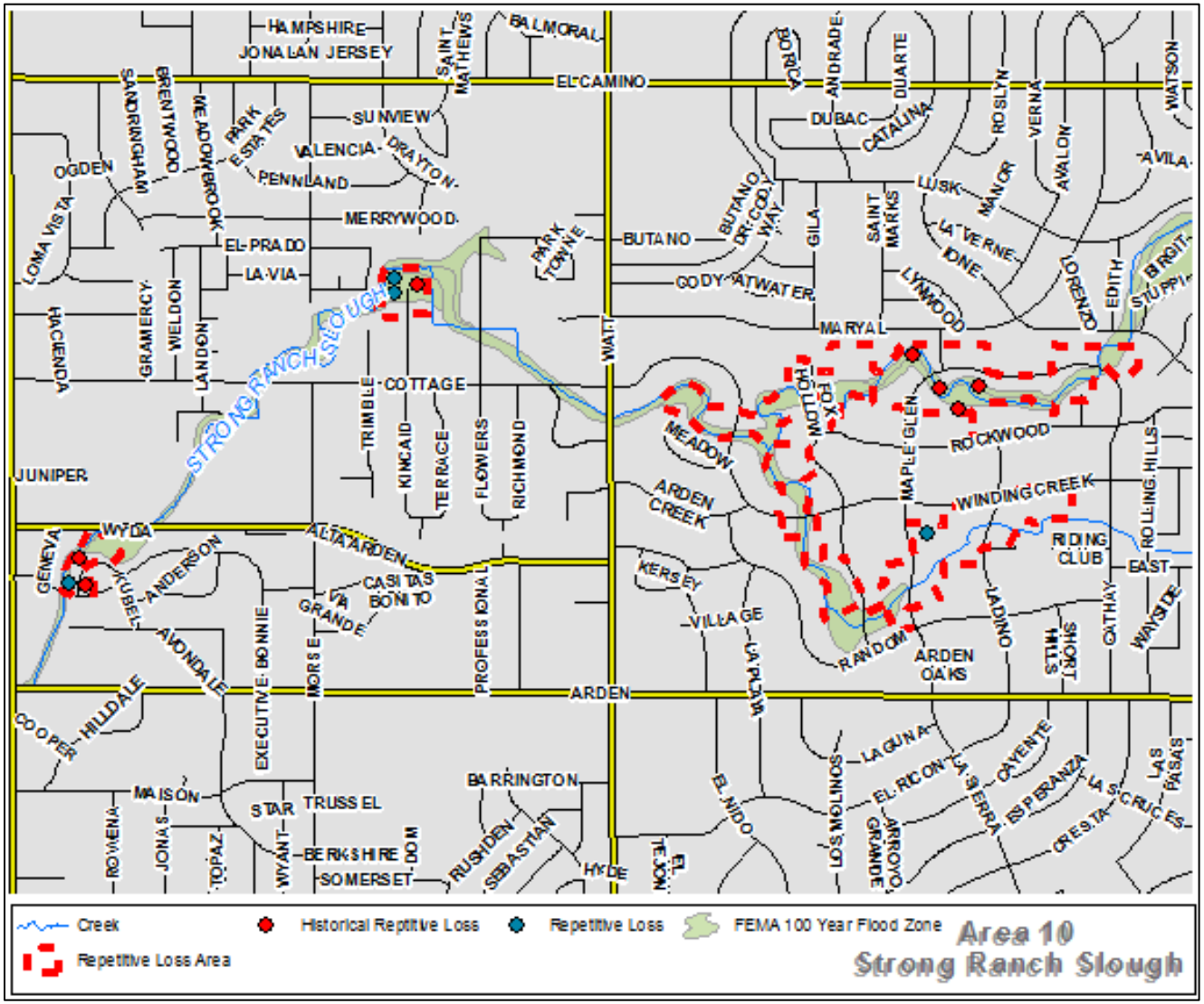
From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- Drainage study was developed by David Ford Engineers

The primary methods of property protection are:

- Home Elevation – Is your floor below the elevation of the floodplain? If so, it may be prudent to elevate the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, the County has utilized FEMA grant money for dozens of qualified elevation projects.
- Site Modification – Would a small wall, berm, or other site specific grading help keep water out of your house? Often, modification of the area around your home may be appropriate to minimize flooding depending on the depth of floodwater and site specific constraints.
- Temporary Flood Barriers – Perhaps sandbags or other barriers could be employed on site in advance of a storm to help keep water out.

FIGURE A10
Repetitive Loss Area #10



A10.5 DATA COLLECTION

Sacramento County Plans and studies for Strong Ranch Slough were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- **Drainage study was developed by David Ford Engineers** for Water Resources in 2006 to analyze flood control alternatives. Staff expanded on the modeling in 2007 and developed a website and flood warning system for the area. The models are used by staff to analyze capital improvement projects.
- Sacramento County **Strong Ranch Slough Flood Prep 100 year Map Book**
- Kincaid Flood Wall Project by Sacramento County Water Resources (CIP).

A10.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) fifty-three (53) properties in the RLA are within the 100-year FEMA floodplain. The remaining twenty-six (26) properties are within the Local Flood Zone. The flooding occurs when low lying areas around Strong Ranch Slough are inundated by out of bank flooding in the older residential areas. The Sacramento County Local Floodplain Map shows the local flooding in Strong Ranch Creek for this RLA,

A10.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 12 of the overall seventy-nine (79) properties and 11 reported to FEMA for insurance purposes are within the Strong Ranch Creek RLA had reported flooding.

A10.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in January 9, 1995, January 9 & 22, 1997. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A10.5.4 Types of Foundations

The most common type of foundations within the Strong Ranch Slough RLA is raised, which constitutes 79.4% of the 79 common foundations found in this RLA in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A10.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for elevating homes . The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

STRONG RANCH CREEK WATERSHED

AREA 10

KINCAID WAY

STRONG RANCH CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**9**
REPETITIVE LOSS PROPERTIES	*2*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*6*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 3
  - SLAB ON GRADE 1
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)
- Flood Wall 4

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
279-0110-002	0 KINCAID WY	N/A	N/A		**PUBLIC UTILITY**	
279-0110-048	2145 KINCAID WY	RAISED	GOOD			**No Record of Flooding**
279-0110-014	2148 KINCAID WY	SLAB ON GRADE	GOOD			**No Record of Flooding**
279-0110-047	2149 KINCAID WY	RAISED	GOOD			**No Record of Flooding**
279-0110-015	2200 KINCAID WY	RAISED	GOOD			**No Record of Flooding**
279-0110-045	2209 KINCAID WY	SLAB ON GRADE	GOOD	Flood Wall (1999)		**3/1999-**Inactive status assumed with recent construction of **Kincaid Way Floodwall Project**. **1/9/1997 –** Structure flood levels were recorded as 24 inches in the house. **1/9/1995 –** Flooded 36" in house.
279-0110-042	2211 KINCAID WY	RAISED	GOOD	Flood Wall (1999)		**3/1999 –** Floodwall constructed w/Contract 60146. Ht. Of wall is 0.8' above high water 1986,(~est. 63 yr. event on Lower American River by Corp of Eng) **1/9/1997 –** Structure flood levels were recorded as 24 inches in the house.
279-0110-038	2224 KINCAID WY	SLAB ON GRADE	GOOD	Flood Wall (1999)		**3/1999-**Inactive status assumed with recent construction of Kincaid Way Floodwall Project. **1/10/1995 –** FEMA Flood Claim
279-0110-039	2228 KINCAID WY	RAISED	GOOD	Flood Wall (1999)		**3/1999-**Inactive status assumed with recent construction of **Kincaid Way Floodwall Project**.

AREA 10

KUBEL CIRCLE

STRONG RANCH CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**6**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	*3*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 4
  - SLAB ON GRADE 2
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
279-0191-018	1840 KUBEL CR	RAISED	GOOD			**No Record of Flooding**
279-0191-031	1860 KUBEL CR	SLAB ON GRADE	GOOD			**1/22/1997 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim
279-0191-016	1870 KUBEL CR	RAISED	GOOD			**1/9/1995 –** Flooded 7" in house.
279-0191-027	1880 KUBEL CR	SLAB ON GRADE	GOOD			**No Record of Flooding**
279-0191-028	1890 KUBEL CR	RAISED	GOOD			**5/4/1999**-Recommend Raise structure. *Identified for possible inclusion in HMGP*. Upgrade inlets 338/170/421 & 422. No **1/9/1997 –** Flooding within structure during intense storms. **1/9/1995 –** Flooded 10" in house. The garage flooded 10”
279-0192-005	1891 KUBEL CR	RAISED	GOOD			**1/10/1995 –** FEMA Flood Claim

AREA 10

MAPLE GLEN ROAD

STRONG RANCH CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**27**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*3*
REPETITIVE LOSS AREA PROPERTIES	*23*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 22
  - SLAB ON GRADE 4
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
281-0191-004	0 MAPLE GLEN RD	N/A	N/A			**No Structure**
281-0351-006	1801 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0292-015	1810 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0351-007	1811 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0292-014	1820 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0291-004	1821 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0292-012	1830 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0244-002	1850 MAPLE GLEN RD	RAISED	GOOD			**1/10/1995 –** FEMA Flood Claim **2/12/1992 –** FEMA Flood Claim
281-0193-001	1960 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0191-005	1961 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0191-009	1971 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0193-002	1980 MAPLE GLEN RD	SLAB ON GRADE	GOOD			**1/9/1997 –** Flooded **10**" in house. The garage flooded 10” **1/9/1986 –** Flooded **5**" in house. The garage flooded 5”
281-0191-002	1981 MAPLE GLEN RD	RAISED	GOOD			**1/25/1997 –** FEMA Flood Claim **1/01/1997 –** FEMA Flood Claim
281-0191-001	1987 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0193-003	2000 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0192-001	2001 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0193-005	2010 MAPLE GLEN RD	SLAB ON GRADE	GOOD			**1/9/1986 –** The garage flooded 1/4”

DATA ANALYSIS TABLE cont.

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
281-0192-002	2011 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0193-017	2020 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0202-016	2030 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0202-003	2040 MAPLE GLEN RD	RAISED	GOOD	County Maintenance		**6/21/1999 -** Install two pipes and construct 160 (+/-) feet of ditch. **4/15/1999** - The garage flooded unknown.
281-0202-020	2050 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0201-003	2051 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0202-005	2060 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**
281-0201-004	2061 MAPLE GLEN RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
281-0201-005	2071 MAPLE GLEN RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
281-0201-010	2077 MAPLE GLEN RD	RAISED	GOOD			**No Record of Flooding**

AREA 10

LADINO ROAD

MEADOW LANE

RIDING CLUB LANE

ROCKWOOD DRIVE

STRONG RANCH CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**18**
REPETITIVE LOSS PROPERTIES	
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	*16*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 12
  - SLAB ON GRADE 2
- NO STRUCTURES 4
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
281-0292-017	1821 LADINO RD	RAISED	GOOD			**No Record of Flooding**
281-0244-005	1901 LADINO RD	RAISED	GOOD			**No Record of Flooding**
281-0254-025	1910 LADINO RD	RAISED	GOOD			**No Record of Flooding**
281-0172-014	3601 MEADOW LN	SLAB ON GRADE	GOOD			**1/10/1995 –** FEMA Flood Claim
281-0172-012	3610 MEADOW LN	RAISED	GOOD			**No Record of Flooding**
281-0222-001	3620 MEADOW LN	SLAB ON GRADE	GOOD			**No Record of Flooding**
281-0221-008	3631 MEADOW LN	RAISED	GOOD			**No Record of Flooding**
281-0222-028	0 MEADOW LN	N/A	N/A			**No Structure**
281-0172-013	0 MEADOW LN	N/A	N/A			**No Structure**
281-0221-001	0 MEADOW LN	N/A	N/A			**No Structure**
281-0254-001	4001 RIDING CLUB LN	RAISED	GOOD			**No Record of Flooding**
281-0291-006	1812 ROCKWOOD DR	RAISED	GOOD			**No Record of Flooding**
281-0343-002	1821 ROCKWOOD DR	RAISED	GOOD			**No Record of Flooding**
281-0281-007	1831 ROCKWOOD DR	RAISED	GOOD			**No Record of Flooding**
281-0281-006	1841 ROCKWOOD DR	N/A	N/A			**No Structure**
281-0193-004	2061 ROCKWOOD DR	RAISED	GOOD			**1/9/1995 –** Flooded 42" in house.
281-0202-017	2139 ROCKWOOD DR	RAISED				**No Record of Flooding**
281-0202-011	2141 ROCKWOOD DR	RAISED	GOOD			**No Record of Flooding**

AREA 10

WINDING CREEK ROAD

STRONG RANCH CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**19**
REPETITIVE LOSS PROPERTIES	*4*
HISTORICAL LOSS PROPERTIES	*4*
REPETITIVE LOSS AREA PROPERTIES	*11*
• EXISTING STRUCTURES (UNMITIGATED)	
o RAISED FOUNDATIONS	13
o SLAB ON GRADE	5
• NO STRUCTURES	
o PRIVATELY OWNED	1
MITIGATED PROPERTIES	
• ACQUSITION & DEMO	
• AQUSITION – NO STRUCTURE	
• ELEVATED (RAISED FOUNDATION)	

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
281-0172-001	3500 WINDING CREEK RD	RAISED	GOOD			**No Record of Flooding**
281-0172-002	3510 WINDING CREEK RD	RAISED	GOOD			**No Record of Flooding**
281-0172-015	3520 WINDING CREEK RD	RAISED	GOOD			**No Record of Flooding**
281-0172-005	3530 WINDING CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
281-0172-006	3600 WINDING CREEK RD	N/A	N/A			**No Structure**
281-0172-007	3620 WINDING CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
281-0172-008	3630 WINDING CREEK RD	SLAB ON GRADE	GOOD			**04/01/2000 –** FEMA Flood Claim
281-0172-009	3640 WINDING CREEK RD	RAISED	GOOD			**01/01/1997–** FEMA Flood Claim **01/10/1995–** FEMA Flood Claim **02/15/1992–** FEMA Flood Claim
281-0231-001	3641 WINDING CREEK RD	RAISED	GOOD			**01/10/1995–** FEMA Flood Claim
281-0231-013	3651 WINDING CREEK RD	RAISED	GOOD			**02/17/1986–** FEMA Flood Claim **01/22/1997–** FEMA Flood Claim **01/10/1995–** FEMA Flood Claim
281-0281-003	3720 WINDING CREEK RD	RAISED	GOOD			**01/10/1995–** FEMA Flood Claim **02/18/1986–** FEMA Flood Claim
281-0231-018	3721 WINDING CREEK RD	RAISED	GOOD			**01/10/1995–** FEMA Flood Claim– Flooding within structure during intense storms **01/23/1997–** FEMA Flood Claim
281-0281-017	3724 WINDING CREEK RD	RAISED	GOOD			**12/12/1995–** FEMA Flood Claim

DATA ANALYSIS TABLE continued

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
281-0244-003	3910 WINDING CREEK RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
281-0244-004	3920 WINDING CREEK RD	RAISED	GOOD			**No Record of Flooding**
281-0254-005	4000 WINDING CREEK RD	SLAB ON GRADE	GOOD			**7/8/1998 -** Depth uncertainty due to lack of information cited in confidential flood site listings.
281-0254-007	4010 WINDING CREEK RD	RAISED	GOOD			**No Record of Flooding**
281-0254-008	4020 WINDING CREEK RD	RAISED	GOOD			**No Record of Flooding**
281-0254-009	4030 WINDING CREEK RD	RAISED	GOOD			**No Record of Flooding**

Appendix 11

Repetitive Loss Area 11

LINDA CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 11

TABLE OF CONTENTS

A11.1 REPETITIVE LOSS AREA 11

This Report focuses on Area 11, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 11 analysis includes properties on Hazel Avenue. Leever Lane, Nipawin Way, Creek Oaks Lane, Oak Avenue, Eden Oaks Avenue, and Oak Avenue defined by **Figure A11**.

A11.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A11.3 PROBLEM STATEMENT

The location of Area 11 is generally west of Granite Avenue and north of Oak Avenue. Floods in the Dry Creek watershed generally occur from October through April. The floods are usually caused by a combination of prolonged rainfall leading to saturated soils, and a short period of one to six hours of intense precipitation associated with frontal convection or severe thunderstorms. The source of flooding was primarily identified Linda Creek low lying areas around Linda Creek and a constrained drainage system. Out of bank flooding may occur in older residential areas constructed prior to NFIP requirements. There are 44 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions.

A11.4 DATA COLLECTION

Sacramento County Plans and studies for Linda Creek Remap were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- The Sacramento County Water Agency, and Placer County For Linda Creek Floodplain Mapping Agreement

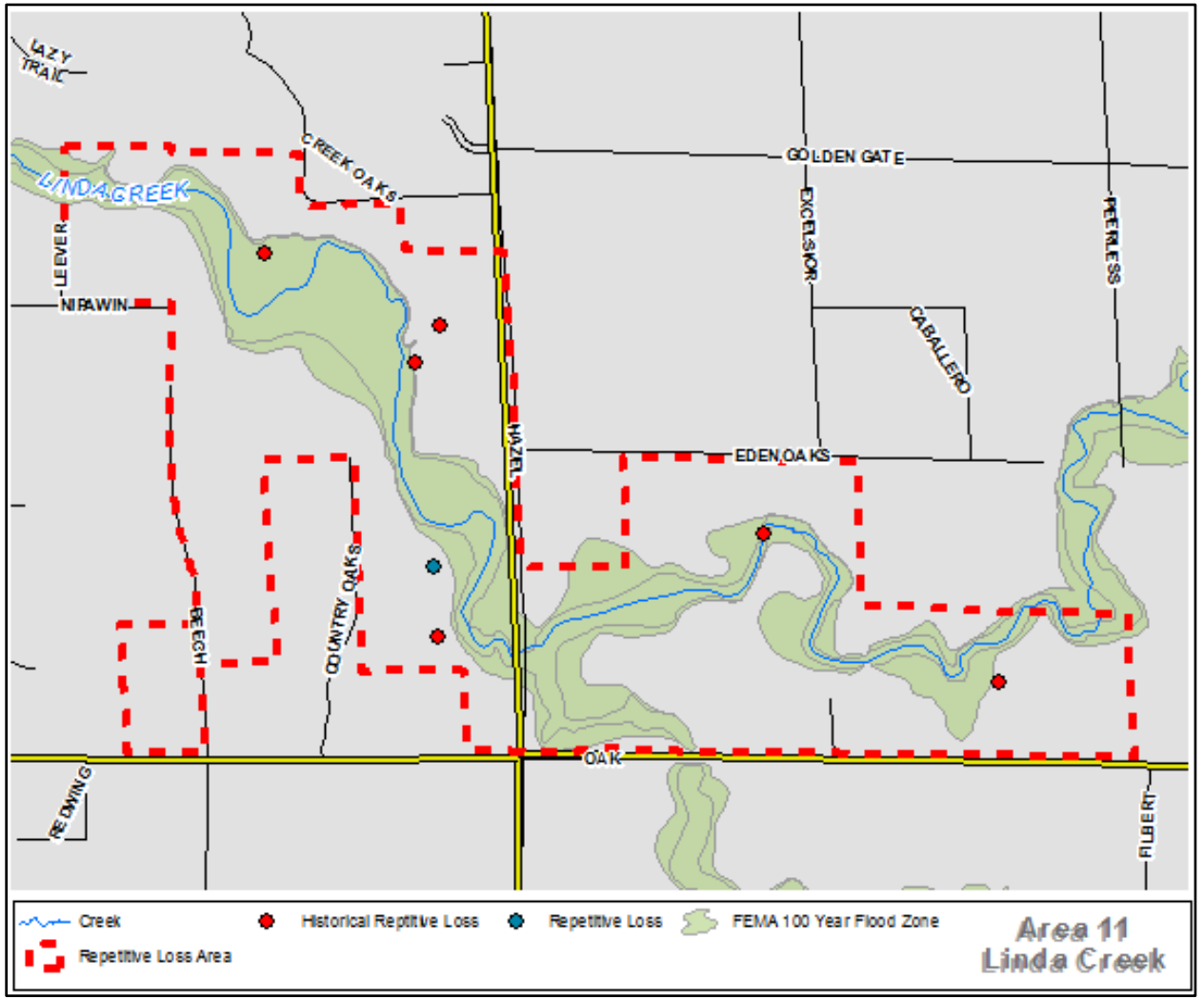
A11.4.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) 37 properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when Linda Creek overtops bank and the constrained drainage system in older residential areas. The Sacramento County Local Floodplain generally follows the existing FEMA floodplain for this RLA,

A11.4.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 4 of the overall 44 properties within the Linda Creek RLA had reported flooding.

FIGURE A11
Repetitive Loss Area #11



A11.4.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in January 9, 1995, April 1, 1996, and February 3, 1998. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A11.4.4 Types of Foundations

The most common type of foundations within the Linda Creek RLA is raised, which constitutes 74.5% of the common foundations found within Repetitive Loss Area 11 in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A11.5 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for elevating structures in this RLA. The County continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

LINDA CREEK

AREA 11

CREEK OAKS LANE

EDEN OAKS AVEVNUE

LINDA CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES		**12**
	REPETITIVE LOSS PROPERTIES	
	HISTORICAL LOSS PROPERTIES	*2*
	REPETITIVE LOSS AREA PROPERTIES	*10*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 9
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
224-0760-009	8816 CREEK OAKS LN	RAISED	GOOD			**No Record of Flooding**
224-0760-037	8826 CREEK OAKS LN	RAISED	GOOD			**FEMA Flood Claim**: 1/10/1995
224-0760-012	8838 CREEK OAKS LN	RAISED	GOOD			**No Record of Flooding**
224-0760-013	8860 CREEK OAKS LN	RAISED	GOOD			**No Record of Flooding**
227-0120-005	8940 EDEN OAKS AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
227-0120-006	8956 EDEN OAKS AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-007	8960 EDEN OAKS AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-008	8970 EDEN OAKS AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
227-0120-009	8980 EDEN OAKS AVE	RAISED	GOOD			**FEMA Flood Claim**: 1/10/1995
227-0120-010	8998 EDEN OAKS AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
227-0120-011	9008 EDEN OAKS AVE	RAISED	GOOD			**1988 – Elevation Certificate**
227-0120-023	9050 EDEN OAKS AVE	RAISED	GOOD			**1/9/1995 –** Flooded 48” in the barn No Record of Flooding in house

AREA 11

HAZEL AVEVNUE

LINDA CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**10**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*3*
REPETITIVE LOSS AREA PROPERTIES	*6*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 4
  - SLAB ON GRADE 4
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
224-0770-003	7447 HAZEL AVE	SLAB ON GRADE	GOOD			**FEMA Flood Claim:** 2/3/1998 **FEMA Flood Claim**: 1/10/1995
224-0770-002	7455 HAZEL AVE	SLAB ON GRADE	GOOD			**FEMA Flood Claim**: 1/10/1995 **1/9/1995 –** Flooded 12" in the house. Flooded 54" in the garage **FEMA Flood Claim:** 2/18/1986
227-0120-004	7540 HAZEL AVE	RAISED	GOOD			**1/9/1995 –** Flooded 60" in the storage barn. Flooded 48" in the garage
224-0770-001	7543 HAZEL AVE	N/A	N/A			**No Structure on property**
224-0760-016	7625 HAZEL AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
224-0760-015	7629 HAZEL AVE	RAISED	GOOD			**No Record of Flooding**
224-0760-003	7635 HAZEL AVE	UNKNOWN	UNKNOWN			**FEMA Flood Claim:** 2/18/1986
224-0760-002	7641 HAZEL AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
224-0760-001	7687 HAZEL AVE	RAISED	GOOD			**No Record of Flooding**
224-0760-014	7707 HAZEL AVE	RAISED	GOOD			**No Record of Flooding**

AREA 11

LEEVER LANE

NIPAWIN WAY

OAK AVENUE

LINDA CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**22**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*3*
REPETITIVE LOSS AREA PROPERTIES	*19*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 16
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PRIVATELY OWNED 3

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
224-0760-031	7737 LEEVER LN	RAISED	GOOD			**No Record of Flooding**
224-0760-033	7742 LEEVER LN	RAISED	GOOD			**No Record of Flooding**
224-0760-038	8804 NIPAWIN WY	RAISED	GOOD			**No Record of Flooding**
224-0760-034	0 NIPAWIN WY	N/A	N/A			**No Structure on property**
224-0272-009	8663 OAK AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
224-0272-010	8667 OAK AVE	RAISED	GOOD			**FEMA Flood Claim: 4**/1/1996 **FEMA Flood Claim**: 1/9/1995
224-0770-004	8891 OAK AVE	N/A	N/A			**No Structure on property**
227-0120-038	8915 OAK AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-037	8921 OAK AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-039	8929 OAK AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-030	8945 OAK AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-029	8953 OAK AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-028	8975 OAK AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-027	8991 OAK AVE	RAISED	GOOD			**1/9/1995 –** Flooded 48” in the barn **No Record of Flooding in house**

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
227-0120-026	9005 OAK AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-025	9025 OAK AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
227-0120-024	9045 OAK AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-022	9057 OAK AVE	RAISED	GOOD			**FEMA Flood Claim:** 1/9/1995
227-0120-021	9065 OAK AVE	RAISED	GOOD			**No Record of Flooding**
227-0120-020	9075 OAK AVE	SLAB ON GRADE	GOOD			**No Record of Flooding**
227-0120-019	9091 OAK AVE	RAISED	GOOOD			**No Record of Flooding**
227-0120-034	0 OAK AVE	N/A	N/A			**No Structure On Property**

Appendix 12

Repetitive Loss Area 12

GRAND ISLAND ROAD

&

VIEIRA'S RESORT

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 12

TABLE OF CONTENTS

A12.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 12, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 12 analysis includes properties on Long Island Road, Grand Island Road, and Vieira's resort as defined by **Figure A12**.

A12.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A12.3 PROBLEM STATEMENT

Area 12 is located in the southern portion of the County on the Sacramento River. The properties located in this area are on the water side of the levee prism. The source of flooding is caused by high stages in the Sacramento River. During 1986 storm event Area 12 experienced high stages from the Sacramento River.

There are 43 properties which include buildings on FEMA's repetitive loss list, historical loss properties or nearby buildings that may have the same or similar flooding conditions. Twenty-one (21) of the properties have Elevation Certificates on file and all but three (3) structures have been mitigated either through government assistance or private funding.

A12.4 BASIC INFORMATION

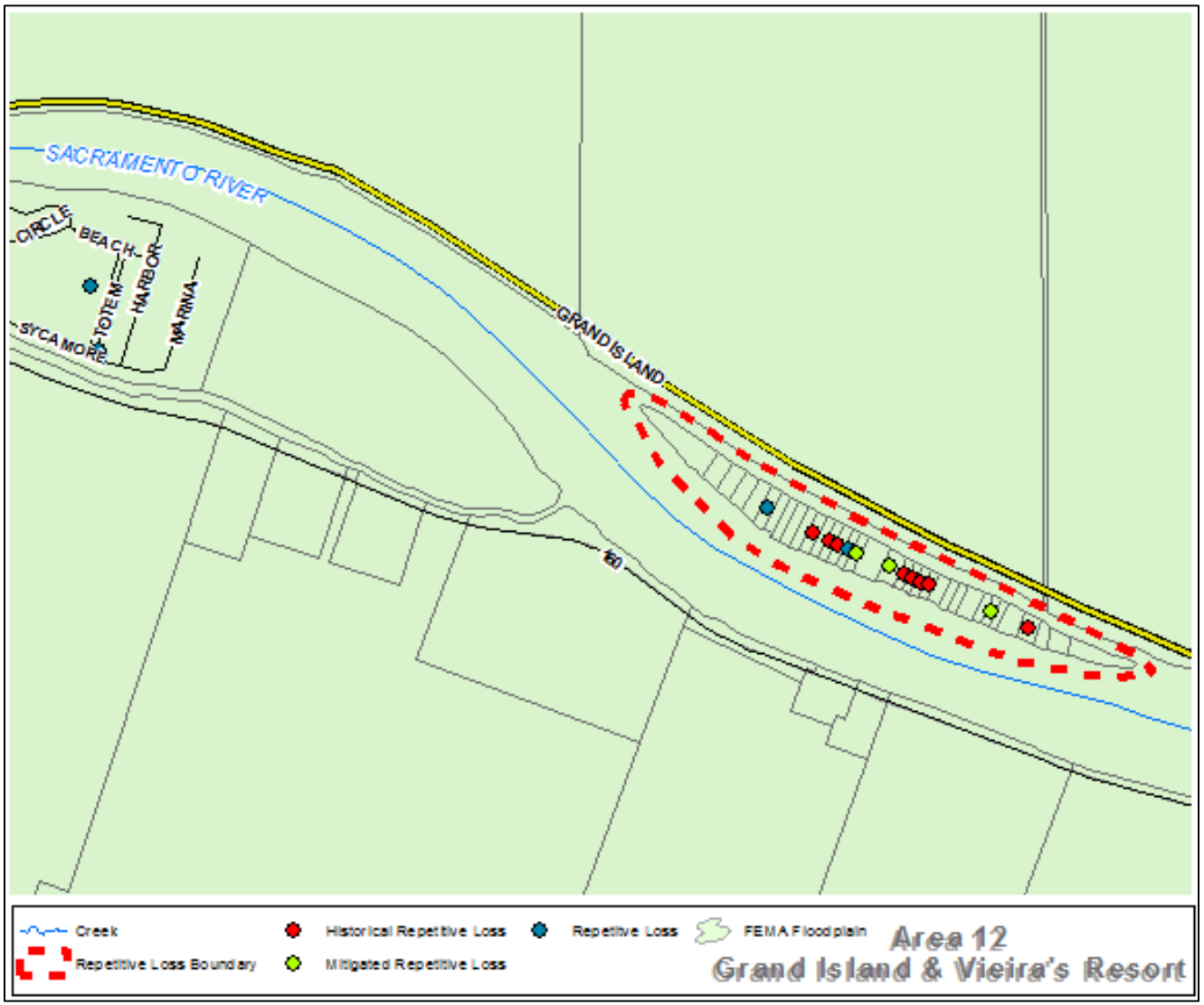
From the agencies or organizations that were contacted (Chapter 2.2), there are no studies or plans to further protect Area 12.

The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

A12.5 DATA COLLECTION

The Federal Emergency Management Agency (FEMA) – Flood Insurance Study for the Unincorporated County were utilized in this analysis to establish the base flood elevation.

FIGURE A12
Repetitive Loss Area #12



A12.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) all the properties within the RLA are within the 100-year FEMA floodplain. Area 12 is located between both levees of the Sacramento River and is inundated by the FEMA Effective floodplain.

A12.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that none of the overall 31 properties within the RLA had reported flooding. However, Area 12 is outside the Urban Services boundary and has limited resources to assist in flooding for this area.

A12.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed on February 6, 2015. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes

A12.5.4 Types of Foundations

The most common type of foundations within the RLA is raised foundation, which constitutes 100% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A12.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for home elevations. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

GRAND ISLAND ROAD
&
VIEIRA'S RESORT

AREA 12

LONG ISLAND ROAD

GRAND ISLAND ROAD

SYCAMORE DRIVE

BEACH DRIVE

ANCHOR DRIVE

SACRAMENTO RIVER WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**43**
REPETITIVE LOSS PROPERTIES	*8*
HISTORICAL LOSS PROPERTIES	*12*
REPETITIVE LOSS AREA PROPERTIES	*23*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 26
  - SLAB ON GRADE 3
  - UNKNOWN 6
- NO STRUCTURES
  - PRIVATELY OWNED 3

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 5

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
142-0140-028	0 LONG ISLAND RD	N/A	N/A			No Structure
142-0140-003	0 LONG ISLAND RD	N/A	N/A			No Structure
142-0140-024	0 LONG ISLAND RD	N/A	N/A			No Structure
142-0140-027	17300 LONG ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0140-002	17336 LONG ISLAND RD	RAISED	GOOD			**12/31/2005 -** FEMA Flood Claim **12/03/2005 -** FEMA Flood Claim
142-0140-009	17368 LONG ISLAND RD	RAISED	GOOD			**01/02/1997 -** FEMA Flood Claim

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
142-0140-025	17322 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0140-026	17332 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0140-002	17336 GRAND ISLAND RD	RAISED	GOOD			**1/25/1998 -** FEMA Flood Claim **1/3/1997 -** FEMA Flood Claim **3/10/1995 -** FEMA Flood Claim
142-0140-004	17344 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0140-005	17348 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0140-019	17352 GRAND ISLAND RD	SLAB ON GRADE	GOOD			**No Flood Reported**
142-0140-018	17356 GRAND ISLAND RD	RAISED	GOOD			**1/3/1997 -** FEMA Flood Claim
142-0140-007	17360 GRAND ISLAND RD	SLAB ON GRADE	GOOD			**No Flood Reported**
142-0140-008	17364 GRAND ISLAND RD	RAISED	GOOD			**1/3/1997 -** FEMA Flood Claim
142-0140-010	17370 GRAND ISLAND RD	RAISED	GOOD			**1/2/2006 -** FEMA Flood Claim **1/1/2006 -** FEMA Flood Claim **1/2/1997 -** FEMA Flood Claim **3/9/1995 -** FEMA Flood Claim
142-0140-011	17376 GRAND ISLAND RD	RAISED	GOOD	Elevated Home		**8/28/2008** – Home Elevated **2/20/1986 -** FEMA Flood Claim **1/27/1983 -** FEMA Flood Claim
142-0140-012	17384 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0140-013	17392 GRAND ISLAND RD	RAISED	GOOD	Elevated Home		**1/3/1998 -** FEMA Flood Claim **1/3/1997 -** FEMA Flood Claim
142-0140-014	17396 GRAND ISLAND RD	RAISED	GOOD			**1/3/1998 -** FEMA Flood Claim **1/3/1997 -** FEMA Flood Claim
142-0140-029	17400 GRAND ISLAND RD	RAISED	GOOD			**1/3/1997 -** FEMA Flood Claim **2/19/1986 -** FEMA Flood Claim

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
142-0150-001	17404 GRAND ISLAND RD	RAISED	GOOD			**2/20/1986 -** FEMA Flood Claim
142-0150-002	17408 GRAND ISLAND RD	RAISED	GOOD			**1/2/1997 -** FEMA Flood Claim
142-0150-003	17412 GRAND ISLAND RD	SLAB ON GRADE	GOOD			**No Flood Reported**
142-0150-004	17416 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0150-005	17420 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0150-028	17428 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0150-008	17432 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0150-009	17436 GRAND ISLAND RD	RAISED	GOOD	Elevated Home		**1/14/1998** – Home Elevated **2/17/1986 -** FEMA Flood Claim **1/27/1983 -** FEMA Flood Claim
142-0150-010	17440 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0150-027	17444 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0150-022	17456 GRAND ISLAND RD	RAISED	GOOD			**1/3/1997 -** FEMA Flood Claim
142-0150-023	17460 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**
142-0150-024	17468 GRAND ISLAND RD	RAISED	GOOD			Elevation Certificate on file
142-0150-025	17484 GRAND ISLAND RD	RAISED	GOOD			**No Flood Reported**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
822-0014-003	1743 SYCAMORE DR		GOOD			**1/3/1997 -** FEMA Flood Claim
157-0090-001	1826 SYCAMORE DR		GOOD			**2/19/1986 -** FEMA Flood Claim **3/5/1983 -** FEMA Flood Claim **1/27/1983 -** FEMA Flood Claim
157-0090-001	1743 BEACH DR #52		GOOD			**1/3/1997 -** FEMA Flood Claim
822-0014-030	1745 BEACH DR # 51		GOOD			**1/3/1997 -** FEMA Flood Claim
157-0090-001	1756 BEACH DR		GOOD			**1/2/1997 -** FEMA Flood Claim **3/1/1995 -** FEMA Flood Claim
822-0014-060	1759 BEACH DR		GOOD			**1/1/1997 -** FEMA Flood Claim
822-0014-057	1762 BEACH DR	RAISED	GOOD	Elevated Home		**8/26/1997** – Home Elevated **1/3/1997 -** FEMA Flood Claim **3/1/1995 -** FEMA Flood Claim
157-0090-001	1848 ANCHOR DR	RAISED	GOOD	Elevated Home		**5/21/2001** – Home Elevated **2/6/1998 -** FEMA Flood Claim **1/2/1997 -** FEMA Flood Claim **02/19/1986 -** FEMA Flood Claim **1/27/1983 -** FEMA Flood Claim

Appendix 13

Repetitive Loss Area 13

BADGER CREEK

WILTON

LOCAL FLOODPLAIN

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 13

TABLE OF CONTENTS

A13.1 REPETITIVE LOSS AREA 13

This Report focuses on Area 13, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 13 includes properties in Wilton, California on Collings Road, Davis Road, Haggie Road, Mann Road, and Dillard Road as show on **Figure A13**.

A13.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs.

A13.3 PROBLEM STATEMENT

The location of Area 13 is within the Wilton area, south of Dillard Road generally between Collins Road and Davis Road, and north of Mann Road.

The source of flooding was primarily identified as poor drainage and flat terrain. The local floodplain tends from Dillard Road southeast across Mann Road toward the North Fork Badger Creek FEMA A-Zone floodplain. Damaging floods occurred in January of 1995 and January of 1997.

There are 33 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions. The lone repetitive loss property has not been mitigated.

A13.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding:

- none

The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

A13.5 DATA COLLECTION

The State of California – Department of Water Resources Central Valley Flood Evaluation and Delineation LiDAR (dated 2008) was utilized in this analysis.

A13.5.1 Flood Insurance and Flood Event Data

Area 13 is in Zone X, on the FEMA Flood Insurance Rate Map 06067C0345H. The flooding is associated with local drainage issues as a result of very flat terrain and limited drainage facilities. The flooding occurs when large storm events back up North Fork Badger Creek. Due to the extremely flat terrain, water ponds through the repetitive loss area.

FIGURE A13
Repetitive Loss Area #13

A13.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) has no record of any calls to report flooding from the properties identified in the repetitive loss area. The only repetitive loss property in the area filed flood claims in January of 1995 and January of 1997. The only historical loss property filed a flood claim in February of 1998.

A13.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed during the storm events causing repetitive flooding of January 1995 and January 1997. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the local flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location;
- Neighborhood topography and flow routes

In addition, visual inspections for each property were made in preparation of this Report.

A13.5.4 Types of Foundations

The most common type of foundations within the Badger Creek RLA is a raised foundation, which constitutes 73% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A13.6 FUTURE MITIGATION MEASURES

The County continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

BADGER CREEK
WILTON
(Local Floodplain)

AREA 13

COLLINGS ROAD

MANN ROAD

BADGER CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**20**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*19*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 16
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
134-0324-012	0 COLLINGS RD	N/A	N/A			**No Structure on Property**
134-0324-022	10011 COLLINGS RD	RAISED	GOOD			**No Record of Flooding**
134-0324-019	10031 COLLINGS RD	RAISED	GOOD			**No Record of Flooding**
134-0324-015	10057 COLLINGS RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
134-0324-010	10061 COLLINGS RD	RAISED	FAIR			**No Record of Flooding**
134-0324-009	10073 COLLINGS RD	RAISED	GOOD			**No Record of Flooding**
134-0324-013	10079 COLLINGS RD	RAISED	FAIR			**No Record of Flooding**
134-0324-007	10111 COLLINGS RD	RAISED	FAIR			**No Record of Flooding**
134-0324-006	10121 COLLINGS RD	RAISED	FAIR			**No Record of Flooding**
134-0324-005	10131 COLLINGS RD	RAISED	FAIR			**No Record of Flooding**
134-0324-031	10149 COLLINGS RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
134-0324-032	10153 COLLINGS RD	RAISED	FAIR			**No Record of Flooding**
134-0324-028	11011 MANN RD	RAISED	GOOD			**No Record of Flooding**
134-0324-029	11025 MANN RD	RAISED	FAIR			**No Record of Flooding**
134-0211-025	11030 MANN RD	RAISED	GOOD			**No Record of Flooding**
134-0324-030	11041 MANN RD	RAISED	FAIR			**No Record of Flooding**
134-0324-025	11057 MANN RD	SLAB ON GRADE	GOOD			**1/10/95** - FEMA Flood Claim **1/02/97**- FEMA Flood Claim
134-0324-026	11119 MANN RD	RAISED	FAIR			**No Record of Flooding**
134-0324-027	11135 MANN RD	RAISED	GOOD			**No Record of Flooding**
134-0211-021	11168 MANN RD	RAISED	GOOD			**No Record of Flooding**

AREA 13

HAGGIE ROAD

DILLARD ROAD

DAVIS ROAD

BADGER CREEEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**13**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*12*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 8
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PRIVATELY OWNED 2

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
134-0324-023	11132 HAGGIE RD	RAISED	FAIR			**No Record of Flooding**
134-0324-020	11155 HAGGIE RD	SLAB ON GRADE	FAIR			**No Record of Flooding**
134-0324-021	11192 HAGGIE RD	RAISED	FAIR			**No Record of Flooding**
134-0324-033	11202 HAGGIE RD	SLAB ON GRADE	BEING REPAIRED			**No Record of Flooding, Fire Damage Repairs**
134-0324-034	11218 HAGGIE RD	SLAB ON GRADE	FAIR			**No Record of Flooding**
134-0322-012	11229 HAGGIE RD	RAISED	GOOD			**No Record of Flooding**
134-0324-035	11234 HAGGIE RD	RAISED	GOOD			**No Record of Flooding**
134-0322-014	11245 HAGGIE RD	RAISED	GOOD			**2/5/98** - FEMA Flood Claim
134-0324-036	11264 HAGGIE RD	RAISED	GOOD			**No Record of Flooding**
134-0322-005	0 HAGGIE RD	N/A	N/A			**No Structure on Property**
134-0321-003	9961 DILLARD RD	RAISED	GOOD			**No Record of Flooding**
134-0321-002	9971 DILLARD RD	RAISED	GOOD			**No Record of Flooding**
134-0324-002	0 DAVIS RD	N/A	N/A			**No Structure on Property**

Appendix 14

REPETITIVE LOSS AREA 14
ARCADE CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 14

TABLE OF CONTENTS

A14.1 REPETITIVE LOSS AREA 14

This Report focuses on Area 14, one of the twenty eight (28) designated RLAs within the Sacramento County. Area 14 analyses include Manzanita Avenue, Peppermill Court, Sycamore Avenue, and Winding Way as defined by **Figure A14**.

A14.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAs.

A14.3 PROBLEM STATEMENT

The location of Area 14 is made up of six subareas. The area is bounded by Pasadena Avenue, Winding Way and College Oak Drive. The second subarea is generally bounded by Arcade Creek, Valhalla Drive, and Winding Way. The third subarea is adjacent to Brooktree Creek.

The source of flooding was primarily identified as the residences being in low lying areas, in some instances adjacent to a creek that is over capacity, and most of the homes having slab-on-grade foundations.

There are 47 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions.

A14.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following plans or studies that could affect the cause or impacts to flooding are:

- Drainage Study for 4950 Hackberry Lane

The primary methods of property protection are:

- Home Elevation – Is your floor below the elevation of the floodplain? If so, it may be prudent to elevate the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, the County has utilized FEMA grant money for dozens of qualified elevation projects.
- Site Modification – Would a small wall, berm, or other site specific grading help keep water out of your house? Often, modification of the area around your home may be appropriate to minimize flooding depending on the depth of floodwater and site specific constraints.
- Temporary Flood Barriers – Perhaps sandbags or other barriers could be employed on site in advance of a storm to help keep water out.

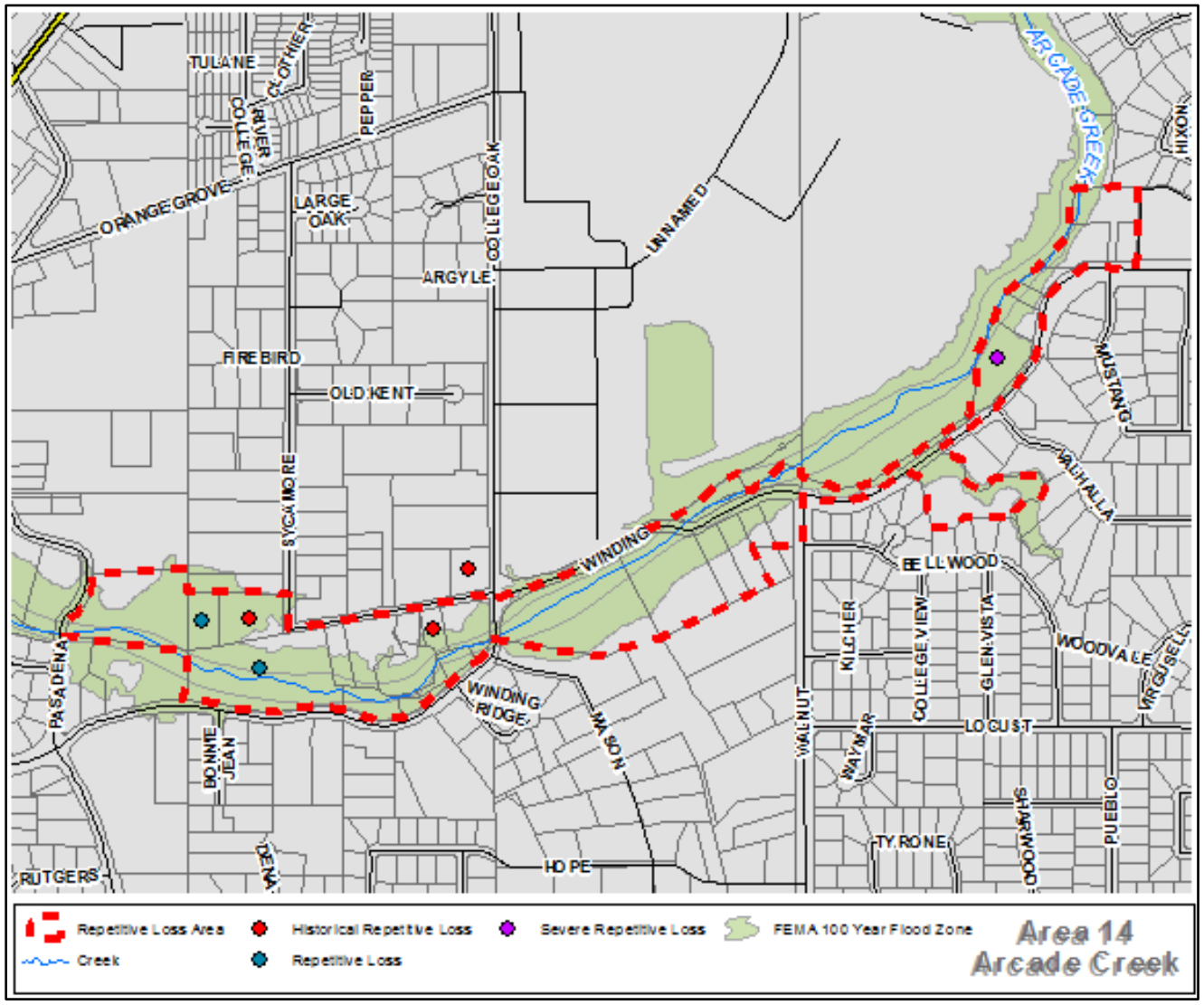
- Home Removal – If necessary, it may be recommended that the County purchase the property and remove the home from the lot.

A14.5 DATA COLLECTION

Sacramento County Plans and studies for Manzanita Avenue were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- Sycamore Avenue Drainage Project
- Del Paso Vale
- Oakvale No. 2
- Oakvale No. 3
- Oak Creek Estates Unit 2
- Hackberry Estates
- 5990 Devecchi Avenue

FIGURE A14
Repetitive Loss Area #14



A14.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) 26 properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when flows exceed the capacity of Arcade Creek, and Brooktree Creek. The Sacramento County Local Floodplain on Sycamore Avenue for this RLA floods due to it being a low lying area.

A14.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 8 of the overall 47 properties within the Arcade Creek RLA had reported flooding.

A14.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in March of 2015. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A14.5.4 Types of Foundations

The most common type of foundations within the Manzanita Avenue RLA is slab-on-grade.

A14.6 FUTURE MITIGATION MEASURES

The County continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

ARCADE CREEK

AREA 14

MANZANITA AVENUE

ARCADE CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**10**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*9*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 10
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES 0

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
230-0700-003-0061	5233 MANZANITA AV 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0062	5233 MANZANITA AV 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0057	5237 MANZANITA AV 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0058	5237 MANZANITA AV 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0053	5241 MANZANITA AV 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0054	5241 MANZANITA AV 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0049	5245 MANZANITA AV 1	SLAB ON GRADE	GOOD			**3/16/1992** - FEMA Flood Claim
230-0700-003-0050	5245 MANZANITA AV 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0045	5249 MANZANITA AV 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0046	5249 MANZANITA AV 2	SLAB ON GRADE	GOOD			**No Flood Reported**

AREA 14

SYCAMORE AVENUE

ARCADE CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**9**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*8*
• EXISTING STRUCTURES (UNMITIGATED)	
o RAISED FOUNDATIONS	3
o SLAB ON GRADE	5
• NO STRUCTURES	
o PRIVATELY OWNED	1
MITIGATED PROPERTIES	0
• ACQUSITION & DEMO	0
• AQUSITION – NO STRUCTURE	0
• ELEVATED (RAISED FOUNDATION)	0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
240-0222-008	0 SYCAMORE AV	N/A	N/A			**No Structure**
240-0223-004	4300 SYCAMORE AV	SLAB ON GRADE	GOOD			**2/18/2004 –** Street Flooding **1/10/1995 –** Garage flooded depth not available due to confidential flood site listings.
240-0222-010	4301 SYCAMORE AV	SLAB ON GRADE	GOOD			**No Flood Reported**
240-0223-033	4308 SYCAMORE AV	SLAB ON GRADE	GOOD			**No Flood Reported**
240-0222-009	4321 SYCAMORE AV	SLAB ON GRADE	GOOD			**1/9/1995 –** House flooded a depth of 1". Garage depth of flooding 6". **1/10/1995** - FEMA Flood Claim
240-0222-030	4329 SYCAMORE AV	RAISED	GOOD			**1/11/1995** - FEMA Flood Claim
240-0222-035	4349 SYCAMORE AV	RAISED	GOOD			**12/31/2005 –** Barn flooded a depth of 36". Crawl Space depth of flooding 24". - FEMA Flood Claim **1/10/1995** - FEMA Flood Claim **2/15/1983** - FEMA Flood Claim **12/22/1982** - FEMA Flood Claim **11/30/1982** - FEMA Flood Claim **11/13/1981**- FEMA Flood Claim
240-0222-051	4351 SYCAMORE AV	RAISED	GOOD	Home Elevation		**9/23/2003** - Raised foundation (FEMA) **1/1/2006** - FEMA Flood Claim **1/9/1995 –** House flooded a depth of 39". Garage depth of flooding 42".
240-0222-050	4353 SYCAMORE AV	SLAB ON GRADE	GOOD			**1/9/1995 –** House flooded a depth of 1.5". Garage depth of flooding 2".

AREA 14

PEPPERMILL COURT

ARCADE CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**22**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*22*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 22
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
230-0700-003-0001	5800 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0002	5800 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0005	5804 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-070-0003-0006	5804 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0009	5812 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0010	5812 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0013	5816 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0014	5816 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0017	5820 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0018	5820 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0021	5824 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0022	5824 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0041	5828 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
230-0700-003-0042	5828 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0037	5832 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0038	5832 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0033	5836 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0034	5836 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0029	5840 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0030	5840 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0025	5844 PEPPER MILL CT 1	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0700-003-0026	5844 PEPPER MILL CT 2	SLAB ON GRADE	GOOD			**No Flood Reported**

AREA 14

PASADENA AVENUE

WINDING WAY

ARCADE CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**6**
REPETITIVE LOSS PROPERTIES	
SEVERE REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*5*
REPETITIVE LOSS AREA PROPERTIES	

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 1
  - SLAB ON GRADE 4
- NO STRUCTURES 1
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
240-0222-022	4740 PASADENA AV	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0230-011	0 WINDING WY	N/A	N/A			**No Structure**
230-0230-013	5213 WINDING WY	RAISED	FAIR			**1/9/1995 –** House flooded a depth of 48". Garage depth of flooding 24". **1/10/1995 -** FEMA Flood Claim **2/17/1986 -** FEMA Flood Claim **3/12/1983 -** FEMA Flood Claim **3/31/1982 -** FEMA Flood Claim **2/15/1982 -** FEMA Flood Claim **1/4/1982 -** FEMA Flood Claim **1/13/1978 -** FEMA Flood Claim
230-0230-017	5217 WINDING WY	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0230-016	5221 WINDING WY	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0230-010	5235 WINDING WY	SLAB ON GRADE	GOOD			**No Flood Reported**

Appendix 15

REPETITIVE LOSS AREA 15

DILLARD RD/BERRY RD

Wilton

Local Floodplain

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 15

TABLE OF CONTENTS

A15.1 REPETITIVE LOSS AREA 15

This Report focuses on Area 15, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 15 includes properties in Wilton, California on Apple Road, Berry Road, Cherry Road, Currant Road, Dillard Road, Early Times Road, Live Oak Road, and Orange Road as shown on **Figure A15**.

A15.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A15.3 PROBLEM STATEMENT

The location of Area 15 is within the Wilton area, east of Dillard Road generally between Apple Road and Orange Road, and east of Berry Road.

The source of flooding was primarily identified as backwater caused by the inverted siphon crossing at Folsom South Canal. During large storm events, the siphon is overwhelmed and backs up the unknown creek that runs north to south through the RLA. Damaging floods occurred in February of 1986, January of 1995, February of 1998, and February of 2000.

There are 40 properties which include buildings on FEMA's repetitive loss list, historical loss properties, and nearby buildings that may have the same or similar flooding conditions. One property contains two structures with different addresses, so there are a total of 41 structures within the RLA. None of the repetitive loss, severe repetitive loss, or historical repetitive loss properties have been mitigated.

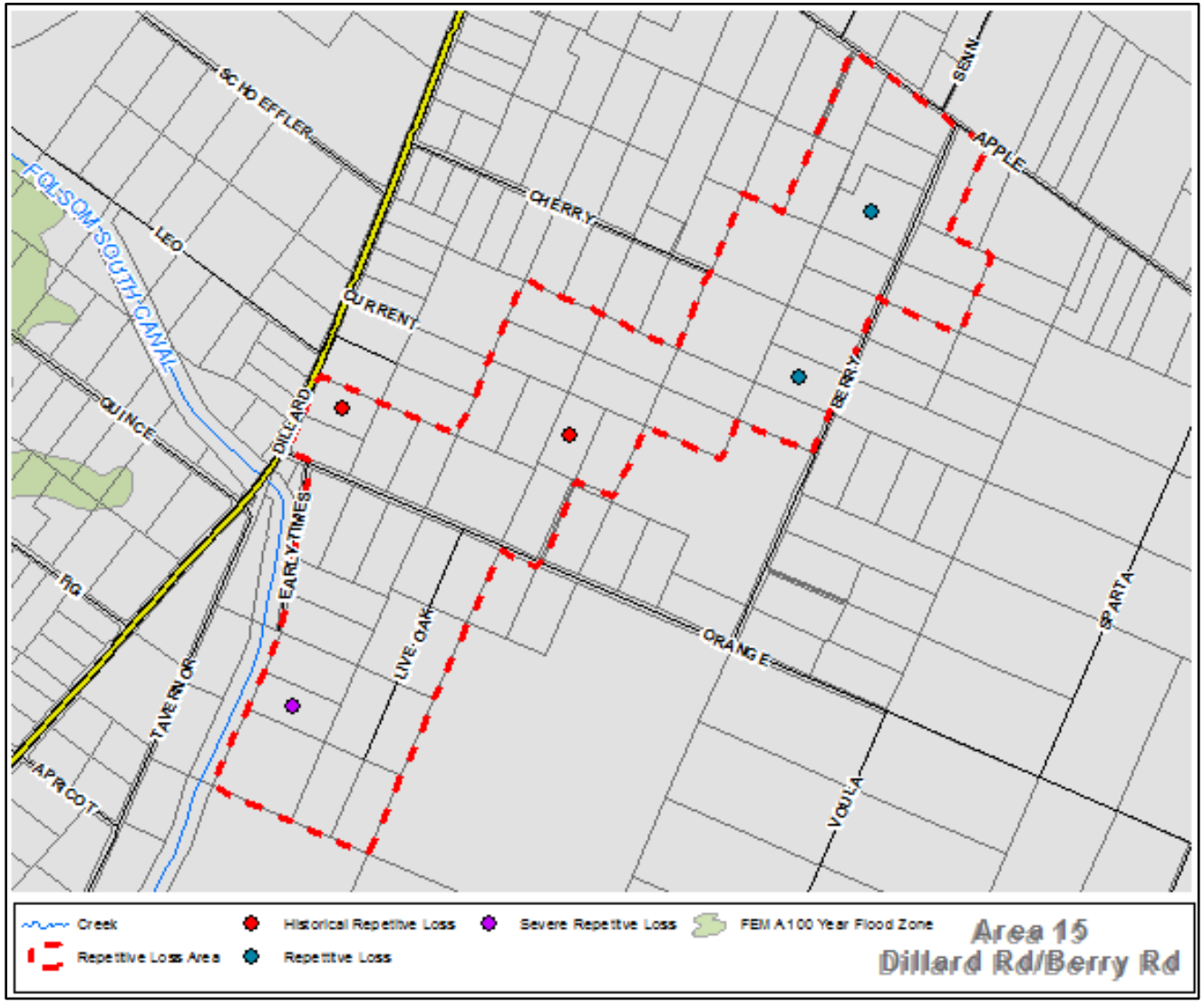
A15.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- **US Bureau of Reclamation Folsom South Canal Design Drawings – Reach 2**

The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

FIGURE A15
Repetitive Loss Area #15



A15.5 DATA COLLECTION

The State of California – Department of Water Resources Central Valley Flood Evaluation and Delineation LiDAR (dated 2008) was utilized in this analysis. In addition, the US Bureau of Reclamation Design Plans for Folsom South Canal were reviewed and used in the analysis.

A15.5.1 Flood Insurance and Flood Event Data

Area 15 is in Zone X, on the FEMA Flood Insurance Rate Map 06067C0375H. The flooding is associated with local drainage issues as a result of backwater created by the inverted siphon crossing at Folsom South Canal. The flooding occurs when large storm events overwhelm the capacity of the siphon. The unknown stream that crosses the Folsom South Canal runs north to south through the RLA. The properties located adjacent to the creek experience the localized flooding.

A15.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that five (5) of the overall 4 properties within the Dillard Rd/Berry Rd RLA had reported flooding. The severe repetitive loss property, repetitive loss properties, and historic loss properties in the area filed flood claims as indicated in the Data Analysis Summaries at the end of this Appendix.

A15.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed during the storm events causing repetitive flooding of February 1986, January 1995, February 1998, and February 2000. These inspections were performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the local flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location;
- Neighborhood topography and flow routes

In addition, visual inspections for each property were made in preparation of this Report.

A15.5.4 Types of Foundations

The most common type of foundations within the RLA is a raised foundation, which constitutes 66% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A15.6 FUTURE MITIGATION MEASURES

The County continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available
- **Potential Funding:** State and/or Federal Grant

In addition, the County could explore a regional improvement project to increase the capacity of the inverted siphon crossing at Folsom South Canal.

DATA ANALYSIS SUMMARY

DILLARD RD/BERRY RD
Wilton
(Local Floodplain)

AREA 15

APPLE ROAD

BERRY ROAD

DATA ANALYSIS SUMARY

PROPERTIES	**12**
REPETITIVE LOSS PROPERTIES	*2*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*10*
• EXISTING STRUCTURES (UNMITIGATED)	
o RAISED FOUNDATIONS	8
o SLAB ON GRADE	2
• NO STRUCTURES	
o PRIVATELY OWNED	2
MITIGATED PROPERTIES	0
• ACQUSITION & DEMO	0
• AQUSITION – NO STRUCTURE	0
• ELEVATED (RAISED FOUNDATION)	0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
12800320470000	13200 APPLE RD	RAISED	FAIR			**No Record of Flooding**
12800330010000	13254 APPLE RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
12803600010000	8450 BERRY RD	RAISED	FAIR			**FEMA Flood Claim -** 3/31/1982, 2/18/1986, 1/10/1995, 12/31/1996, 2/3/1998, 2/14/2000
12800330050000	8475 BERRY RD	RAISED	GOOD			**No Record of Flooding**
12800320240000	8490 BERRY RD	SLAB ON GRADE	GOOD			**No Record of Flooding**
12800320250000	8508 BERRY RD	RAISED	GOOD			**No Record of Flooding**
12800330080000	8525 BERRY RD	RAISED	FAIR			**No Record of Flooding**
12800410790000	8540 BERRY RD	RAISED	GOOD			**No Record of Flooding**
12800410800000	8580 BERRY RD	RAISED	GOOD			**FEMA Flood Claim** - 2/3/1998, 2/11/2000
12800410810000	8606 BERRY RD	RAISED	GOOD			**No Record of Flooding**
12803600020000	0 BERRY RD	N/A	N/A			**No Structure on Property**
12803600030000	0 BERRY RD	N/A	N/A			**No Structure on Property**

AREA 15

CHERRY ROAD

CURRANT ROAD

DILLARD ROAD

CONSUMNES RIVER WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**12**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*11*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 6
  - SLAB ON GRADE 5
- NO STRUCTURES 0
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES 0

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
12800410650000	13060 CHERRY RD	RAISED	Good			**No Record of Flooding**
12800410660000	13070 CHERRY RD	SLAB ON GRADE	Good			**No Record of Flooding**
12800410700000	13078 CHERRY RD	RAISED	Good			**No Record of Flooding**
12800410480000	13082 CHERRY RD	RAISED	Good			**No Record of Flooding**
12800410470000	13086 CHERRY RD	SLAB ON GRADE	Good			**No Record of Flooding**
12800410670000	13090 CHERRY RD	RAISED	Fair			**No Record of Flooding**
12800410680000	13094 CHERRY RD	RAISED	Fair			**No Record of Flooding**
12800410040000	13100 CHERRY RD	SLAB ON GRADE	Fair			**No Record of Flooding**
12800320140000	13107 CHERRY RD	RAISED	Good			**No Record of Flooding**
12800410690000	0 CURRANT RD	N/A				**No Structure on Property**
12800410570000	8563 DILLARD RD	SLAB ON GRADE	Fair			**FEMA Flood Claim** - 12/17/2002
12800410580000	8581 DILLARD RD	SLAB ON GRADE	Good			**No Record of Flooding**

AREA 15

EARLY TIMES ROAD

LIVE OAK ROAD

CONSUMNES RIVER WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**11**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*10*
• EXISTING STRUCTURES (UNMITIGATED)	
o RAISED FOUNDATIONS	9
o SLAB ON GRADE	2
• NO STRUCTURES	0
o PRIVATELY OWNED	0
MITIGATED PROPERTIES	0
• ACQUSITION & DEMO	0
• AQUSITION – NO STRUCTURE	0
• ELEVATED (RAISED FOUNDATION)	0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
12802000120000	8709 EARLY TIMES LN	RAISED	GOOD			**No Record of Flooding**
12802000130000	8733 EARLY TIMES LN	RAISED	GOOD			**2/23/2000** - FEMA Flood Claim **1998** - Flooded garage and barn depth of flooding 1 ft. **2/5/1998** - FEMA Flood Claim **1997** - Flooded garage and barn depth of flooding 1 ft. **1/1/1997** - FEMA Flood Claim **2/18/1986** - FEMA Flood Claim **12/26/1983**- FEMA Flood Claim **3/12/1983** - FEMA Flood Claim **1/27/1983** - FEMA Flood Claim **12/21/1982** - FEMA Flood Claim **4/1/1982** - FEMA Flood Claim
12802000180000	8761 EARLY TIMES LN	RAISED	GOOD			**No Record of Flooding**
12802000270000	8683 EARLY TIMES LN	SLAB ON GRADE	GOOD			**No Record of Flooding**
12802000140000	8768 LIVE OAK RD	SLAB ON GRADE				**No Record of Flooding**
12802000140000	8770 LIVE OAK RD	RAISED				**No Record of Flooding**
12802000150000	8769 LIVE OAK RD	RAISED				**No Record of Flooding**
12802000200000	8805 LIVE OAK RD	RAISED				**No Record of Flooding**
12802000190000	8814 LIVE OAK RD	RAISED				**No Record of Flooding**
12802000090000	8754 LIVE OAK RD	RAISED				**No Record of Flooding**
12802000250000	8620 LIVE OAK RD	RAISED				**No Record of Flooding**

AREA 15

ORANGE ROAD

CONSUMNES RIVER WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**6**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*5*
• EXISTING STRUCTURES (UNMITIGATED)	4
o RAISED FOUNDATIONS	4
o SLAB ON GRADE	0
• NO STRUCTURES	2
o PRIVATELY OWNED	2
MITIGATED PROPERTIES	0
• ACQUSITION & DEMO	0
• AQUSITION – NO STRUCTURE	0
• ELEVATED (RAISED FOUNDATION)	0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
12800410710000	12977 ORANGE RD	RAISED	GOOD			**2/3/1998** - FEMA Flood Claim
12800410720000	12981 ORANGE RD	RAISED	GOOD			**No Record of Flooding**
12800410260000	13051 ORANGE RD	RAISED	GOOD			**No Record of Flooding**
12800410610000	13055 ORANGE RD	RAISED	GOOD			**No Record of Flooding**
12800410910000	0 ORANGE RD	N/A	N/A			**No Structure on Property**
12800410920000	0 ORANGE RD	N/A	N/A			**No Structure on Property**

Appendix 16

REPETITIVE LOSS AREA 16
ROBLA CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 16

TABLE OF CONTENTS

A16.1 REPETITIVE LOSS AREA 16

This Report focuses on Area 16, one of the twenty eight (28) designated RLAs within the Sacramento County. Area 16 analyses include properties on C Street, E Street, 16th Street, 20th Street, and 21st Street and are defined by **Figure A16**.

A16.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAs.

A16.3 PROBLEM STATEMENT

The location of Area 16 is generally bounded by Dry Creek Road, C Street, 22nd Street, and G Street.

The source of flooding was primarily identified as being due to capacity exceedance of Robla Creek and Rio Linda Creek.

There are 51 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions.

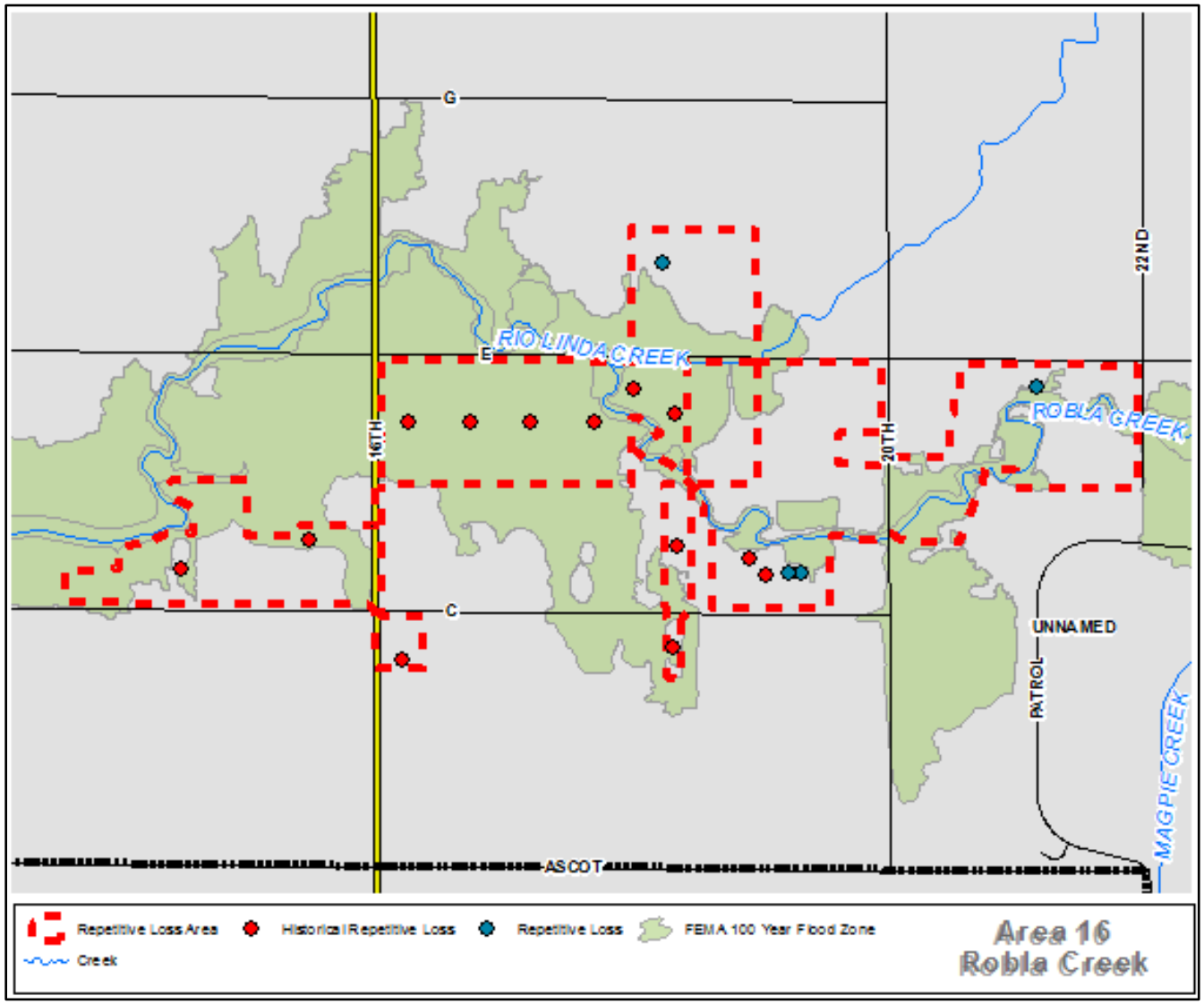
A16.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), plans or studies that could affect the cause or impacts to flooding were not available.

The primary methods of property protection are:

- Home Elevation – Is your floor below the elevation of the floodplain? If so, it may be prudent to elevate the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, the County has utilized FEMA grant money for dozens of qualified elevation projects.
- Site Modification – Would a small wall, berm, or other site specific grading help keep water out of your house? Often, modification of the area around your home may be appropriate to minimize flooding depending on the depth of floodwater and site specific constraints.
- Temporary Flood Barriers – Perhaps sandbags or other barriers could be employed on site in advance of a storm to help keep water out.
- Home Removal – If necessary, it may be recommended that the County purchase the property and remove the home from the lot.

FIGURE A16
Repetitive Loss Area #16



A16.5 DATA COLLECTION

Sacramento County Plans and studies for Robla Creek were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- Rio Linda Subdivision No. 5

A16.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) 41 properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when flows exceed the capacity of Robla Creek and Rio Linda Creek. The Sacramento County Local Floodplain at the intersection of E Street and 20th Street for this RLA floods due to it being a flat and low lying area.

A16.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 7 of the overall 45 properties within the Dry Creek RLA had reported flooding.

A16.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in March of 2015. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A16.5.4 Types of Foundations

The most common type of foundation within the Robla Creek RLA is slab-on-grade.

A16.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for future mitigation measures. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

ROBLA CREEK WATERSHED

AREA 16

C STREET

ROBLA CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**16**
REPETITIVE LOSS PROPERTIES	*2*
HISTORICAL LOSS PROPERTIES	*5*
REPETITIVE LOSS AREA PROPERTIES	*9*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 5
  - SLAB ON GRADE 10
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES 0

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
215-0140-070	0 C ST	VACANT	N/A			No EC on file.
215-0140-029	1333 C ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
215-0140-028	1345 C ST	RAISED	GOOD			**No Record of Flooding**
215-0140-074	1401 C ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
215-0140-069	1409 C ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
215-0140-076	1411 C ST	SLAB ON GRADE	GOOD			**2/20/1986 –** FEMA Flood Claim
215-0140-078	1425 C ST	RAISED	GOOD			**No Record of Flooding**
215-0150-034	1815 C ST	RAISED	GOOD			**12/27/2010 –** FEMA Flood Claim
215-0201-018	1816 C ST	RAISED	GOOD			**7/18/1995 -** Driveway Flooded 6" And Street At Least 36".
215-0150-046	1825 C ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
215-0150-047	1843 C ST	SLAB ON GRADE	GOOD			**3/22/2000 –** FEMA Flood Claim
215-0150-016	1901 C ST	SLAB ON GRADE	GOOD			**6/18/1998 –** Flooding within structure during intense storms. **1/22/1997 –** Flooded 10" in house.
215-0150-017	1905 C ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
215-0150-018	1909 C ST	SLAB ON GRADE	GOOD			**1/12/1993 –** FEMA Flood Claim **2/15/1992 –** FEMA Flood Claim
215-0150-019	1913 C ST	SLAB ON GRADE	GOOD			**1/22/1997 –** FEMA Flood Claim **1/12/1990 –** FEMA Flood Claim
215-0150-028	1919 C ST	RAISED	GOOD			**No Record of Flooding**
215-0150-027	1923 C ST	RAISED	GOOD			**No Record of Flooding**

AREA 16

16TH STREET

20TH STREET

ROBLA CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**14**
REPETITIVE LOSS PROPERTIES	
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	*12*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 10
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
215-0212-025	5736 16TH ST	RAISED	GOOD			**2/2/1998 –** FEMA Flood Claim
215-0212-034	5742 16TH ST	RAISED	GOOD			**No Record of Flooding**
215-0212-038	5748 16TH ST	RAISED	GOOD			**No Record of Flooding**
215-0140-052	5815 16TH ST	RAISED	FAIR			**No Record of Flooding**
215-0140-055	5829 16TH ST	SLAB ON GRADE	GOOD			**1/9/1995 –** Flooded 1" in house and 18” in kennels
215-0140-049	5833 16TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
215-0161-023	5830 20TH ST	RAISED	FAIR			**No Record of Flooding**
215-0161-020	5848 20TH ST	RAISED	GOOD			**No Record of Flooding**
215-0150-060	5901 20TH ST	RAISED	GOOD			**No Record of Flooding**
215-0161-006	5905 22ND ST	N/A	N/A			**No Structure**
215-0161-019	5908 20TH ST	RAISED	GOOD			**No Record of Flooding**
215-0150-031	5933 20TH ST	RAISED	FAIR			**No Record of Flooding**
215-0150-030	5945 20TH ST	RAISED	GOOD			**No Record of Flooding**
215-0161-014	5945 22ND ST	SLAB ON GRADE	POOR			**No Record of Flooding**

AREA 16

E Street

Robla Creek

DATA ANALYSIS SUMARY

PROPERTIES	**21**
REPETITIVE LOSS PROPERTIES	*2*
HISTORICAL LOSS PROPERTIES	*5*
REPETITIVE LOSS AREA PROPERTIES	*14*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 9
  - SLAB ON GRADE 11
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 1

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
215-0150-001	1610 E ST	RAISED	GOOD			**6/16/1998 -** Flooding Depth uncertainty confidential flood site listings. **1/22/1997 –** Flooded 6" in garage
215-0150-071	1630 E ST	RAISED	GOOD			**6/16/1998 - Flooding** Depth uncertainty confidential flood site listings. **1/22/1997 –** Flooded 6" in garage
215-0150-065	1640 E ST	RAISED	GOOD			**6/16/1998 –** Flooding Depth uncertainty confidential flood site listings. **1/25/1997 –** FEMA Flood Claim **1/22/1997 –** Flooded 4" in garage
215-0150-066	1650 E ST	RAISED	GOOD			**No Record of Flooding**
215-0150-007	1712 E ST	RAISED	GOOD			**1/2/2006 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim **1/9/1995 -** Flooding Depth uncertainty confidential flood site listings.
215-0150-008	1740 E ST	RAISED	GOOD			**1/10/1995 –** FEMA Flood Claim
215-0150-048	1746 E ST	SLAB ON GRADE	GOOD			**12/31/2005 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim **1/9/1995 –** Flooded 6" in house, 12" in the garage and 3" in the barn **1/13/1993 –** FEMA Flood Claim **2/19/1980–** FEMA Flood Claim **1/29/1980 –** FEMA Flood Claim
215-0120-035	1811 E ST	RAISED	FAIR			**No Record of Flooding**
215-0150-044	1816 E ST	SLAB	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
215-0120-087	1823 E ST	SLAB	GOOD			**12/31/2005 –** FEMA Flood Claim **3/10/1995–** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim
215-0120-045	1827 E ST	SLAB	GOOD			**No Record of Flooding**
215-0150-015	1840 E ST	SLAB	GOOD			**No Record of Flooding**
215-0120-046	1847 E ST	SLAB	GOOD			**No Record of Flooding**
215-0150-037	1900 E ST	SLAB	GOOD			**No Record of Flooding**
215-0150-039	1916 E ST	SLAB	FAIR			**6/16/1998 -** Flooding Depth uncertainty confidential flood site listings. **1/22/1997 –** Flooded 4" in the garage
215-0150-058	1930 E ST	RAISED	GOOD			**6/16/1998 -** Flooding Depth uncertainty confidential flood site listings. **1/22/1997 –** Flooded 6" in the garage
215-0161-017	2030 E ST	SLAB	GOOD			**No Record of Flooding**
215-0161-002	2040 E ST	SLAB	GOOD			**No Record of Flooding**
215-0161-003	2048 E ST	SLAB	GOOD			**No Record of Flooding**
215-0161-012	2056 E ST	RAISED	GOOD	Home Elevation		**10/2000** - Elevation / Raise House / HMGP **1/23/1997 –** FEMA Flood Claim **1/9/1997 –** Flooded 12” in the garage, 1” house. **1/9/1995 –** FEMA Flood Claim **1/9/1995 –** Flooded 12” in the garage
215-0161-013	2100 E ST	RAISED	GOOD			**No Record of Flooding**

Appendix 17

Repetitive Loss Area 17

GARDEN HIGHWAY

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 17

TABLE OF CONTENTS

A17.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 17, one of the twenty-seven designated RLAs within the Sacramento County. Area 17 analysis includes properties primarily along Garden Highway and is defined by **Figure 1**.

A17.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A17.3 PROBLEM STATEMENT

The location of Area 17 is located adjacent to the Sacramento River. According to information from the County of Sacramento – County Clerk Office, development of along the Sacramento River in Area 17 first began in the 1850's and is continuing to develop. The majority of homes was built prior to 1975 and is considered Pre-FIRM. These homes were built with no FEMA guidelines for proper construction in flood prone areas.

The Sacramento River Basin is approximately 27,000 square miles which drains the northern central valley into the Sacramento – San Joaquin Delta. Several hydrologic and hydraulic studies have been conducted on the Sacramento River system to understand the flooding potential at various locations. These models were calibrated to the large storm events that occurred in 1986, 1997, and 2005. Based on these models, Area 17 is susceptible to high flood stages in the Sacramento River. This is caused by tidal influences, American River, Feather River, Sacramento River, and Natomas Cross Canal converging around Area 17.

The source of flooding is caused by high stages in the Sacramento River. The FEMA Effective FIRM indicates that these parcels are inundated by the 100-year storm. Additionally, the U.S. Army Corps of Engineers (USACE) Common Features and the State of California Central Valley Flood Evaluation and Delineation hydraulic models confirmed this area is flood prone.

There are 300 properties which include buildings on FEMA's repetitive loss list, historical loss properties or nearby buildings that may have the same or similar flooding conditions. Of the total homes in Area 17, three (3) homes have been elevated and one (1) home was demolished.

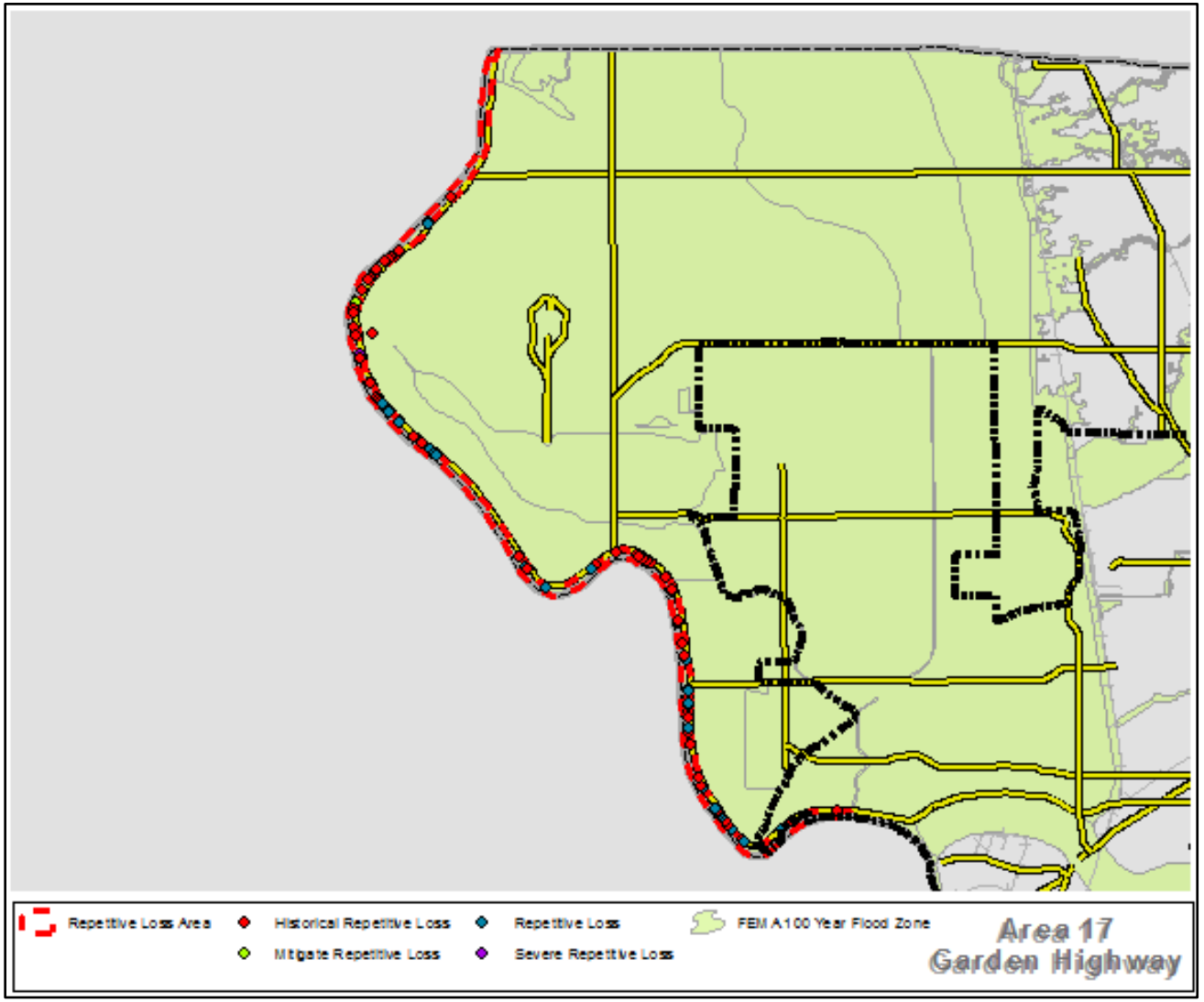
A17.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- SAFCA and USACE – Sacramento Levee Improvement Project
- USACE and Bureau of Reclamation – Folsom Dam Joint Federal Project (Completion 2017)
- State of California – Fremont Weir Expansion (Planning Stage)

The primary method of protection is to inform the public about flood risks of living in flood prone areas, especially for homes on the waterside of a levee. Additionally, all of the homes in Area 17 are identified in the County's building permit database. These homes are required to be in compliance with the local Floodplain Management Ordinance which describes how to safely build in areas that are within a FEMA Effective Floodplain and Local Floodplain.

FIGURE A17
Repetitive Loss Area #17



A17.5 DATA COLLECTION

Plans and studies have been conducted for the Sacramento River system and were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- FEMA Effective Flood Insurance Study
- SAFCA and USACE – Sacramento River Levee Improvement Project
- Central Valley Flood Evaluation and Delineation Project
- USACE and Bureau of Reclamation – Joint Federal Project
- State of California – Fremont Weir Expansion Project

A17.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) all properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when the Sacramento River reaches flood stages. Additionally, the Sacramento County Local Floodplain is included for the RLA.

A17.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that forty (40) of the overall 327 properties within the Sacramento River RLA had reported flooding.

A17.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed during large storm events which caused the Sacramento River to reach flood stages and for the purposes of preparing this document. These inspections were performed from both the public right-of-way, when staff was not allowed onto the property. As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- High-water marks and debris mark levels

A17.5.4 Types of Foundations

The most common type of foundations within the Sacramento River RLA are raised foundations, which constitutes 89% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A17.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for land acquisition and home elevations. The Federal and State governments have taken a strong interest in the Natomas area and have starting funding projects to strengthen and build setback levees protecting the area. Additionally, the Federal and State governments' area conducting off-site projects to decrease flood stages in the Sacramento River. Lastly, the County further continues to encourage home owners to raise their structures above the flood hazard.

- SAFCA and USACE – Sacramento River Levee Improvement Project
- Central Valley Flood Evaluation and Delineation Project
- USACE and Bureau of Reclamation – Joint Federal Project
- State of California – Fremont Weir Expansion Project
- County - Raise Home Elevations

DATA ANALYSIS SUMMARY

SACRAMENTO RIVER WATERSHED

AREA 17

GARDEN HIGHWAY

SACRAMENTO RIVER WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**300**
REPETITIVE LOSS PROPERTIES	*24*
SEVERE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*53*
REPETITIVE LOSS AREA PROPERTIES	*222*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 181
  - SLAB ON GRADE 22
- NO STRUCTURES
  - PRIVATELY OWNED 41
  - PUBLICALLY OWNED 51

MITIGATED PROPERTIES

- DEMO 2
- NO STRUCTURE
- ELEVATED (RAISED FOUNDATION) 3

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
201-0010-007	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-009	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-013	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-014	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-033	4409 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-033	4409 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-034	0 GARDEN HWY	N/A	N/A		NATOMAS CENTRAL MUTUAL WATER CO	**No Structure on Property**
201-0010-035	8935 GARDEN HWY	N/A	N/A		RECLAMATION DISTRICT 1000	**No Structure on Property**
201-0010-036	8925 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-037	8915 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-038	4409 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-039	8881 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-040	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-041	8805 GARDEN HWY	N/A	N/A		COUNTY	Elevation Certificate on file
201-0010-042	8793 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-043	4409 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0010-044	0 GARDEN HWY	N/A	N/A		RECLAMATION DISTRICT 1000	**No Structure on Property**
201-0140-015	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-035	8399 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-036	8399 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-042	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-043	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
201-0140-044	8595 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-045	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-046	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-047	0 GARDEN HWY	N/A	N/A		COUNTY	**No Flood Reported**
201-0140-049	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-050	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-051	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0140-052	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0150-011	0 DELTA RD	N/A	N/A		COUNTY	**No Structure on Property**
201-0150-013	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0150-015	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0150-034	7907 GARDEN HWY	RAISED	GOOD			**12/29/2005 –** FEMA Flood Claim
201-0150-036	7925 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0150-037	7911 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0150-038	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0150-044	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0150-052	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0150-053	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0150-054	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0250-009	7115 GARDEN HWY	RAISED	GOOD			**1/4/1997 –** FEMA Flood Claim **2/24/1986 –** FEMA Flood Claim
201-0250-020	7105 GARDEN HWY	RAISED	GOOD			**2/19/1986 –** FEMA Flood Claim
201-0250-021	7095 GARDEN HWY	RAISED	GOOD			**1/3/1997 –** FEMA Flood Claim
201-0250-022	7077 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0250-024	6901 GARDEN HWY	RAISED	GOOD	Elevated		**1/6/2000 –** HMGP raise dwelling **1/2/1997 –** FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
						8/9/1978 – FEMA Flood Claim
201-0250-025	7197 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0250-027	7199 GARDEN HWY	RAISED	GOOD			**2/18/1986 –** FEMA Flood Claim
201-0250-028	7283 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0250-029	7257 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0250-030	7145 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0250-032	6915 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0250-033	6911 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0250-034	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0250-035	6801 GARDEN HWY	N/A	N/A		COUNTY	Elevation Certificate on file
201-0250-036	7715 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim **3/10/1995 –** FEMA Flood Claim **2/28/1986 –** FEMA Flood Claim **2/9/1980 –** FEMA Flood Claim
201-0250-037	7701 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim **1/1/2006 –** FEMA Flood Claim
201-0250-039	0 GARDEN HWY	N/A	N/A		NATOMAS CENTRAL MUTUAL WATER CO	**No Flood Reported**
201-0250-040	7651 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0260-011	7027 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0260-013	7021 GARDEN HWY	RAISED	GOOD			**1/1/1997 –** FEMA Flood Claim
201-0260-015	7011 GARDEN HWY	RAISED	GOOD			**2/19/1986 –** FEMA Flood Claim
201-0260-017	7001 GARDEN HWY	N/A	N/A			**No Structure on Property**
201-0260-023	6971 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0260-025	6961 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0260-027	6951 GARDEN HWY	RAISED	GOOD			**12/31/2005 –** FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
201-0260-029	6941 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0260-031	6931 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0260-036	7045 GARDEN HWY	RAISED	GOOD			**5/7/1987 –** FEMA Flood Claim
201-0260-037	7039 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0260-038	7033 GARDEN HWY	N/A	N/A			**No Structure on Property**
201-0260-039	6991 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0260-040	6981 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0260-041	7069 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-033	6687 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-034	6645 GARDEN HWY	RAISED	GOOD			**1/1/1997 –** FEMA Flood Claim
201-0270-042	6805 GARDEN HWY	RAISED	GOOD			**1/3/1997 –** FEMA Flood Claim
201-0270-043	6801 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-044	6735 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-045	6837 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-046	6825 GARDEN HWY	RAISED	GOOD			**1/4/1997 –** FEMA Flood Claim **2/4/1998 –** FEMA Flood Claim
201-0270-049	6601 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-050	6587 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-051	6575 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim **1/11/1995 –** FEMA Flood Claim **2/18/1986 –** FEMA Flood Claim **12/18/1983 –** FEMA Flood Claim
201-0270-055	6535 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-056	6521 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0270-057	6401 GARDEN HWY	RAISED	GOOD			**2/7/1998 –** FEMA Flood Claim **1/4/1997 –** FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
201-0270-058	6409 GARDEN HWY	RAISED	GOOD			**1/5/2006 –** FEMA Flood Claim **2/2/1998 –** FEMA Flood Claim **1/1/1997 –** FEMA Flood Claim **1/1/1996 –** FEMA Flood Claim **3/12/1995 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim **2/19/1986 –** FEMA Flood Claim
201-0270-059	6333 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-060	6301 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0270-069	6576 GARDEN HWY	RAISED	GOOD			**12/18/1983 –** FEMA Flood Claim
201-0270-070	6598 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0280-001	5751 GARDEN HWY	RAISED	GOOD			**12/31/2005 –** FEMA Flood Claim **2/26/1998 –** FEMA Flood Claim **1/22/1997 –** FEMA Flood Claim **1/1/1997 –** FEMA Flood Claim **2/19/1986 –** FEMA Flood Claim
201-0280-003	5871 GARDEN HWY	RAISED	GOOD			**12/31/2005 –** FEMA Flood Claim **1/1/1997 –** FEMA Flood Claim **3/10/1995 –** FEMA Flood Claim **1/11/1995 –** FEMA Flood Claim
201-0280-007	5999 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0280-008	6029 GARDEN HWY	RAISED	GOOD			**1/9/1995 –** FEMA Flood Claim **1/9/1995 –** FEMA Flood Claim
201-0280-010	6047 GARDEN HWY	RAISED	GOOD			**12/27/2005 –** FEMA Flood Claim **1/1/1997 –** FEMA Flood Claim
201-0280-011	6051 GARDEN HWY	RAISED	GOOD			**1/1/1997 –** FEMA Flood Claim **3/10/1995 –** FEMA Flood Claim
201-0280-057	5851 GARDEN HWY	N/A	N/A		STATE OF CALIFORNIA	**No Structure on Property**

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
201-0280-066	6075 GARDEN HWY	RAISED	GOOD			**12/31/2005 –** FEMA Flood Claim
201-0280-068	6057 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0280-069	6053 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
201-0280-072	6041 GARDEN HWY	RAISED	GOOD			**1/1/2006 –** FEMA Flood Claim **12/31/2005 –** FEMA Flood Claim
201-0330-020	5721 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0330-021	0 GARDEN HWY	N/A	N/A			
201-0330-022	5629 GARDEN HWY	RAISED	GOOD			**1/9/1995 –** FEMA Flood Claim
201-0330-023	0 GARDEN HWY	N/A	N/A			
201-0330-024	5601 GARDEN HWY	RAISED	GOOD			**3/2/2006 –** FEMA Flood Claim **2/21/1980 –** FEMA Flood Claim
201-0330-025	5595 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0330-026	5445 GARDEN HWY	N/A	N/A			Elevation Certificate on file
201-0330-027	5311 GARDEN HWY	RAISED	GOOD			**12/31/1996 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim
201-0330-028	5307 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0330-029	5301 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
201-0330-030	5295 GARDEN HWY	RAISED	GOOD			**1/1/1997 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim
201-0330-031	5291 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim **2/13/1995 –** FEMA Flood Claim
201-0330-034	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
201-0330-040	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0010-038	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0090-016	4007 GARDEN HWY	SLAB ON GRADE	GOOD			**No Flood Reported**
225-0090-017	4027 GARDEN HWY	RAISED	GOOD	House		Elevation Certificate on file

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
				Demolished		
225-0090-018	0 GARDEN HWY	N/A	N/A		RECLAMATION DISTRICT 1000	**No Structure on Property**
225-0090-019	4061 GARDEN HWY	SLAB ON GRADE	GOOD			**1/2/1997 –** FEMA Flood Claim **1/1/1997 –** FEMA Flood Claim
225-0090-020	4075 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0090-021	4101 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0090-022	4111 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0090-027	4161 GARDEN HWY	SLAB ON GRADE	GOOD			**12/31/2005 –** FEMA Flood Claim **1/2/1997 –** FEMA Flood Claim
225-0090-028	4171 GARDEN HWY	SLAB ON GRADE	GOOD			**12/27/2005 –** FEMA Flood Claim **2/18/1986 –** FEMA Flood Claim
225-0090-029	4181 GARDEN HWY	SLAB ON GRADE	GOOD			**1/2/1997 –** FEMA Flood Claim **2/18/1986 –** FEMA Flood Claim
225-0090-031	4201 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0090-032	4201 GARDEN HWY	N/A	N/A			Elevation Certificate on file
225-0090-033	4209 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0090-034	4221 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0090-035	4780 GARDEN HWY	N/A	N/A		SACRAMENTO AREA FLOOD CONTROL AGENCY	**No Structure on Property**
225-0090-045	4229 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0090-046	4233 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0090-047	0 GARDEN HWY	N/A	N/A			
225-0090-048	0 GARDEN HWY	N/A	N/A			
225-0090-052	4251 GARDEN HWY	RAISED	GOOD			**1/3/1997 –** FEMA Flood Claim **2/19/1986 –** FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
225-0090-053	4237 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0090-054	4141 GARDEN HWY	SLAB ON GRADE	GOOD			**1/2/1997 –** FEMA Flood Claim **1/9/1995 –** FEMA Flood Claim **2/18/1986 –** FEMA Flood Claim
225-0090-055	4145 GARDEN HWY	SLAB ON GRADE	GOOD			**1/2/1997 –** FEMA Flood Claim **2/18/1986 –** FEMA Flood Claim
225-0090-073	4153 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0102-011	4625 GARDEN HWY	RAISED	GOOD			**12/31/2005 –** FEMA Flood Claim
225-0102-013	4601 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
225-0102-024	4537 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0102-029	4477 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0102-030	4475 GARDEN HWY	SLAB ON GRADE	GOOD			**2/17/1986 –** FEMA Flood Claim **11/15/1983 –** FEMA Flood Claim **1/13/1980 –** FEMA Flood Claim
225-0102-031	4473 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0102-033	4471 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0102-034	4465 GARDEN HWY	SLAB ON GRADE	GOOD			**No Flood Reported**
225-0102-037	4435 GARDEN HWY	SLAB ON GRADE	GOOD			Elevation Certificate on file
225-0102-043	4341 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
225-0102-045	4321 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim **3/8/1995 –** FEMA Flood Claim
225-0102-047	4290 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
225-0102-052	4455 GARDEN HWY	SLAB ON GRADE	GOOD			Elevation Certificate on file
225-0102-053	0 GARDEN HWY	N/A	N/A			**No Structure on Property**

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
225-0102-054	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
225-0102-055	4603 GARDEN HWY	RAISED	GOOD	Elevated		**1/2/1997 –** FEMA Flood Claim **3/9/1995 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim **2/18/1986 –** FEMA Flood Claim **1/27/1983 –** FEMA Flood Claim **2/22/1981 –** FEMA Flood Claim **1/15/1980 –** FEMA Flood Claim
225-0102-056	0 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
225-0102-058	4309 GARDEN HWY	N/A	N/A		COUNTY	**11/18/1996 -** Garden Highway Residences Demolition And Site Restoration **1/9/1995 –** FEMA Flood Claim
225-0102-059	4301 GARDEN HWY	N/A	N/A		COUNTY	**No Structure on Property**
225-0102-060	4559 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0102-061	4559 GARDEN HWY	RAISED	GOOD			**2/19/1986 –** FEMA Flood Claim
225-0110-001	3771 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0110-001	3771 GARDEN HWY	SLAB ON GRADE	GOOD			**No Flood Reported**
225-0110-002	3777 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0110-003	3721 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0110-004	3791 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0110-005	3815 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0110-006	3831 GARDEN HWY	SLAB ON GRADE	GOOD			**No Flood Reported**
225-0110-007	3843 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim **2/19/1986 –** FEMA Flood Claim
225-0110-008	3853 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
						2/18/1986 – FEMA Flood Claim
225-0110-011	3947 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0110-012	3957 GARDEN HWY	SLAB ON GRADE	GOOD			**No Flood Reported**
225-0110-055	3901 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0110-057	3941 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0190-007	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0190-010	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0200-001	3001 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0200-002	3017 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0200-003	3025 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0200-004	3031 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim
225-0200-005	3039 GARDEN HWY	RAISED	GOOD			**1/3/1997 –** FEMA Flood Claim
225-0200-008	3061 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0200-009	3067 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0200-010	3071 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim **2/13/1995 –** FEMA Flood Claim **4/5/1983 –** FEMA Flood Claim
225-0200-011	3077 GARDEN HWY	SLAB ON GRADE	GOOD			**12/22/1982 –** FEMA Flood Claim **12/23/1981 –** FEMA Flood Claim **2/20/1980 –** FEMA Flood Claim
225-0200-012	3083 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0200-013	3099 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0200-020	3101 GARDEN HWY	RAISED	GOOD			**1/1/1997 –** FEMA Flood Claim **1/29/1993 –** FEMA Flood Claim
225-0200-021	0 GARDEN HWY	RAISED	GOOD			
225-0200-022	3051 GARDEN HWY	RAISED	GOOD			**2/15/1980 –** FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
225-0200-023	3045 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0200-027	3131 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0200-028	3121 GARDEN HWY	RAISED	GOOD			**1/3/1997 –** FEMA Flood Claim **2/18/1986 –** FEMA Flood Claim **2/17/1986 –** FEMA Flood Claim **1/4/1982 –** FEMA Flood Claim
225-0200-031	3111 GARDEN HWY	RAISED	GOOD			**12/31/2005 –** FEMA Flood Claim **1/2/1997 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim **3/25/1983 –** FEMA Flood Claim
225-0200-032	3107 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0210-030	2945 GARDEN HWY	RAISED	GOOD			**1/1/1997 –** FEMA Flood Claim **3/10/1995 –** FEMA Flood Claim
225-0210-031	2931 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0210-032	2915 GARDEN HWY	N/A	N/A			**1/1/2000 –** Structure demoed (D-0018700)
225-0210-035	2611 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0210-036	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0210-042	2847 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0210-043	2851 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0210-044	2827 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0210-045	2817 GARDEN HWY	RAISED	GOOD			**4/4/2006 –** FEMA Flood Claim
225-0210-046	2733 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0210-047	2707 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0210-048	2633 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0260-001	3651 GARDEN HWY	RAISED	GOOD			**2/17/1986 –** FEMA Flood Claim
225-0260-002	0 GARDEN HWY	N/A	N/A			**No Structure on Property**

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
225-0260-003	3575 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0260-004	3563 GARDEN HWY	RAISED	GOOD			**12/31/2005 –** FEMA Flood Claim **2/17/1986 –** FEMA Flood Claim
225-0260-005	3551 GARDEN HWY	RAISED	GOOD			**12/31/2005 –** FEMA Flood Claim **1/6/1997 –** FEMA Flood Claim
225-0260-006	3505 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0260-007	3445 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0260-008	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0260-009	3337 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0260-013	3333 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0260-014	3201 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
225-0360-001	4001 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim
225-0360-002	3997 GARDEN HWY	RAISED	GOOD			**4/4/2006 –** FEMA Flood Claim **12/27/2005 –** FEMA Flood Claim **10/19/1998 –** FEMA Flood Claim **1/2/1997 –** FEMA Flood Claim
225-0360-003	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0360-011	3981 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
225-0360-013	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
225-0360-014	3963 GARDEN HWY	SLAB ON GRADE	GOOD			Elevation Certificate on file
225-0360-015	3973 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0021-003	1841 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0021-004	1851 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0021-005	1861 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0021-006	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0021-007	1911 GARDEN HWY	RAISED	GOOD			**No Flood Reported**

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
274-0021-008	1951 GARDEN HWY	RAISED	GOOD			**2/18/1986** – FEMA Flood Claim **1/2/1997** – FEMA Flood Claim
274-0021-009	1957 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim
274-0021-010	1963 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
274-0021-015	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0030-008	1715 GARDEN HWY	RAISED	GOOD			1/2/1997 – **FEMA Flood Claim**
274-0030-050	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0030-056	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0030-071	1661 GARDEN HWY	RAISED	GOOD			
274-0220-024	2125 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0220-025	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0220-045	2145 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0220-056	1995 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0220-062	2111 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0220-063	1977 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0220-064	0 GARDEN HWY	N/A	N/A		CITY OF SACRAMENTO	**No Structure on Property**
274-0220-065	0 GARDEN HWY	N/A	N/A		CITY OF SACRAMENTO	**No Structure on Property**
274-0220-066	2005 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0250-017	2375 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim **3/10/1995** – FEMA Flood Claim **1/10/1995** – FEMA Flood Claim **2/17/1986** – FEMA Flood Claim
274-0250-018	2385 GARDEN HWY	RAISED	GOOD			1/3/1997 – **FEMA Flood Claim**
274-0250-019	2395 GARDEN HWY	RAISED	GOOD			**1/2/2006** – FEMA Flood Claim **1/4/1997** – FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
						2/18/1986 – FEMA Flood Claim **1/13/1980** – FEMA Flood Claim
2740250-021	2427 GARDEN HWY	SLAB ON GRADE	GOOD			Elevation Certificate on file
274-0250-024	2493 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
274-0250-025	2501 GARDEN HWY	RAISED	GOOD			**1/2/1997 –** FEMA Flood Claim **12/31/1996 –** FEMA Flood Claim **3/11/1995 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim **3/11/1986 –** FEMA Flood Claim **2/19/1986 –** FEMA Flood Claim **12/26/1983 –** FEMA Flood Claim **12/28/1982 –** FEMA Flood Claim **1/4/1982 –** FEMA Flood Claim **2/20/1980 –** FEMA Flood Claim **1/3/1980 –** FEMA Flood Claim
2740250-026	2517 GARDEN HWY	SLAB ON GRADE	GOOD			Elevation Certificate on file
274-0250-027	2521 GARDEN HWY	SLAB ON GRADE	GOOD			**12/31/1996 –** FEMA Flood Claim
274-0250-029	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0250-030	2575 GARDEN HWY	RAISED	GOOD			**12/31/1996 –** FEMA Flood Claim
274-0250-031	2589 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0250034	2481 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0250-035	2483 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0250-041	2399 GARDEN HWY	RAISED	GOOD			**1/1/2006 –** FEMA Flood Claim **1/2/1997 –** FEMA Flood Claim **3/9/1986 –** FEMA Flood Claim **4/11/1982 –** FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
						1/15/1980 – FEMA Flood Claim
274-0250-044	2531 GARDEN HWY	SLAB ON GRADE	GOOD			Elevation Certificate on file
274-0250-045	2541 GARDEN HWY	SLAB ON GRADE	GOOD			**No Flood Reported**
274-0260-009	0 GARDEN HWY	RAISED	GOOD		PACIFIC GAS & ELECTRIC	**No Flood Reported**
274-0260-013	2331 GARDEN HWY	RAISED	GOOD			**1/10/1995** – FEMA Flood Claim **1/13/1980–** FEMA Flood Claim
274-0260-014	2315 GARDEN HWY	RAISED	GOOD	Elevated		Elevation Certificate on file
274-0260-015	2305 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0260-016	2295 GARDEN HWY	RAISED	GOOD			**1/2/1995** – FEMA Flood Claim
274-0260-017	2281 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0260-019	2271 GARDEN HWY	RAISED	GOOD			**4/3/2006 –** FEMA Flood Claim **12/31/2005 –** FEMA Flood Claim **1/2/1997** – FEMA Flood Claim **1/6/1996** – FEMA Flood Claim
274-0260-020	2261 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0260-021	2251 GARDEN HWY	SLAB ON GRADE	GOOD			Elevation Certificate on file
274-0260-022	2231 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
274-0260-023	2221 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
274-0260-024	2211 GARDEN HWY	RAISED	GOOD			**12/31/1996** – FEMA Flood Claim
274-0260-025	2197 GARDEN HWY	RAISED	GOOD			**3/1/1993** – FEMA Flood Claim
274-0260-026	2191 GARDEN HWY	N/A	N/A			Elevation Certificate on file
274-0260-035	2365 GARDEN HWY	RAISED	GOOD			**1/2/1997** – FEMA Flood Claim **3/10/1986** – FEMA Flood Claim **2/18/1986** – FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
274-0260-036	2345 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0260-040	2181 GARDEN HWY	RAISED	GOOD			Elevation Certificate on file
274-0270-006	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0420-001	1807 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-003	1811 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-004	1813 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-005	1815 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-006	1817 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-007	1819 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-008	1821 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-009	1823 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-010	1825 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-011	1827 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-012	1829 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-013	1831 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0420-014	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0420-016	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0680-015	1635 GARDEN HWY	RAISED	GOOD			**No Flood Reported**
274-0690-001	0 GARDEN HWY	N/A	N/A			**No Structure on Property**
274-0690-002	0 GARDEN HWY	N/A	N/A			**No Structure on Property**

Appendix 18

REPETITIVE LOSS AREA 18
LEONA CIRCLE

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 18

TABLE OF CONTENTS

A18.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 18, one of the twenty-eight (28) designated RLAs within the Sacramento County. The Area 18 analysis includes properties on Leona Circle as defined by **Figure A18**.

A18.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A18.3 PROBLEM STATEMENT

The location of Area 18 is located is located Natomas off of El Centro between Arena Boulevard and San Juan Road. East of Leona Circle is West Drainage Canal which is designed to take local drainage to the Sacramento River. The topography is this area is relatively flat and is generally sloping east towards the canal. Additionally, Area 18 is located in a rural portion of the County which depends on ditches and culverts to provide positive drainage.

The source of flooding for Area 18 is caused by local drainage. Runoff from the adjacent areas collects in ditches and is conveyed toward the canal. During large storm events the ditches are overtopped and the drainage starts to sheet flow causing a wide floodplain. However, the floodplain is shallow.

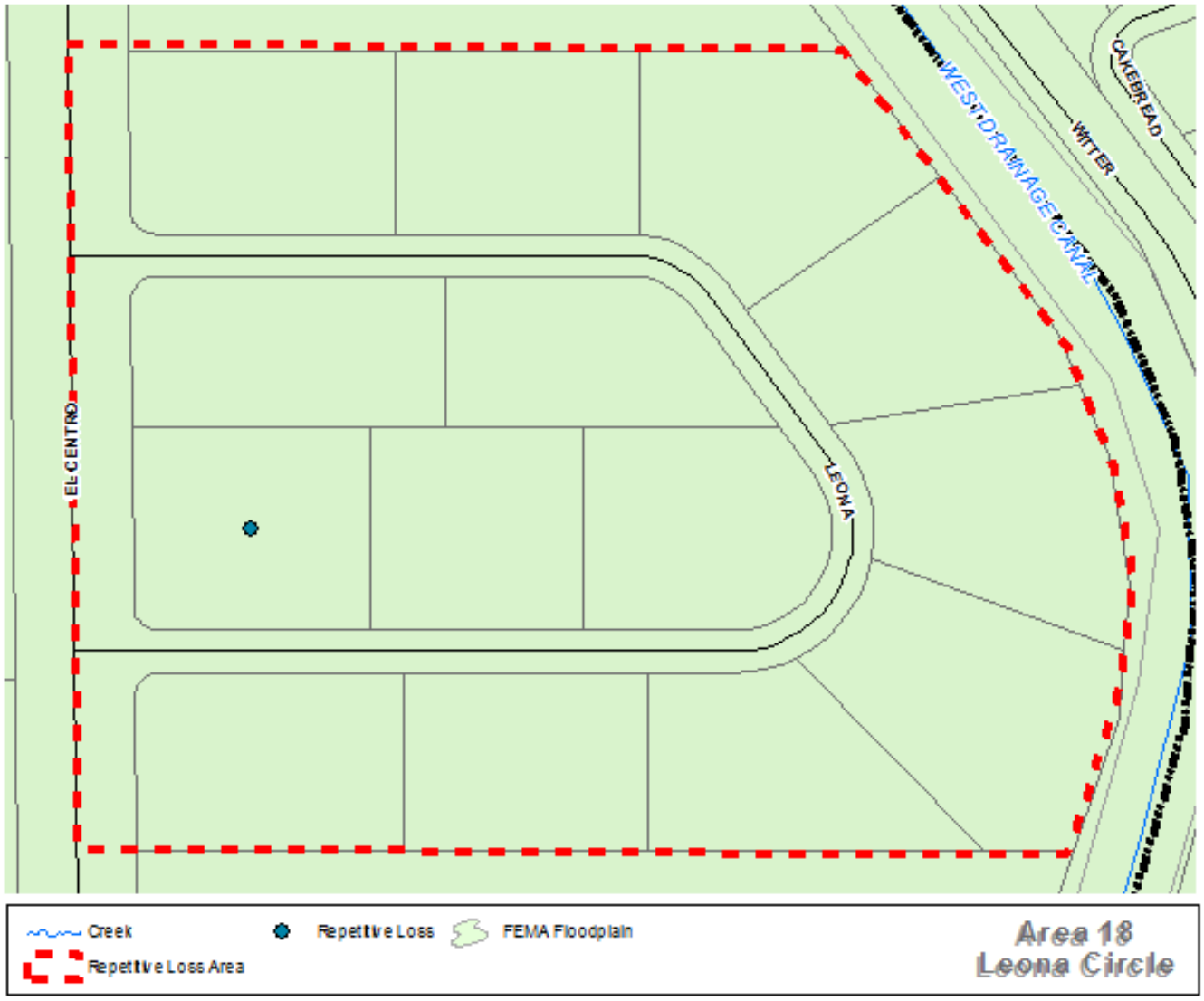
There are 14 properties which include buildings on FEMA's repetitive loss list, historical loss properties or nearby buildings that may have the same or similar flooding conditions. No properties have been acquired as part of the Hazard Mitigation Grant Program (HMGP).

A18.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), there are no projects to improve this area. However, private land developers have submitted a Planning Application seeking to redevelop this area.

The primary methods of property protection are to elevate structures above existing grades or damage prone components, dry flood proof, wet flood proof portions of the building, or acquire and demolish structures at grade.

FIGURE A18
Repetitive Loss Area #18



A18.5 DATA COLLECTION

The Sacramento County study for Repetitive Loss for Area 18 was utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- Sacramento County - Repetitive Loss documentation (2009)

A18.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) thirteen (13) properties are within the RLA are within the 100-year FEMA floodplain. The levees surrounding Natomas have been decertified by US Army Corps of Engineers (USACE) and de-accredited by FEMA. The resulting FEMA floodplain is the maximum stage in the Sacramento or American River project across Natomas. However, US Congress has authorized the USACE to improve the levees, which result in a FEMA floodplain zone change from Zone AE to Zone A99.

A18.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that none of the overall 13 properties within Leona Circle RLA had reported flooding.

A18.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed for the preparation of this report. This inspection was performed from public right-of-way. As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.

A18.5.4 Types of Foundations

The most common type of foundations within the Leona Circle RLA is slab on grade, which constitutes 80% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A18.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for acquisition of properties and further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources through FMA and property owners to elevate homes.
- **Timeline:** As opportunities and funding becomes available
- **Potential Funding:** State and/or Federal Grants

DATA ANALYSIS SUMMARY

NATOMAS BASIN

AREA 18

LEONA CIRCLE

NATOMAS BASIN

DATA ANALYSIS SUMARY

PROPERTIES	**14**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*13*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 2
  - SLAB ON GRADE 8
- NO STRUCTURES
  - PRIVATELY OWNED 4

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
225-0131-009	3200 LEONA CR	N/A	N/A			**No Structure on Property**
225-0132-005	3201 LEONA CR	SLAB OF GRADE	GOOD			**3/20/1995** – FEMA Flood Claim **1/9/1995** – FEMA Flood Claim
225-0132-004	3217 LEONA CR	N/A	N/A			**No Structure on Property**
225-0131-008	3220 LEONA CR	RAISED	GOOD			Elevation Certificate on file
225-0132-003	3237 LEONA CR	N/A	N/A			**No Structure on Property**
225-0131-007	3240 LEONA CR	SLAB ON GRADE	FAIR			**No Flood Reported**
225-0131-006	3260 LEONA CR	N/A	N/A			**No Structure on Property**
225-0131-005	3280 LEONA CR	SLAB OF GRADE	GOOD			**No Flood Reported**
225-0131-004	3300 LEONA CR	SLAB ON GRADE	GOOD			**No Flood Reported**
225-0131-003	3320 LEONA CR	SLAB ON GRADE	GOOD			**No Flood Reported**
225-0132-002	3337 LEONA CR	RAISED	GOOD			**No Flood Reported**
225-0131-002	3340 LEONA CR	SLAB ON GRADE	GOOD			**No Flood Reported**
225-0132-008	3357 LEONA CR	SLAB ON GRADE	FAIR			**No Flood Reported**
225-0131-001	3360 LEONA CR	RAISED	GOOD			**No Flood Reported**

Appendix 19

REPETITIVE LOSS AREA 19
TANGERINE AVENUE

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 19

TABLE OF CONTENTS

A19.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 19, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 19 analysis includes properties on Persimmon Avenue and Tangerine Avenue as defined by **Figure A19**.

A19.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A19.3 PROBLEM STATEMENT

Area 19 is located in South Sacramento between Florin and Elder Creeks. Flooding in this area generally occurs between October and April during the rainy season. During large storm events the drainage system becomes overwhelmed and begins to discharge onto the streets, which eventually drains to the creek. However, according to the best available topographic data and staff observations, the parcels experiencing flooding are built lower than the roadway. Therefore, street flooding is spilling onto the parcels in the RLA.

There are three (3) properties which include buildings on FEMA's repetitive loss list, historical loss properties or nearby buildings that may have the same or similar flooding conditions. None of the properties in Area 19 have been mitigated for flooding.

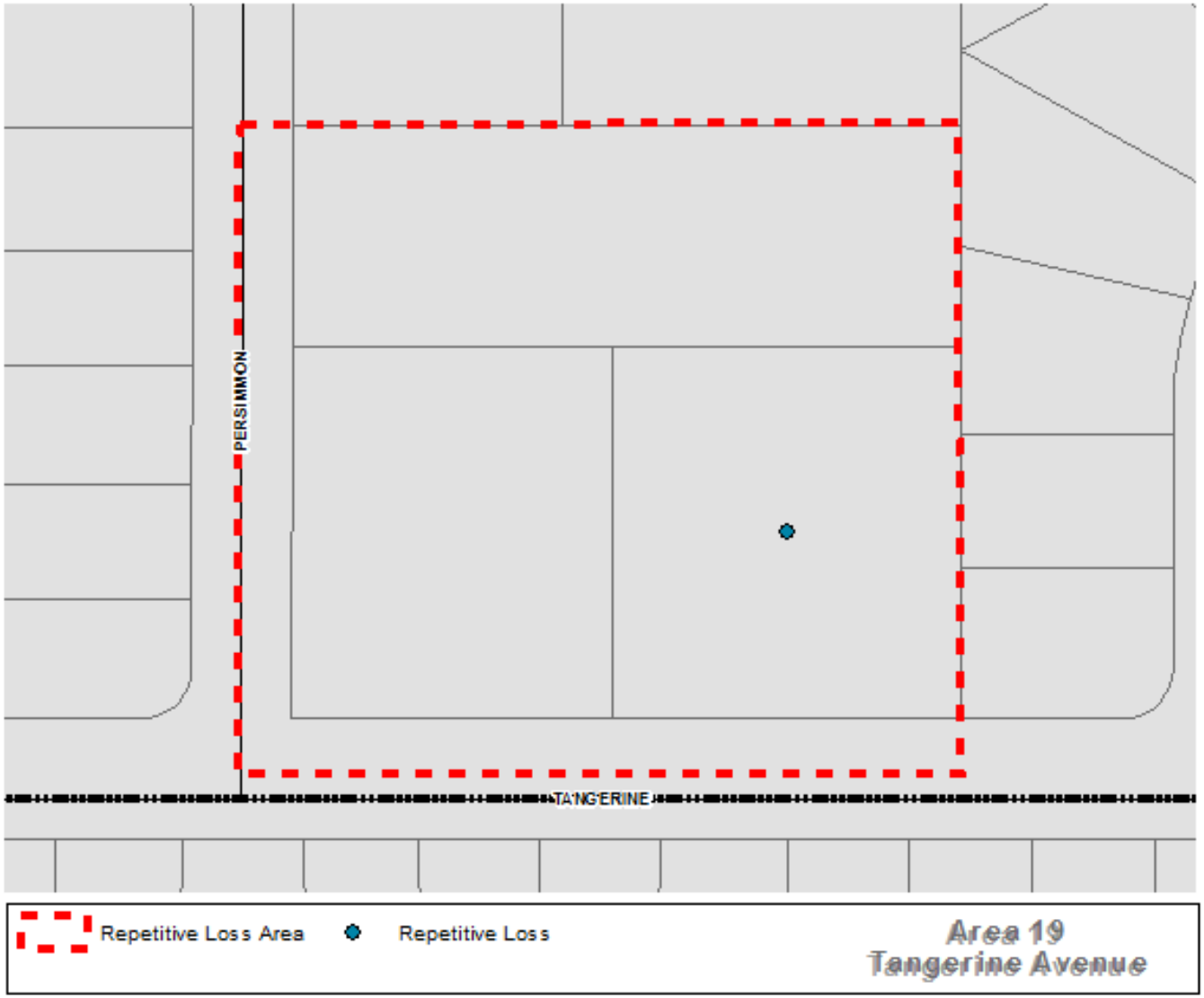
A19.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- SAFCA – Franklin-Boyce Detention Basin

The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

FIGURE A19
Repetitive Loss Area #19



A19.5 DATA COLLECTION

The State of California – Department of Water Resources Central Valley Flood Evaluation and Delineation LiDAR (dated 2008) was utilized in this analysis.

A19.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) none of the properties in Area 19 are within the 100-year FEMA floodplain.

A19.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that two (2) of the overall three (3) properties are within Area 19.

A19.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed by County staff. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A19.5.4 Types of Foundations

The most common type of foundations in Area 19 is a slab on grade foundation, which constitutes 100% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A19.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for acquisition of flood prone properties. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

FLORIN AND ELDER CREEK WATERSHEDS

AREA 19

PERSIMMON AVENUE

TANGERINE AVENUE

FLORIN AND ELDER CREEK WATERSHEDS

DATA ANALYSIS SUMARY

PROPERTIES	**3**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*2*

- EXISTING STRUCTURES (UNMITIGATED)
  - o RAISED FOUNDATIONS 0
  - o SLAB ON GRADE 3
- NO STRUCTURES
  - o PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
050-0500-048	5615 TANGERINE AV	SLAB ON GRADE	GOOD			**No Flood Reported**
050-0500-047	5625 TANGERINE AV	SLAB ON GRADE	GOOD	County Project	Owner would like County to provide drainage across neighboring property	**12/20/2001** - Contract work by North Star Construction via Purchase Order included one (1) 48" SDMH, Two (2) Type 'B' drain inlets, one (1) Type 'D' drain inlet and approximately 77 L.F. C900 DR18 pipe to help lessen garage flooding at this address. In addition, Field Instruction No. 1 authorized the installation of a 12" drain inlet in the driveway with 22 L.F. of 8" pipe connecting to the Type 'D' drain inlet installed at edge of driveway. **9/5/2000** - flooding to attached garage and water under house are yearly events. Additionally, during heavy storms, flooding depths are as follows: Laundry room 2"; detached garage 1"; shop 1".
050-0500-046	7585 PERSIMMON AV	SLAB ON GRADE	GOOD			**No Flood Reported**

Appendix 20

REPETITIVE LOSS AREA 20
TREEHOUSE LANE

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 20

TABLE OF CONTENTS

A20.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 20, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 20 analysis includes twelve (12) parcels as defined by **Figure A20**.

A20.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A20.3 PROBLEM STATEMENT

The location of Area 20 is located north of the American River between Eastern Avenue and Watt Avenues. The subdivisions built in this area occurred between the 1940's to the 1990's, with the majority of the development taking place around the 1950's. During this time, it was a very common practice to direct drainage to the natural flow path, which included drainage pipes between parcels, drainage pipes discharging overland and re-entering into drainage pipes, drainage pipes decreasing is size downstream to regulate flow, and variety of other unique schemes.

The source of flooding was primarily caused by large storm events that overwhelmed the drainage system and begins to discharge onto the surface, which eventually drains between parcels. The structures in Area 20 are adjacent to the overland release and are built low enough for potential flooding. Reported damages occurred in 1994 and 1995.

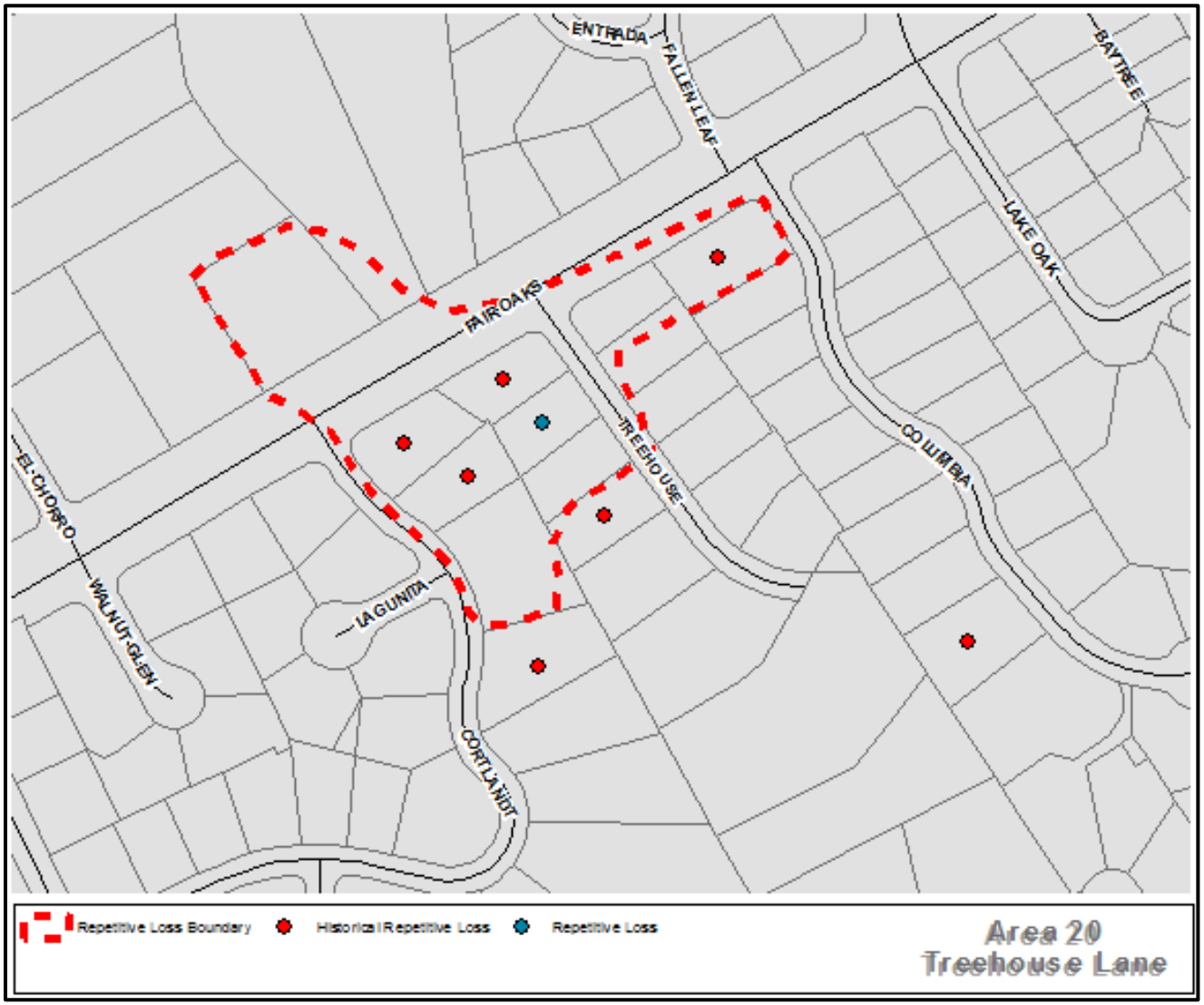
There are twelve (12) properties which include buildings on FEMA's repetitive loss list, historical loss properties or nearby buildings that may have the same or similar flooding conditions. No properties have been mitigated in Area 20.

A20.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), no projects are proposed that would impact flooding in Area 20.

The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

FIGURE A20
Repetitive Loss Area #20



A20.5 DATA COLLECTION

The State of California – Department of Water Resources Central Valley Flood Evaluation and Delineation LiDAR (dated 2008) was utilized in this analysis.

A20.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) none of the properties in Area 20 are within the 100-year FEMA floodplain.

A20.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that seven (8) of the overall twelve (12) properties within Area 20 have reported flooding.

A20.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in 1994 and 1995. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A20.5.4 Types of Foundations

The most common type of foundations within Area 20 is slab on grade, which constitutes of 100% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A20.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for acquisition of flood prone properties. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

HAGGINBOTTOM WATERSHED

AREA 20

COLUMBIA DRIVE

CORTLANDT DRIVE

FAIR OAKS BOULEVARD

TREEHOUSE LANE

AMERICAN RIVER WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**12**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*7*
REPETITIVE LOSS AREA PROPERTIES	*4*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 12
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
288-0362-008	4175 FAIR OAKS BL	SLAB ON GRADE	GOOD			**No Record of Flooding**
288-0362-007	4181 FAIR OAKS BL	SLAB ON GRADE	GOOD			**No Record of Flooding**
292-0161-010	721 COLUMBIA DR	SLAB ON GRADE	GOOD			**Jan-1995** – Flooded in garage, depth is 0.5 inch.
292-0174-028	837 COLUMBIA DR	SLAB ON GRADE	GOOD			**Jan-1995** – Flooded in residence, depth unknown. Garage and office flooded 2 inches
292-0162-014	744 CORTLANDT DR	SLAB ON GRADE	GOOD			**Jan-1995** – Flooded in residence, depth unknown.
292-0162-015	750 CORTLANDT DR	SLAB ON GRADE	GOOD			**No Record of Flooding**
292-0162-016	756 CORTLANDT DR	SLAB ON GRADE	GOOD			**Jan-1995** - House flooded. Depth of flooding is unknown.
292-0162-021	760 CORTLANDT DR	SLAB ON GRADE	GOOD			**1/9/1995** - House flooded 15",yard and pool flooded **1/1/2006** – Street flooding
292-0173-004	807 TREEHOUSE LN	SLAB ON GRADE	GOOD			**1/9/1995** - Flood 2" in storage shed and backyard.
292-0173-003	813 TREEHOUSE LN	SLAB ON GRADE	GOOD			**No Record of Flooding**
292-0173-002	819 TREEHOUSE LN	SLAB ON GRADE	GOOD			**Jan-1995** – FEMA flood claim Oct-1994 – FEMA flood claim
292-0173-012	825 TREEHOUSE LN	SLAB ON GRADE	GOOD			**Jan-1995** – Flooded in residence and pool 10-15 inches

Appendix 21

REPETITIVE LOSS AREA 21
RIO LINDA DRY CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 21

TABLE OF CONTENTS

A21.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 21, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 21 analysis includes properties on U Street and 24th Street in Rio Linda defined by **Figure A21**.

A21.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A21.3 PROBLEM STATEMENT

The location of Area 20 is generally south of U street and along 24th Street.

A strong frontal system moved from the Pacific Ocean through California from January 4 through 15. This storm caused damages throughout the state. It was particularly severe in Sacramento County where the slow, west to east movement of the frontal system temporarily stopped, positioning the front over and in line with the American River in Sacramento County. While the front stalled, the rain-producing flow along the front from the southwest continued to dump moisture in roughly the same area, resulting in extraordinary rainfall depths in the area.[1]

The source of flooding was primarily identified Dry Creek out of bank flooding in older residential areas constructed prior to NFIP requirements.

There are 19 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions. Three of the properties were mitigated by elevating the structures.

A21.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- Sacramento Area Flood Control Agency (SAFCA) Flood Control Program
- Dry Creek Parkway Project

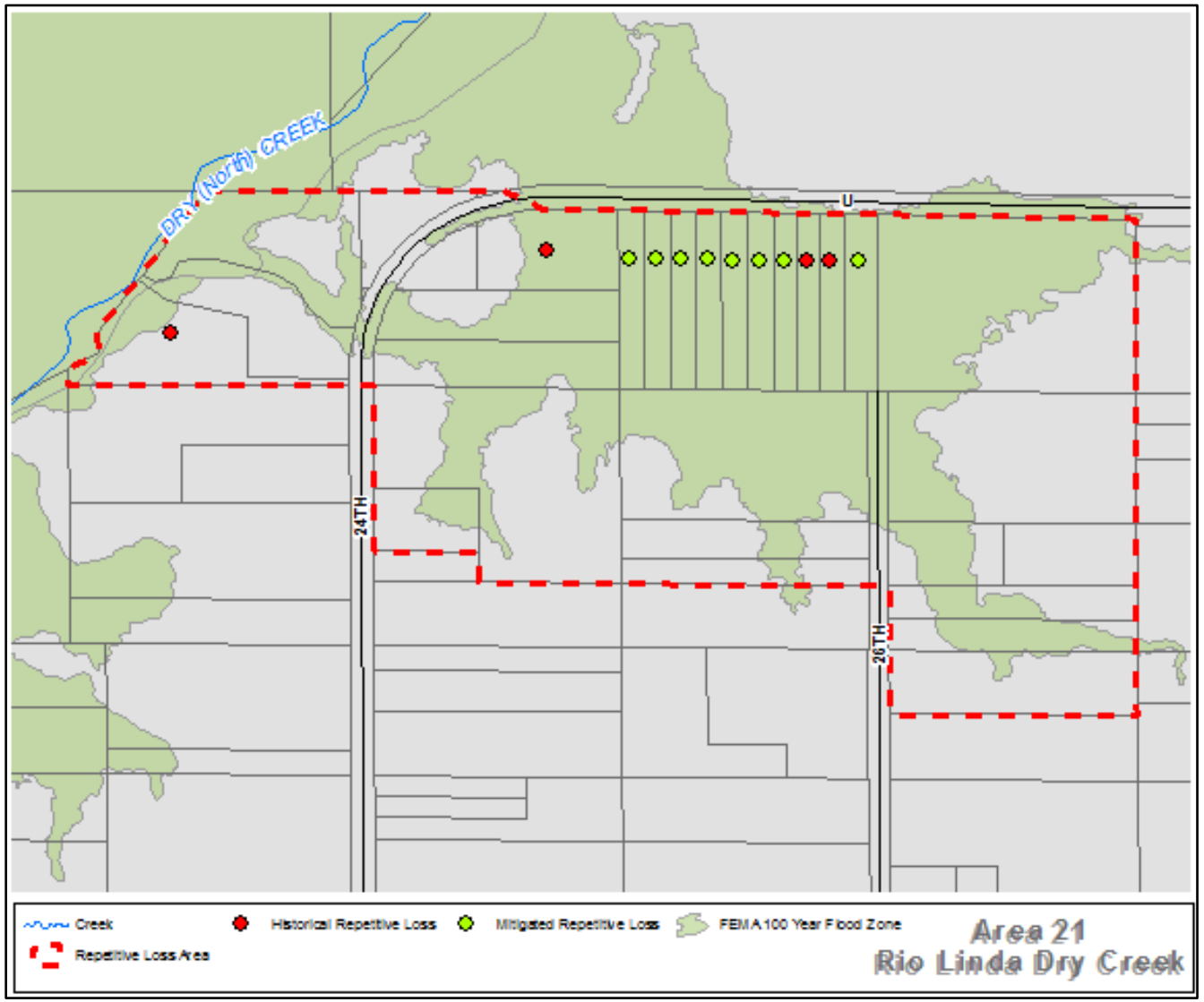
The primary methods of property protection are:

- Home Elevation – Is your floor below the elevation of the floodplain? If so, it may be prudent to elevate the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, the County has utilized FEMA grant money for dozens of qualified elevation projects.

[1] District Engineer, Placer County Flood Control and Water Conservation District, 11444 B Avenue, Auburn CA, 95603

- Site Modification – Would a small wall, berm, or other site specific grading help keep water out of your house? Often, modification of the area around your home may be appropriate to minimize flooding depending on the depth of floodwater and site specific constraints.
- Temporary Flood Barriers – Perhaps sandbags or other barriers could be employed on site in advance of a storm to help keep water out.

FIGURE A21
Repetitive Loss Area #21



A21.5 DATA COLLECTION

Sacramento County Plans and studies for Dry Creek were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- 2003 Dry Creek Watershed Coordinated Resources Management Plan (DCC, HLA, Swanson, ECORP)
- Dry Creek Watershed Plan Update

A21.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) XXX properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when when Out of bank flooding may occur in older residential areas. The Sacramento County Local Floodplain does not cover this RLA,

A21.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 10 of the overall 19 properties within the Dry Creek RLA had reported flooding.

A21.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A21.5.4 Types of Foundations

The most common type of foundations within the Rio Linda Dry Creek RLA is raised, which constitutes 83% of the two common foundations found in this Sacramento County RLA (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A21.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for HMGP The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

RIO LINDA DRY CREEK

AREA 21

24TH STREET

U STREET

RIO LINDA DRY CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**19**
REPETITIVE LOSS PROPERTIES	*3*
HISTORICAL LOSS PROPERTIES	*9*
REPETITIVE LOSS AREA PROPERTIES	*7*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 7
  - SLAB ON GRADE 3
- NO STRUCTURES
  - PRIVATELY OWNED 1

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION) 8

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
208-0011-005	7500 24TH ST	SLAB ON GRADE	GOOD			**No Flood Reported**
207-0061-063	7501 24TH ST	SLAB ON GRADE	GOOD			**FEMA Flood Claim**: 1/10/1995
208-0011-004	7512 24TH ST	RAISED (Motor Home)	GOOD			**No Flood Reported**
208-0011-002	7520 24TH ST	SLAB ON GRADE	GOOD			**No Flood Reported**
207-0061-064	7521 24TH ST	RAISED	GOOD			**No Flood Reported**
207-0061-065	7549 24TH ST	RAISED	GOOD			**No Flood Reported**
208-0011-001	7551 24TH ST	RAISED	GOOD			**No Flood Reported**
208-0011-022	0 24TH ST	N/A	N/A			**No Structure**
208-0011-003	2428 U ST	RAISED	GOOD			**1/1/1995** – House flooded a depth of 6". Garage flooded a depth of 12".
208-0011-032	2500 U ST	RAISED	GOOD	Home Elevated		**6/2000 -** Raise Foundation Per H.MG.P. CASE **11/20/1999 –** Flood Damage repairs **1/22/1997** –Garage flooded a depth of 18". **FEMA Flood Claim: 1/10/1995**
208-0011-033	2510 U ST	RAISED	GOOD	Home Elevated		**11/20/1999 -** Flood Repair, Raise Foundation **1/22/1997 –**Garage flooded a depth of 12".

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
208-0011-034	2516 U ST	RAISED	GOOD	Home Elevated		**11/20/1999 -** Flood Repair, Raise Foundation **1/22/1997** –Garage flooded a depth of 14”. **1/1/1995** – House flooded a depth of 44”. Garage flooded a depth of 67”.
208-0011-035	2520 U ST	RAISED	GOOD	Home Elevated		**10/2000 -** Raise Foundation Per H.MG.P. CASE **1/22/1997** –Garage flooded a depth of 12”. **FEMA Flood Claim:** 1/23/1997 **FEMA Flood Claim:** 1/10/1995
208-0011-036	2524 U ST	RAISED	GOOD	Home Elevated		**6/2000 -** Raise Foundation Per H.MG.P. CASE **1/22/1997** –Garage flooded a depth of 12”. **FEMA Flood Claim:** 1/10/1995 **FEMA Flood Claim:** 2/17/1986
208-0011-031	2528 U ST	RAISED	GOOD	Home Elevated		**FEMA Flood Claim:** 7/14/2010 **10/2000 -** Raise Foundation Per H.MG.P. CASE **1/22/1997** –Garage flooded a depth of 12”.

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
208-0011-037	2534 U ST	RAISED	GOOD	Home Elevated		**6/2000 -** Raise Foundation Per H.MG.P. CASE **1/22/1997** –Garage flooded a depth of 12” **1/1/1995** – House flooded a depth of 54”. Garage flooded a depth of 78”.
208-0011-038	2540 U ST	RAISED	GOOD			**11/20/1999 -** Flood Repair **6/18/1998 -** CONFIDENTIAL flood site list **1/22/1997** –Garage flooded a depth of 12”
208-0011-039	2546 U ST	RAISED	GOOD			**1/22/1997** –Garage flooded a depth of 12”
208-0011-040	2552 U ST	RAISED	GOOD	Home Elevated		**6/2000 -** Raise Foundation Per H.MG.P. CASE **1/22/1997** –House flooded a depth of 12” **1/1/1995** – House flooded a depth of 42”. Garage flooded a depth of 54”

Appendix 22

REPETITIVE LOSS AREA 22

NORTH NATOMAS
EAST MAIN DRAIN CANAL

(NEMDC Tributaries)

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 22

TABLE OF CONTENTS

A22.1 REPETITIVE LOSS AREA 22

This Report focuses on Area 22, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 22 analyses includes properties on 2nd Street, 4th Street, 6th Street, Burr Avenue, E. Levee Road, El Modena Avenue, M Street, Marysville Boulevard, Q Street, Rio Linda Boulevard, Schandoney Avenue, Sorento Road, Straugh Road, and W Street as defined by **Figure A22**.

A22.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A22.3 PROBLEM STATEMENT

The location of Area 22 is located east of the Natomas East Main Drainage Canal (NEMDC) and north of Elkhorn Boulevard to the County boundary. Floods in this watershed generally occur from October through April. The floods are usually caused by a combination of prolonged rainfall leading to saturated soils, and a short period of one to six hours of intense precipitation associated with frontal convection or severe thunderstorms. The source of flooding was primarily identified as the North NEMDC Tributary floodplain are caused by high stages exceeding the channel banks and flooding older residential areas constructed prior to NFIP requirements.

NEMDC Tributary Canal has an extensive record of flood conditions. Damaging floods occurred in December 1955, April 1958, October 1962, December 1964, March 1983 and February 1986. The floods of 1983 and 1986 were the largest and most damaging on record before 1992. Hydrologic studies have shown that the recurrence interval of the March 1983 flood was approximately 10 years and the recurrence interval of the February 1986 flood was from 50 to 100 years, depending on the specific location in the watershed. Six flood events also occurred in in January 1995, January 1997, February 1998, and December 2005, with the 1995 flood event causing extensive damage.

There are 99 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions. One property has been elevated as part of the Hazard Mitigation Grant Program.

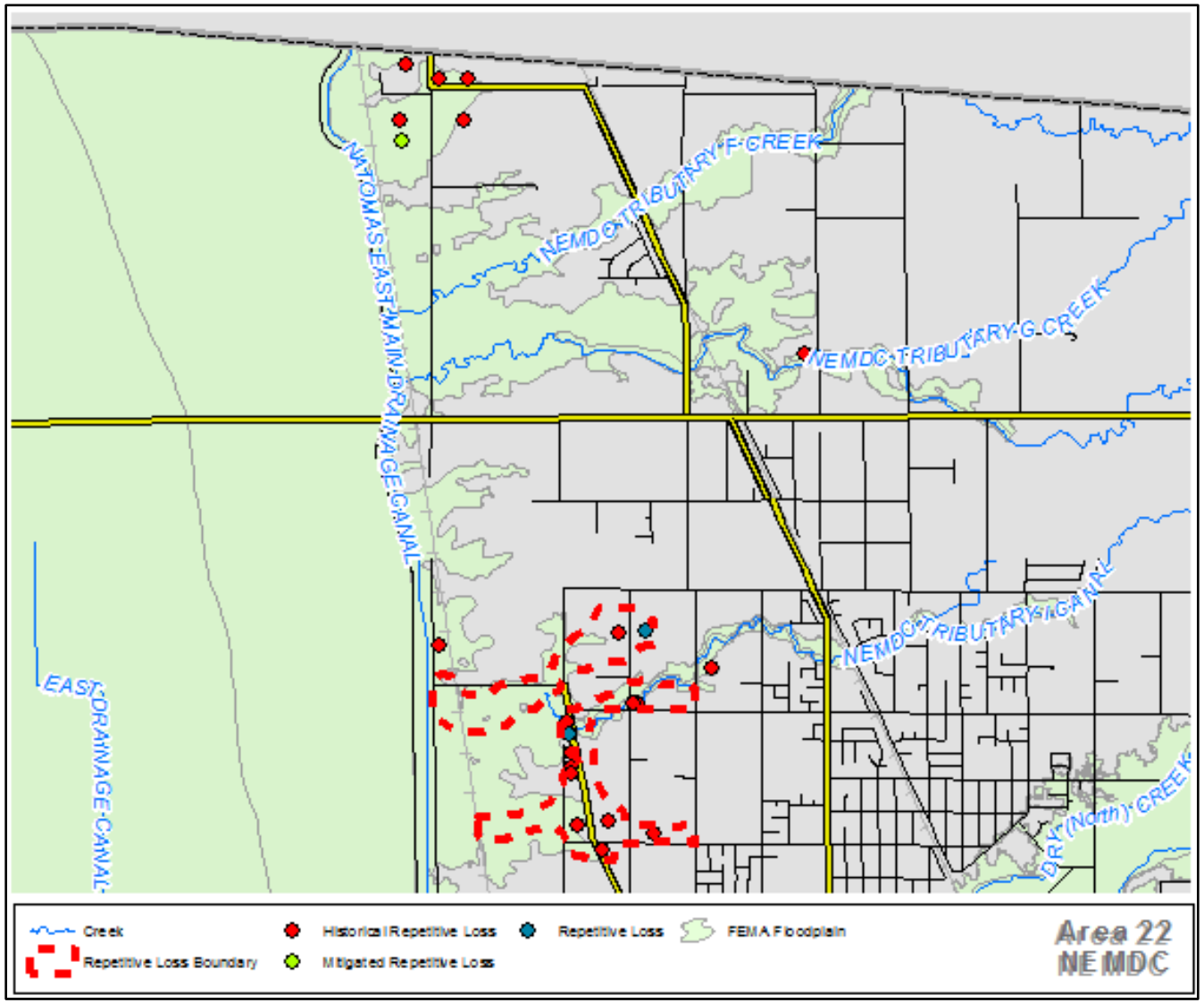
A22.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- SAFCA and USACE – Sacramento Levee Improvement Project
- USACE and Bureau of Reclamation – Folsom Dam Joint Federal Project (Completion 2017)
- State of California – Fremont Weir Expansion (Planning Stage)

The primary method of protection is to inform the public about flood risks of living in flood prone areas, especially for homes on the waterside of a levee. Additionally, all of the homes in Area 22 are identified in the County's building permit database. These homes are required to be in compliance with the local Floodplain Management Ordinance which describes how to safely build in areas that are within a FEMA Effective Floodplain and Local Floodplain.

FIGURE A22
Repetitive Loss Area #22



A22.5 DATA COLLECTION

Plans and studies have been conducted for the Sacramento River system and were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- FEMA Effective Flood Insurance Study
- SAFCA and USACE – Sacramento River Levee Improvement Project
- Central Valley Flood Evaluation and Delineation Project
- USACE and Bureau of Reclamation – Joint Federal Project
- State of California – Fremont Weir Expansion Project

A22.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) the majority of properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when the American River reaches flood stages and the NEMDC streams are under backwater conditions. Additionally, the Sacramento County Local Floodplain is included for the RLA.

A22.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 8 of the overall 98 properties within the North NEMDC Tributary RLA had reported flooding.

A22.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in January 9, 1995, January 9 & 22, 1997, June 15, 1997, February 3, 1998, and June 15 & 16, 1998. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A22.5.4 Types of Foundations

The most common type of foundations within the North NEMDC Tributary RLA is a raised foundation, which constitutes 41% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A22.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for acquisition of additional properties in North NEMDC floodplain for demolition to restores the natural floodplain. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

NORTH NATOMAS
EAST MAIN DRAIN CANAL
(NEMDC Tributaries)

AREA 22

BURR AV

E LEVEE RD

EL MODENA AV

North NEMDC Tributaries

DATA ANALYSIS SUMARY

PROPERTIES	**15**
REPETITIVE LOSS PROPERTIES	
HISTORICAL LOSS PROPERTIES	
REPETITIVE LOSS AREA PROPERTIES	*15*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 3
  - SLAB ON GRADE 7
- NO STRUCTURES
  - PRIVATELY OWNED 5

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
201-0069-018	1040 BURR AV	N/A	N/A			**No Structure**
201-0053-007	1151 BURR AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
201-0092-001	9060 E LEVEE RD	RAISED	GOOD			**No Record of Flooding**
202-0281-004	0 EL MODENA AV	N/A	N/A			**No Structure**
202-0282-017	0 EL MODENA AV	N/A	N/A			**No Structure**
202-0282-018	0 EL MODENA AV	N/A	N/A			**No Structure**
202-0282-003	8110 EL MODENA AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
202-0281-006	8145 EL MODENA AV	RAISED	GOOD			**No Record of Flooding**
202-0281-007	8191 EL MODENA AV	SLAB ON GRADE	FAIR			**No Record of Flooding**
202-0282-016	8200 EL MODENA AV	SLAB ON GRADE	FAIR			**No Record of Flooding**
202-0281-001	8205 EL MODENA AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
202-0271-005	8225 EL MODENA AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
202-0271-002	8313 EL MODENA AV	RAISED	GOOD			**No Record of Flooding**
202-0271-001	8383 EL MODENA AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
202-0330-028	8513 EL MODENA AV	N/A	N/A			**No Structure**

AREA 22

MARYSVILLE BOULEVARD

North NEMDC Tributaries

DATA ANALYSIS SUMARY

PROPERTIES	**15**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*10*
REPETITIVE LOSS AREA PROPERTIES	*4*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 5
  - SLAB ON GRADE 10
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
206-0130-005	6800 MARYSVILLE BL	RAISED	GOOD			**No Record of Flooding**
206-0130-025	6864 MARYSVILLE BL	RAISED	GOOD			**No Record of Flooding**
206-0130-001	6940 MARYSVILLE BL	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0130-007	6941 MARYSVILLE BL	RAISED	GOOD			**No Record of Flooding**
206-0090-021	7000 MARYSVILLE BL	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0090-011	7001 MARYSVILLE BL	SLAB ON GRADE	GOOD			**3/10/2000 –** Flooded Yard.
206-0090-049	7005 MARYSVILLE BL	SLAB ON GRADE	GOOD			**1/10/1995 –** FEMA Flood Claim
206-0090-001	7035 MARYSVILLE BL	SLAB ON GRADE	GOOD			**1/10/1995 –** FEMA Flood Claim
206-0090-032	7036 MARYSVILLE BL	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0090-001	7039 MARYSVILLE BL	RAISED	GOOD			**1/10/1995 –** FEMA Flood Claim
206-0090-001	7045 MARYSVILLE BL	SLAB ON GRADE	GOOD			**1/9/1995** – Structure flooded a depth of 24" in house, 32” in garage.
206-0090-031	7048 MARYSVILLE BL	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0090-001	7049 MARYSVILLE BL	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0090-002	7101 MARYSVILLE BL	RAISED	GOOD			**2/3/1998 –** FEMA Flood Claim **1/03/1997** – FEMA Flood Claim
206-0090-003	7149 MARYSVILLE BL	SLAB ON GRADE	GOOD			**1/10/1995 –** FEMA Flood Claim

AREA 22

RIO LINDA BOULEVARD
SCHANDONEY AVENUE
SORENTO ROAD
STRAUGH ROAD

North NEMDC Tributaries

DATA ANALYSIS SUMARY

PROPERTIES	**16**
REPETITIVE LOSS PROPERTIES	
HISTORICAL LOSS PROPERTIES	*3*
REPETITIVE LOSS AREA PROPERTIES	*4*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 3
  - SLAB ON GRADE 4
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
202-0010-053	9000 RIO LINDA BL	SLAB ON GRADE	GOOD			**No Record of Flooding**
202-0010-056	9010 RIO LINDA BL	RAISED	GOOD			**No Record of Flooding**
202-0010-055	9030 RIO LINDA BL	SLAB ON GRADE	GOOD			**6/15/1998** - depth information CONFIDENTIAL flood site list.
202-0010-060	9050 RIO LINDA BL	SLAB ON GRADE	FAIR			**No Record of Flooding**
202-0010-031	9120 RIO LINDA BL	RAISED & SLAB ON GRADE	GOOD			**1/10/1995 –** FEMA Flood Claim
201-0053-002	9145 RIO LINDA BL	RAISED	GOOD			**6/15/1998** - depth information CONFIDENTIAL flood site list.
201-0053-006	9155 RIO LINDA BL	RAISED	GOOD			**No Record of Flooding**
201-0093-010	0 SCHANDONEY AV	N/A	N/A			**No Structure**
201-0053-005	0 SORENTO RD	N/A	N/A			**No Structure**
201-0110-018	8655 SORENTO RD	RAISED	GOOD			**No Record of Flooding**
201-0079-021	8821 SORENTO RD	RAISED	GOOD	Elevated		**12/22/2000** – Elevated House **1/10/1995** – FEMA Flood Claim **1/9/1995** – Structure flooded a depth of 12" in house, 30-36” in barn. **11/25/1986** – FEMA Flood Claim
202-0010-016	8846 SORENTO RD	SLAB ON GRADE	FAIR			**3/2/2004** – Street Flooding **1/10/1995** – FEMA Flood Claim
201-0079-020	8855 SORENTO RD	RAISED	GOOD			**1/10/1995** – FEMA Flood Claim **6/15/1998** - depth information CONFIDENTIAL flood site list.
206-0080-001	916 STRAUGH RD	RAISED	GOOD			**No Record of Flooding**
206-0080-002	920 STRAUGH RD	RAISED	GOOD			**No Record of Flooding**
202-0090-004	945 STRAUGH RD	SLAB ON GRADE	FAIR			**2/19/1986** – FEMA Flood Claim

AREA 22

M STREET

WEST M STREET

North NEMDC Tributaries

DATA ANALYSIS SUMARY

PROPERTIES	**20**
REPETITIVE LOSS PROPERTIES	
HISTORICAL LOSS PROPERTIES	*3*
REPETITIVE LOSS AREA PROPERTIES	*17*
• EXISTING STRUCTURES (UNMITIGATED)	
o RAISED FOUNDATIONS	8
o SLAB ON GRADE	8
• NO STRUCTURES	
o PRIVATELY OWNED	4
MITIGATED PROPERTIES	
• ACQUSITION & DEMO	
• AQUSITION – NO STRUCTURE	
• ELEVATED (RAISED FOUNDATION)	

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
206-0142-020	0 M ST	N/A	N/A			**No Structure**
206-0200-059	0 M ST	N/A	N/A			**No Structure**
206-0200-060	0 M ST	N/A	N/A			**No Structure**
206-0142-010	101 M ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0142-009	111 M ST	RAISED	GOOD			**No Record of Flooding**
206-0142-019	125 M ST	RAISED	GOOD			**No Record of Flooding**
206-0142-012	129 W M ST	RAISED	GOOD			**No Record of Flooding**
206-0130-012	231 W M ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0130-013	241 W M ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0130-014	249 W M ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0130-015	329 W M ST	SLAB ON GRADE	GOOD			**11/14/1998** – FEMA Flood Claim
206-0130-016	331 W M ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0130-019	425 W M ST	RAISED	GOOD			**6/15/1998** - depth information CONFIDENTIAL flood site list. **1/10/1995** – FEMA Flood Claim
206-0200-036	440 W M ST	RAISED	FAIR			**1/10/1995** – FEMA Flood Claim **1/9/1995** – Structure flooded a depth of 48" in house, 48” in garage.
206-0130-006	507 W M ST	SLAB ON GRADE	GOOD			**1/9/1995** – FEMA Flood Claim
206-0200-005	508 W M ST	RAISED	GOOD			**No Record of Flooding**
206-0200-004	512 W M ST	RAISED	GOOD	Home Elevated		**12/27/1999** - HMGP Sac/County Resident Elevation Program **1/10/1995** – FEMA Flood Claim
206-0200-003	532 W M ST	N/A	N/A			**No Structure**
206-0200-034	536 W M ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0200-033	542 W M ST	RAISED	POOR			**No Record of Flooding**

AREA 22

Q STREET

WEST Q STREET

North NEMDC Tributaries

DATA ANALYSIS SUMARY

PROPERTIES	**12**
REPETITIVE LOSS PROPERTIES	
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	*11*
• EXISTING STRUCTURES (UNMITIGATED)	
o RAISED FOUNDATIONS	7
o SLAB ON GRADE	5
• NO STRUCTURES	
o PRIVATELY OWNED	
MITIGATED PROPERTIES	
• ACQUSITION & DEMO	
• AQUSITION – NO STRUCTURE	
• ELEVATED (RAISED FOUNDATION)	

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
206-0050-040	123 Q ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-005-0038	146 Q ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0050-023	111 W Q ST	SLAB ON GRADE	FAIR			**No Record of Flooding**
206-0050-022	121 W Q ST	RAISED	GOOD			**No Record of Flooding**
206-0040-013	229 W Q ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0040-005	239 W Q ST	RAISED	GOOD			**No Record of Flooding**
206-0040-019	309 W Q ST	RAISED	GOOD			**No Record of Flooding**
206-0040-020	315 W Q ST	RAISED	GOOD			**No Record of Flooding**
206-0040-029	321 W Q ST	RAISED	GOOD			**No Record of Flooding**
206-0040-030	323 W Q ST	RAISED	GOOD			**1/10/1995 –** FEMA Flood Claim
206-0040-031	329 W Q ST	RAISED	GOOD			**1/10/1995 –** FEMA Flood Claim
206-0090-005	516 W Q ST	SLAB ON GRADE	GOOD			**No Record of Flooding**

AREA 22

2ND STREET

WEST 2ND STREET

4TH STREET

WEST 4TH STREET

WEST 6TH STREET

North NEMDC Tributaries

DATA ANALYSIS SUMARY

PROPERTIES	**21**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*4*
REPETITIVE LOSS AREA PROPERTIES	*16*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 11
  - SLAB ON GRADE 7
- NO STRUCTURES 2
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
206-0142-006	6811 2ND ST	RAISED	GOOD			**No Record of Flooding**
206-0280-033	6930 2ND ST	SLAB ON GRADE	GOOD			**2/14/2000 –** FEMA Flood Claim
206-0130-027	6825 W 2ND ST	RAISED	GOOD			**No Record of Flooding**
206-0050-044	7210 W 2ND ST	RAISED	GOOD			**No Record of Flooding**
206-0050-019	7253 W 2ND ST	SLAB ON GRADE	GOOD			**1/10/1995 –** FEMA Flood Claim
206-0040-038	7315 W 2ND ST	RAISED	GOOD			**No Record of Flooding**
206-0010-025	0 W 4TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-020-0056	6740 W 4TH ST	RASIED	GOOD			**No Record of Flooding**
206-0130-018	6829 W 4TH ST	NO STRUCTURE	N/A			**1/9/1995** –Depth of flooding 48"
206-0040-035	7220 W 4TH ST	RAISED	FAIR			**No Record of Flooding**
206-0040-042	7232 W 4TH ST	RAISED	GOOD			**No Record of Flooding**
206-0040-002	7337 W 4TH ST	RAISED	GOOD			**No Record of Flooding**
206-0010-016	7400 W 4TH ST	NO STRUCTURE	N/A			**No Record of Flooding**
206-0010-017	7406 W 4TH ST	RAISED	GOOD			**No Record of Flooding**
206-0010-026	7407 W 4TH ST	SLAB ON GRADE	GOOD			**1/10/1995 –** FEMA Flood Claim
206-0010-018	7412 W 4TH ST	SLAB ON GRADE	POOR			**No Record of Flooding**
206-0010-019	7420 W 4TH ST	SLAB ON GRADE	GOOD			**6/23/1998** - depth information CONFIDENTIAL flood site list. **3/10/1995 –** FEMA Flood Claim **1/10/1995 –** FEMA Flood Claim
206-0010-021	7425 W 4TH ST	RAISED	GOOD			**No Record of Flooding**
206-0010-012	7500 W 4TH ST	SLAB ON GRADE	POOR			**No Record of Flooding**
206-0192-001	6801 W 6TH ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
206-0040-044	7330 W 6TH ST	RAISED	GOOD			**No Record of Flooding**

Appendix 23

REPETITIVE LOSS AREA 23

MORRISON CREEK

Sacramento

FEMA Floodplain

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 23

TABLE OF CONTENTS

A23.1 REPETITIVE LOSS AREA 23

This Report focuses on Area 23, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 23 includes properties in Sacramento, California on Bradshaw Road and Mayhew Road as shown on **Figure A23**.

A23.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs.

A23.3 PROBLEM STATEMENT

The location of Area 23 is just south of highway 16 on the west side of Bradshaw Road and east of Mayhew Road.

The source of flooding is the Morrison Creek floodplain that runs directly through the RLA. The 100-year floodplain escapes the banks of the creek and floods the adjacent properties in the area. Damaging floods occurred in January of 1995 and 1997.

There are 24 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions. Two (2) properties were purchased for purposes of mining by private owners and all structures were demolished as a part of the mining operations. Most of the properties located within the repetitive loss area are actively being mined. As such, the mining pits will be filled with flood water in the events where the creek banks are exceeded.

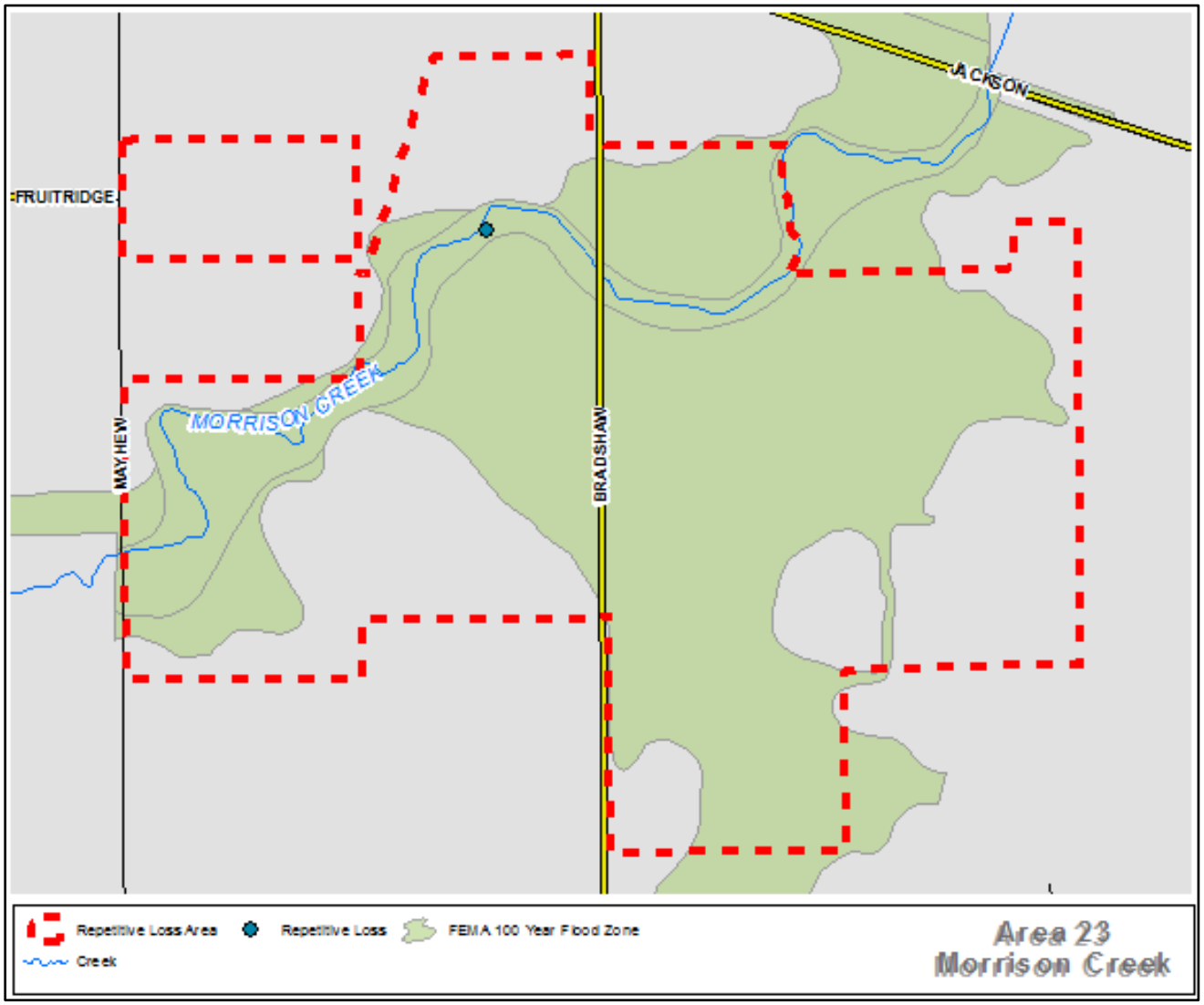
A23.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- West Jackson Highway – Master Drainage Study (Dated: 2012)

The primary methods of property protection are: demolition/relocation, elevate structure or damage prone components such as furnace or ac unit, dry flood-proof (so water cannot get in), wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

FIGURE A23
Repetitive Loss Area #23



A23.5 DATA COLLECTION

Sacramento County Plans and studies for Morrison Creek were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- West Jackson Highway – Master Drainage Study (2012)

The State of California – Department of Water Resources Central Valley Flood Evaluation and Delineation LiDAR (dated 2008) was also utilized in this analysis.

A23.5.1 Flood Insurance and Flood Event Data

Area 23 is in Zone AE, on the FEMA Flood Insurance Rate Map 06067C0215H (August 2012). Based on the FIRM all twenty-four (24) properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when low lying areas around Morrison Creek are inundated by out of bank flooding resulting from the large watershed contributing to Morrison Creek.

A23.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 2 of the overall 24 properties within the Morrison Creek RLA had reported flooding. Both of these properties no longer have structures on them.

A23.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed on January 9, 1995 and January 22, 1997 during record storm events. In addition inspections were conducted in May 2015. These inspections were performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location;
- Neighborhood topography and flow routes; and
- High-water marks and debris mark levels.

A23.5.4 Types of Foundations

The most common type of foundations within the Morrison Creek RLA is a raised foundation, which constitutes 71% of the two common foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A23.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for acquisition of additional properties in Morrison Creek floodplain for demolition to restores the natural floodplain. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

Further, a weir along Morrison Creek is planned to be constructed upstream of highway 16 at an aggregate mine that should control flooding and help reduce some of the structural flooding that has been experienced in the past. Flooding could still be experienced in existing and future mining areas that are below the flow line of the creek.

DATA ANALYSIS SUMMARY

MORRISON CREEK

AREA 23

BRADSHAW ROAD

MORRISON CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**20**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*19*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 5
  - SLAB ON GRADE 2
- NO STRUCTURES
  - PRIVATELY OWNED 11

MITIGATED PROPERTIES

- ACQUSITION & DEMO 2
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
06300700180000	5236 BRADSHAW RD	SLAB ON GRADE	Fair			**No Record of Flooding**
06300700150000	5260 BRADSHAW RD	RASIED	Fair			**No Record of Flooding**
06300700160000	5268 BRADSHAW RD	RASIED	Fair			**No Record of Flooding**
06300700110000	5280 BRADSHAW RD	RASIED	Fair			**FEMA Flood Claim -** 1/9/1995, 1/22/1997, 2/3/1998 (four structures) **1/9/1995 -** Business flooded 3-4 feet
06301000200000	5645 BRADSHAW RD	RASIED	Fair			**2 Vacant Portables Blgs, No Flooding Reported**
06301000160000	5750 BRADSHAW RD	N/A				**No Structure on Property**
06301000190000	5750 BRADSHAW RD	N/A				**No Structure on Property**
06301900250000	5831 BRADSHAW RD	N/A		Demolished by Owner		**No Structure on Property** **2006 -** All Structures Removed
06301900220000	5861 BRADSHAW RD	N/A		Demolished by Owner		**No Structure on Property** **2006 -** All Structures Removed **1/9/1995 -** Flood 6"-8" in garage and 8"-10" in other structures
06301000110000	5890 BRADSHAW RD	N/A				**No Structure on Property**
06301900210000	5931 BRADSHAW RD	RAISED	Fair			**Mobile Office Bldg, No Flooding Reported**
06301800230000	6059 BRADSHAW RD	SLAB ON GRADE	Fair			**One main structure, several structures on property being stored, truck storage, No Flooding Reported**
06301800170000	6141 BRADSHAW RD	N/A				**No Structure on Property**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
06300700170000	0 BRADSHAW RD	N/A	N/A			**No Structure on Property**
06301000180000	0 BRADSHAW RD	N/A	N/A			**No Structure on Property**
06301800240000	0 BRADSHAW RD	N/A	N/A			**No Structure on Property**
06301900330000	0 BRADSHAW RD	N/A	N/A			**No Structure on Property**
06301900400000	0 BRADSHAW RD	N/A	N/A			**No Structure on Property**
06302000090000	0 BRADSHAW RD	N/A	N/A			**No Structure on Property**
06302000080000	0 BRADSHAW RD	N/A	N/A			**No Structure on Property**

AREA 23

MAYHEW ROAD

MORRISON CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**4**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*4*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 0
- NO STRUCTURES
  - PRIVATELY OWNED 4

MITIGATED PROPERTIES

- ACQUSITION & DEMO 0
- AQUSITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
06300700130000	5500 MAYHEW RD	N/A	N/A			**No Structure on Property**
06301000010000	5645 MAYHEW RD	N/A	N/A			**No Structure on Property**
06301000150000	5737 MAYHEW RD	N/A	N/A			**No Structure on Property**
06301000140000	0 MAYHEW RD	N/A	N/A			**No Structure on Property**

Appendix 24

REPETITIVE LOSS AREA 24

ARCADE CREEK
AT
PARK ROAD

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 24

TABLE OF CONTENTS

A24.1 REPETITIVE LOSS AREA 1

This Report focuses on Area 24, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 24 includes the floodplain associated with Arcade Creek in the vicinity of Park Road as shown in **Figure A24**.

A24.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A24.3 PROBLEM STATEMENT

The location of Area 24 is generally on Park Road, adjacent to Del Paso Park downstream of Auburn Boulevard. The source of flooding is due to Arcade Creek overtopping.

The five structures within Area 24 reside on FEMA's repetitive loss list, have experienced historical flooding, or are nearby buildings that may have the same or similar flooding conditions. Three of the five structures have been mitigated through elevation.

A24.4 BASIC INFORMATION

Due to the severity and nature of the flooding, the primary method of property protection in this area is home elevation.

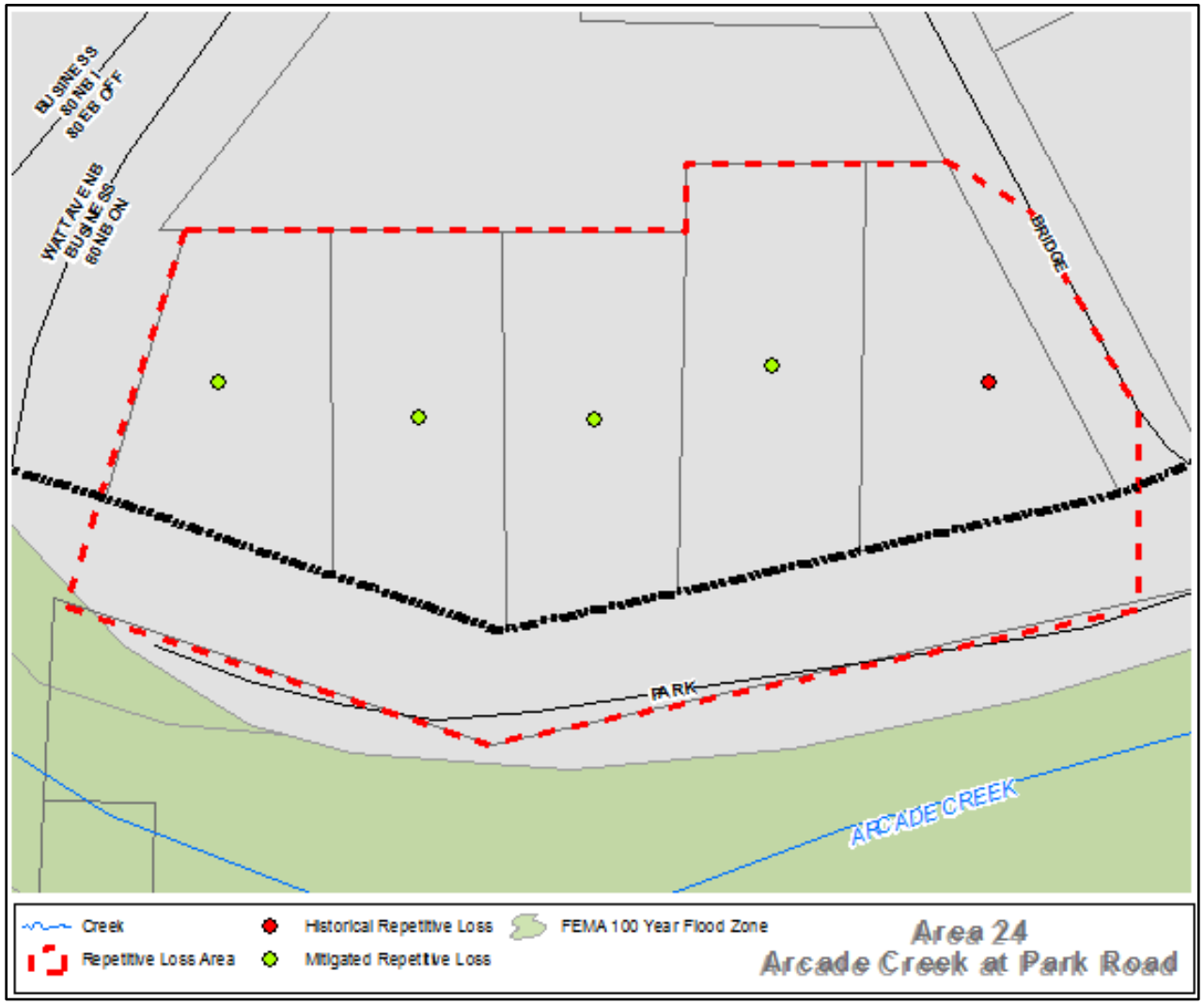
A24.5 DATA COLLECTION

Sacramento County Plans, high water information, homeowner testimony, and studies for the Arcade Creek watershed were utilized in this analysis. The structures located within this area were reviewed by DWR staff as part of the Hazard Mitigation Grant Program and Flood Mitigation Assistance Program.

A24.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) no properties within the RLA are within the 100-year FEMA floodplain although the flooding occurs when Arcade Creek overflows its banks. This is because Arcade Creek water surface elevations have exceeded those in the Flood Insurance Study, notably during the 1982, 1983, 1986, and 1995 storm events. Sacramento County DWR is currently in the process of having Arcade Creek remapped in this area to reflect a higher base flood elevation.

FIGURE A24
Repetitive Loss Area #24



A24.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that more than one of the five properties within the Area 24 RLA had reported flooding, but the records are to remain confidential by request of the homeowners.

A24.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed as part of the Hazard Mitigation Grant Program and the Flood Mitigation Assistance program. The inspections were performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A24.5.4 Types of Foundations

The most common type of foundations within the Area 24 RLA is raised foundations although one home has a slab foundation (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A24.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for home elevations. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Sacramento County Department of Water Resources
- **Timeline:** As opportunity and/or funding becomes available
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

ARCADE CREEK AT PARK ROAD

AREA 24

ARCADE CREEK AT PARK RD.

ARCADE CREEK WATERSHED

DATA ANALYSIS SUMARY

PROPERTIES	**5**
REPETITIVE LOSS PROPERTIES	*3*
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS
  - SLAB ON GRADE 1
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION) 4

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
240-0521-008	3590 PARK RD	RAISED	GOOD	ELEVATION		**1/1/1995** – Garage flooded a depth of 39". House flooding in 1982 & 1983. **8/31/1983** – Property elevated
240-052-1004	3609 PARK RD	RAISED	GOOD	ELEVATION		**1/9/95** - Flooding 14" inside home. **6/12/2003** – Elevation Cert. Issued **4/1/2003** - Home elevated as part of FMA program.
240-0521-003	3611 PARK RD	RAISED	GOOD	ELEVATION		**1/31/2006** – FEMA Flood Claim **9/27/2000** – Elevation Cert. Issued **10/21/1999** - Home elevated as part of HMGP program. **1/22/1997** - FEMA Flood Claim **1/9/1995** - Flooding 17" inside home.
240-0521-002	3621 PARK RD	RAISED	GOOD	ELEVATION		**5/19/2004** – Raised Foundation Flood history is confidential. **8/1/1995** – Elevation Cert. Issued **1/10/1995** - FEMA Flood Claim
240-0521-001	3625 PARK RD	SLAB	GOOD			**6/22/1998** - Storm depth unknown **Confidential** flood site list.

Appendix 25

REPETITIVE LOSS AREA 25

MADISON AVENUE AT ROLLINGWOOD

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 25

TABLE OF CONTENTS

A25.1 REPETITIVE LOSS AREA 25

This Report focuses on Area 25, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 25 comprises the local floodplain area as shown in **Figure A25**.

A25.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A25.3 PROBLEM STATEMENT

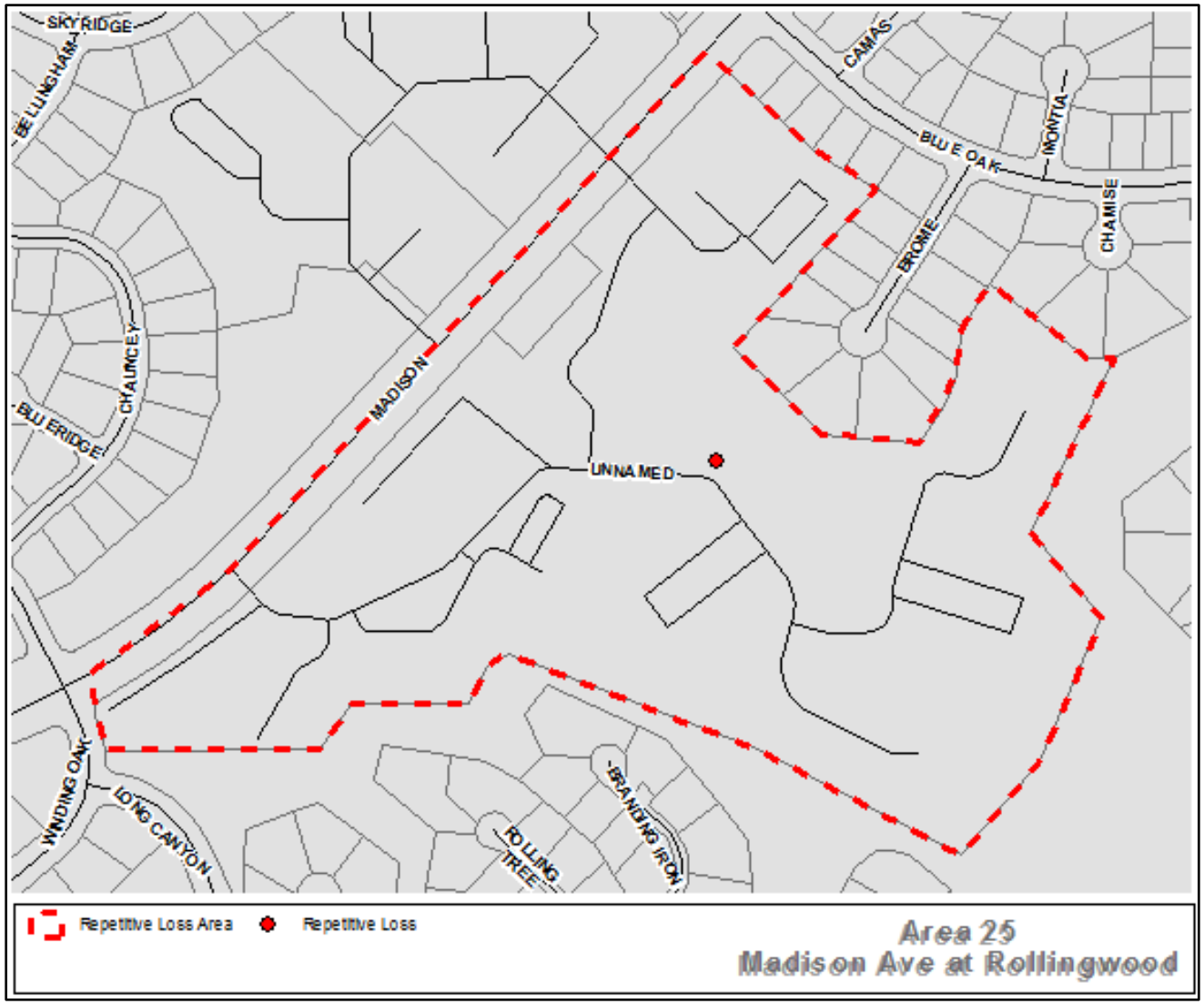
The location of Area 25 is generally the south side of Madison Avenue in the area of the Rollingwood development (east of the intersection of Madison and Hazel Avenue. The source of flooding is a unnamed stream system flowing southward to the American River.

There are 137 addresses which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions. The historic loss properties and repetitive loss properties are all located within the Rolling Wood condominium project. Eight of the condo units have repetitive losses and 17 others have a history of flooding but are not repetitive loss.

A25.4 BASIC INFORMATION

The primary methods of property protection would be to elevate affected structures or to construct a permanent floodwall around them if it could be designed to not cause impacts to any other structures in the area.

FIGURE A25
Repetitive Loss Area #25



A25.5 DATA COLLECTION

LIDAR topography, street level photography, and aerial photography were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

A25.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) none of the properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when the local floodplain associated with an unnamed stream overtops its banks during intense rainfall events.

A25.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that approximately 15 of the overall 137 addresses within the RLA had reported drainage related issues.

A25.5.3 Structure Inspections

The flood protection assessments in this Report are based upon visual observation of relative elevations. Each property within the RLA was reviewed and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A25.5.4 Types of Foundations

The most common type of foundations within the RLA is slab on grade, which constitutes a substantial portion of the foundations found in Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A25.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for home elevation projects. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Sacramento County Department of Water Resources
- **Timeline:** As opportunity and/or funding becomes available
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

FAIR OAKS STREAM GROUP

AREA 25

MADISON AVENUE

FAIR OAKS STREAM GROUP

DATA ANALYSIS SUMARY

PROPERTIES	**69**
REPETITIVE LOSS PROPERTIES	*8*
HISTORICAL LOSS PROPERTIES	*17*
REPETITIVE LOSS AREA PROPERTIES	*44*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS
  - SLAB ON GRADE 69
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
235-0670-001-0001	9160 MADISON AV 1	SLAB ON GRADE				**No Report of Flooding**
23506700010003	9160 MADISON AV 3	SLAB ON GRADE				**No Report of Flooding**
23506700010005	9160 MADISON AV 5	SLAB ON GRADE				**No Report of Flooding**
23506700010007	9160 MADISON AV 7	SLAB ON GRADE				**No Report of Flooding**
23506700010009	9160 MADISON AV 9	SLAB ON GRADE				**No Report of Flooding**
23506700010011	9160 MADISON AV 11	SLAB ON GRADE				**No Report of Flooding**
23506700010013	9160 MADISON AV 13	SLAB ON GRADE				**No Report of Flooding**
23506700010015	9160 MADISON AV 15	SLAB ON GRADE				**No Report of Flooding**
23506700010017	9160 MADISON AV 89	SLAB ON GRADE				**No Report of Flooding**
23506700010019	9160 MADISON AV 91	SLAB ON GRADE				**No Report of Flooding**
23506700010021	9160 MADISON AV 93	SLAB ON GRADE				**No Report of Flooding**
23506700010023	9160 MADISON AV 95	SLAB ON GRADE				**No Report of Flooding**
23506700010025	9160 MADISON AV 81	SLAB ON GRADE				**No Reported Flooding**
23506700010027	9160 MADISON AV 83	SLAB ON GRADE				**No Reported Flooding**

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
23506700010029	9160 MADISON AV 85	SLAB ON GRADE				**No Reported Flooding**
23506700010031	9160 MADISON AV 87	SLAB ON GRADE				**No Reported Flooding**
23506700010033	9160 MADISON AV 73	SLAB ON GRADE				**No Reported Flooding**
23506700010035	9160 MADISON AV 75	SLAB ON GRADE				**No Reported Flooding**
23506700010037	9160 MADISON AV 77	SLAB ON GRADE				**No Reported Flooding**
23506700010039	9160 MADISON AV 79	SLAB ON GRADE				**No Reported Flooding**
23506700010041	9160 MADISON AV 17	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010043	9160 MADISON AV 19	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010045	9160 MADISON AV 21	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010047	9160 MADISON AV 23	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010049	9160 MADISON AV 25	SLAB ON GRADE				**No Reported Flooding**
23506700010051	9160 MADISON AV 27	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010053	9160 MADISON AV 29	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010055	9160 MADISON AV 31	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010057	9160 MADISON AV 33	SLAB ON				**No Reported Flooding**

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
		GRADE				
23506700010059	9160 MADISON AV 35	SLAB ON GRADE				**No Reported Flooding**
23506700010061	9160 MADISON AV 37	SLAB ON GRADE				**No Reported Flooding**
23506700010063	9160 MADISON AV 39	SLAB ON GRADE				**No Reported Flooding**
23506700010065	9160 MADISON AV 41	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010067	9160 MADISON AV 43	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010069	9160 MADISON AV 45	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010071	9160 MADISON AV 47	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010073	9160 MADISON AV 49	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010075	9160 MADISON AV 51	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010077	9160 MADISON AV 53	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010079	9160 MADISON AV 55	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010081	9160 MADISON AV 57	SLAB ON GRADE				**No Reported Flooding**
23506700010083	9160 MADISON AV 59	SLAB ON GRADE				**No Reported Flooding**
23506700010085	9160 MADISON AV 61	SLAB ON GRADE				**No Reported Flooding**

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
23506700010087	9160 MADISON AV 63	SLAB ON GRADE				**No Reported Flooding**
23506700010089	9160 MADISON AV 65	SLAB ON GRADE				**No Reported Flooding**
23506700010091	9160 MADISON AV 67	SLAB ON GRADE				**No Reported Flooding**
23506700010093	9160 MADISON AV 69	SLAB ON GRADE				**No Reported Flooding**
23506700010095	9160 MADISON AV 71	SLAB ON GRADE				**No Reported Flooding**
23506700010097	9160 MADISON AV 97	SLAB ON GRADE				**No Reported Flooding**
23506700010099	9160 MADISON AV 99	SLAB ON GRADE				**No Reported Flooding**
23506700010101	9160 MADISON AV 101	SLAB ON GRADE				**No Reported Flooding**
23506700010103	9160 MADISON AV 103	SLAB ON GRADE				**No Reported Flooding**
23506700010105	9160 MADISON AV 105	SLAB ON GRADE				**No Reported Flooding**
23506700010107	9160 MADISON AV 107	SLAB ON GRADE				**No Reported Flooding**
23506700010109	9160 MADISON AV 109	SLAB ON GRADE				**No Reported Flooding**
23506700010111	9160 MADISON AV 111	SLAB ON GRADE				**No Reported Flooding**
23506700010113	9160 MADISON AV 113	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
23506700010115	9160 MADISON AV 115	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010117	9160 MADISON AV 117	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010119	9160 MADISON AV 119	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010121	9160 MADISON AV 121	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010123	9160 MADISON AV 123	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010125	9160 MADISON AV 125	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010127	9160 MADISON AV 127	SLAB ON GRADE				**4/1/1996** – FEMA Flood Claim
23506700010129	9160 MADISON AV 129	SLAB ON GRADE				**No Reported Flooding**
23506700010131	9160 MADISON AV 131	SLAB ON GRADE				**No Reported Flooding**
23506700010133	9160 MADISON AV 133	SLAB ON GRADE				**No Reported Flooding**
23506700010135	9160 MADISON AV 135	SLAB ON GRADE				**No Reported Flooding**

Appendix 26

REPETITIVE LOSS AREA 26
STRONG RANCH SLOUGH

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 26

TABLE OF CONTENTS

A26.1 REPETITIVE LOSS AREA 26

This report focuses on Area 26, one of the twenty eight (28) designated RLAs within the Sacramento County. Area 26 analysis defined by **Figure A26**.

A26.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAs.

A26.3 PROBLEM STATEMENT

The location of Area 26 is generally bound by Howe Avenue to the west, Fulton Avenue/Munroe Street to the east, Imran Drive to the north and Fair Oaks Boulevard to the south. The Woodside properties are located at the confluence of Sierra Branch and Strong Ranch Slough in the south-west portion of the watershed. The Strong Ranch Slough and Chicken Ranch Slough (SRS / CRS) watershed is an urban watershed of approximately 15 square miles within Sacramento County, in northern California. Water levels in the lower portion of the Strong and Chicken Ranch Slough watershed are affected by the water level in the D05 pond, which, in turn, is related to water level in the lower American River.

Homes and community facilities in the Woodside condominium complex in the Arden-Arcade neighborhood of Sacramento County were flooded by local storm runoff in 1986, in 1997, and again on New Year's Eve of 2005. This complex is located in the Strong Ranch Slough watershed, adjacent to the Strong Ranch and Sierra Branch channels

The source of flooding was primarily identified as the residences being in low lying areas, in some instances adjacent to Strong Ranch Slough that is over capacity, and most of the homes having slab-on-grade foundations.

There are 69 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions.

A26.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following had plans or studies that could affect the cause or impacts to flooding are:

- USACE (1987). Hydrologic analysis of interior areas. EM 1110-2-1413. Office of the Chief of Engineers, Washington, D.C.
- Chicken Ranch Slough drainage master plan. Prepared for County of Sacramento, Department of Public Works, Water Resources Division, Sacramento, CA. Nolte and Associates – 1991
- Hydrologic study of Folsom Re-operation impacts on Sacramento County Drainage Facilities. Prepared by David Ford Consulting Engineers,
- How can Strong Ranch Slough and Chicken Ranch Slough flooding be reduced?

Prepared by David Ford Consulting Engineers, Sacramento, CA. – 1997

- Impact of Sacramento River stage on D05 pumping station exterior stage. Prepared by David Ford Consulting Engineers, Sacramento, CA. – 1997
- Use of weather radar data will improve forecasting in Sacramento County. Prepared by David Ford Consulting Engineers, Sacramento, CA.- 1997
- Economic efficiency of flood-damage-reduction plan for Arden-Arcade neighborhood of Sacramento County. Prepared by David Ford Consulting Engineers, Sacramento, CA. – 1997
- Federal Emergency Management Agency Flood insurance study: Sacramento, California, unincorporated areas. Washington, DC. - 1998
- USACE (1999). Reconnaissance study of Strong and Chicken Ranch Sloughs. WRDA 86, 905b Analysis. Sacramento, CA.
- USACE (2001). Strong and Chicken Ranch Sloughs, California – Feasibility report: Phase 1 studies. Prepared by David Ford Consulting Engineers, Sacramento, CA.

The primary methods of property protection are:

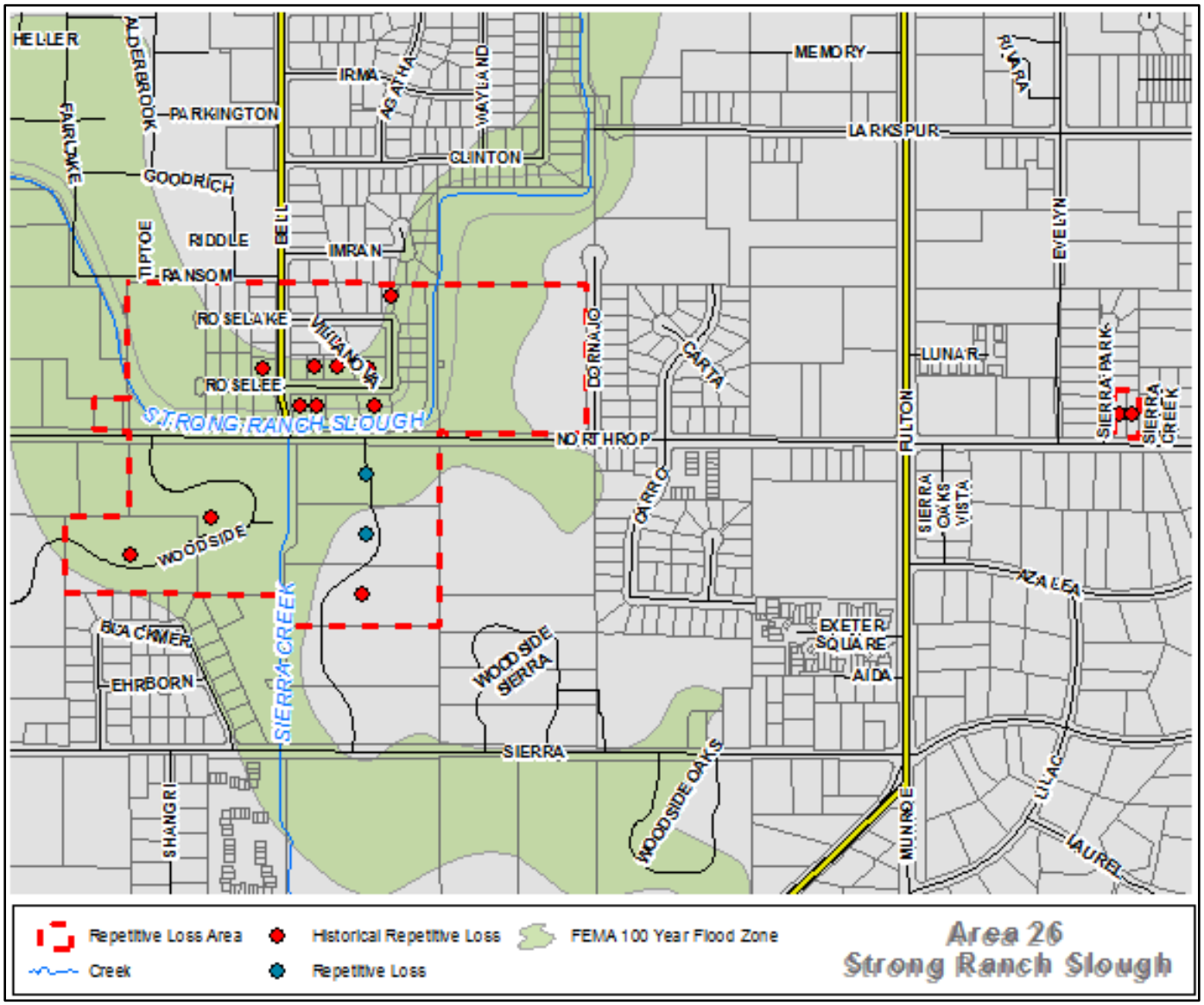
- The primary methods of property protection are: Home Elevation – Is your floor below the elevation of the floodplain? If so, it may be prudent to elevate the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, the County has utilized FEMA grant money for dozens of qualified elevation projects.
- Site Modification – Would a small wall, berm, or other site specific grading help keep water out of your house? Often, modification of the area around your home may be appropriate to minimize flooding depending on the depth of floodwater and site specific constraints.
- Temporary Flood Barriers – Perhaps sandbags or other barriers could be employed on site in advance of a storm to help keep water out.
- Home Removal – If necessary, it may be recommended that the County purchase the property and remove the home from the lot

A26.5 DATA COLLECTION

Sacramento County Plans and studies for Strong Ranch Slough were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- Strong and Chicken Ranch Slough Watershed Alternative Analysis – 2006
- Sacramento County 5.1 Local Hazard Mitigation Plan Update - September 2011

FIGURE A26
Repetitive Loss Area #26



A26.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) 107 properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when flows exceed the capacity of Strong Ranch Slough and Sierra Creek. The Sacramento County Local Floodplain on Bell Street, Northrop Avenue, Woodside Lane and Sierra Boulevard for this RLA floods due to them being in low lying areas.

A26.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 187 of the overall 228 properties within the Strong Ranch Slough RLA had reported flooding.

A26.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in June of 2015. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A26.5.4 Types of Foundations

The most common type of foundations within the Strong Ranch Slough RLA is slab-on-grade.

A26.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for future mitigation measures. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available
- **Potential Funding:** State and/or Federal Grant

AREA 26

BELL STREET

NORTHROP AVENUE

Strong Ranch Slough

DATA ANALYSIS SUMMARY

PROPERTIES	**17**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*5*
REPETITIVE LOSS AREA PROPERTIES	*12*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 2
  - SLAB ON GRADE 13
- NO STRUCTURES
  - PRIVATELY OWNED 2

MITIGATED PROPERTIES

- ACQUISITION & DEMO 0
- ACQUISITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
285-0265-002	900 BELL ST	RAISED	GOOD			**10/26/2004** – Street Flooding **1/22/1997** - Flooded 6 inches in garage.
285-0263-004	901 BELL ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0262-006	909 BELL ST	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
285-0264-006	910 BELL ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0262-005	917 BELL ST	RAISED	GOOD			**1/22/1997** - Flooded 6 inches in garage.
285-0262-004	919 BELL ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0261-002	923 BELL ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0261-001	927 BELL ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0265-017	928 BELL ST	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0201-026	1117 BELL ST APT 9	SLAB ON GRADE	GOOD		The Arbor - Townhomes	**9/16/2004** – FEMA Flood Claim
285-0201-011	0 NORTHROP AV	NA	NA		Parking lot	**No Record of Flooding**
285-0265-001	0 NORTHROP AV	NA	NA			**No Record of Flooding**
285-0201-012	2241 NORTHROP AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0201-027	2251 NORTHROP AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0210-041	2345 NORTHROP AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
286-0300-045	2751 NORTHROP AV	SLAB ON GRADE	GOOD			**2/28/1998** – FEMA Flood Claim
286-0300-047	2751 NORTHROP AV	SLAB ON GRADE	GOOD			**2/13/2000** – FEMA Flood Claim

AREA 26

ROSELAKE AVENUE

ROSELEE WAY

Strong Ranch Slough

DATA ANALYSIS SUMMARY

PROPERTIES	**12**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*0*
REPETITIVE LOSS AREA PROPERTIES	*12*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 8
  - SLAB ON GRADE 4
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUISITION & DEMO 0
- ACQUISITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
285-0262-001	2208 ROSELAKE AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0261-005	2209 ROSELAKE AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0262-002	2212 ROSELAKE AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0261-004	2213 ROSELAKE AV	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0262-003	2216 ROSELAKE AV	RAISED	GOOD			**No Record of Flooding**
285-0261-003	2217 ROSELAKE AV	RAISED	GOOD			**No Record of Flooding**
285-0262-009	2217 ROSELEE WY	RAISED	GOOD			**No Record of Flooding**
285-0263-001	2218 ROSELEE WY	RAISED	GOOD			**No Record of Flooding**
285-0262-008	2219 ROSELEE WY	RAISED	GOOD			**No Record of Flooding**
285-0263-002	2222 ROSELEE WY	RAISED	GOOD			**No Record of Flooding**
285-0263-003	2224 ROSELEE WY	RAISED	GOOD			**No Record of Flooding**
285-0262-007	2225 ROSELEE WY	RAISED	GOOD			**No Record of Flooding**

AREA 26

VILLANOVA CIRCLE

Strong Ranch Slough

DATA ANALYSIS SUMMARY

PROPERTIES	**20**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*8*
REPETITIVE LOSS AREA PROPERTIES	*12*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 7
  - SLAB ON GRADE 13
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUISITION & DEMO 0
- ACQUISITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
285-0265-003	2304 VILLANOVA CR	RAISED	GOOD			**1/22/1997** – FEMA Flood Claim
285-0264-005	2305 VILLANOVA CR	RAISED	GOOD			**1/22/1997** – FEMA Flood Claim
285-0265-004	2308 VILLANOVA CR	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0264-004	2309 VILLANOVA CR	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim **1/22/1997** – Flooded 1 foot in lower apartment
285-0265-005	2312 VILLANOVA CR	SLAB ON GRADE	GOOD			**1/22/1997** – Garage flooded 2 to 3 inches **1/22/1997** – FEMA Flood Claim **1/10/1995** – FEMA Flood Claim
285-0264-003	2313 VILLANOVA CR	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
285-0265-006	2316 VILLANOVA CR	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0265-007	2322 VILLANOVA CR	RAISED	GOOD			**No Record of Flooding**
285-0265-008	2324 VILLANOVA CR	RAISED	GOOD			**No Record of Flooding**
285-0265-009	2328 VILLANOVA CR	RAISED	GOOD			**No Record of Flooding**
285-0264-002	2329 VILLANOVA CR	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0265-010	2332 VILLANOVA CR	RAISED	GOOD			**No Record of Flooding**
285-0265-011	2336 VILLANOVA CR	SLAB ON GRADE	GOOD	Berm		**1/22/1997** – Apartment flooded approximately 3 inches

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
285-0265-012	2340 VILLANOVA CR	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim **2/18/1986** – FEMA Flood Claim
285-0265-013	2344 VILLANOVA CR	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0265-014	2348 VILLANOVA CR	SLAB ON GRADE	GOOD			**1/22/1997** – Flooding however, Number Of Structures Or The Depth Of Flooding Unknown
285-0264-001	2349 VILLANOVA CR	SLAB ON GRADE	GOOD	Floodwall		Owner has built a floodwall around the entire building
285-0265-019	2352 VILLANOVA CR	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0265-020	2354 VILLANOVA CR	SLAB ON GRADE	GOOD			**No Record of Flooding**
285-0264-008	2355 VILLANOVA CR	RAISED	GOOD			**No Record of Flooding**

AREA 26

WOODSIDE LANE

Strong Ranch Slough

DATA ANALYSIS SUMMARY

PROPERTIES	**150**
REPETITIVE LOSS PROPERTIES	*52*
HISTORICAL LOSS PROPERTIES	*11*
REPETITIVE LOSS AREA PROPERTIES	*87*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 0
  - SLAB ON GRADE 150
- NO STRUCTURES
  - PRIVATELY OWNED 0

MITIGATED PROPERTIES

- ACQUISITION & DEMO 0
- ACQUISITION – NO STRUCTURE 0
- ELEVATED (RAISED FOUNDATION) 0

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0230-003-0070	820 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-023-0003-0071	820 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**1/10/1995** – FEMA Flood Claim
294-023-0003-0072	820 WOODSIDE LN E 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-023-0003-0073	820 WOODSIDE LN E 5	SLAB ON GRADE	GOOD			**1/10/1995** – FEMA Flood Claim
294-023-0003-0074	820 WOODSIDE LN E 6	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-023-0003-0075	820 WOODSIDE LN E 7	SLAB ON GRADE	GOOD			**1/10/1995** – FEMA Flood Claim
294-0230-002-0017	841 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0019	841 WOODSIDE LN E 5	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0020	841 WOODSIDE LN E 7	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0023	841 WOODSIDE LN E 13	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0025	843 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0027	843 WOODSIDE LN E 6	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0028	843 WOODSIDE LN E 8	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0230-002-0027	843 WOODSIDE LN E 6	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0028	843 WOODSIDE LN E 8	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0031	843 WOODSIDE LN E 14	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0039	863 WOODSIDE LN E 7	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0040	863 WOODSIDE LN E 8	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0041	863 WOODSIDE LN E 9	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0051	867 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0052	867 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0053	867 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0057	871 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**9/4/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
29402300020058	871 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-002-0059	871 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**9/4/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-002-0063	873 WOODSIDE LN E 7	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-002-0064	873 WOODSIDE LN E 8	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0230-002-0065	873 WOODSIDE LN E 9	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0001	874 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim
294-0230-001-0002	874 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim
294-0230-001-0003	874 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim
294-0230-001-0004	874 WOODSIDE LN E 4	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim
294-0230-001-0005	877 WOODSIDE LN E 7	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0006	877 WOODSIDE LN E 8	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0007	877 WOODSIDE LN E 9	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0011	878 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0012	878 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0013	878 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0014	878 WOODSIDE LN E 4	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0015	879 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0016	879 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0230-001-0017	879 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0021	882 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0022	882 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0023	882 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0024	882 WOODSIDE LN E 4	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0025	883 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim **2/18/1986** – FEMA Flood Claim
294-0230-001-0026	883 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim **2/18/1986** – FEMA Flood Claim
294-0230-001-0027	883 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim **2/18/1986** – FEMA Flood Claim
294-0230-001-0028	883 WOODSIDE LN E 4	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim **2/18/1986** – FEMA Flood Claim
294-0230-001-0029	886 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0030	886 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0230-001-0031	886 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0035	887 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0036	887 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0039	887 WOODSIDE LN E 5	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0040	887 WOODSIDE LN E 6	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0043	888 WOODSIDE LN E 7	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0230-001-0044	888 WOODSIDE LN E 8	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0045	888 WOODSIDE LN E 9	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0230-002-0069	891 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-002-0070	891 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-002-0071	891 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-002-0072	891 WOODSIDE LN E 4	SLAB ON GRADE	GOOD			**12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0049	892 WOODSIDE LN E 7	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0230-001-0050	892 WOODSIDE LN E 8	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0051	892 WOODSIDE LN E 9	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0055	894 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0230-001-0056	894 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0057	894 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0230-001-0061	895 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0062	895 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0063	895 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0064	895 WOODSIDE LN E 4	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0065	895 WOODSIDE LN E 5	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0066	895 WOODSIDE LN E 6	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0230-001-0067	898 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0068	898 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0069	898 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0070	898 WOODSIDE LN E 4	SLAB ON GRADE	GOOD			**1/3/2006** – FEMA Flood Claim **12/31/2005** – FEMA Flood Claim **1/22/1997** – FEMA Flood Claim
294-0230-001-0071	899 WOODSIDE LN E 1	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim **1/3/2006** – FEMA Flood Claim
294-0230-001-0072	899 WOODSIDE LN E 2	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim **1/3/2006** – FEMA Flood Claim
294-0230-001-0073	899 WOODSIDE LN E 3	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim **1/3/2006** – FEMA Flood Claim
294-0230-001-0074	899 WOODSIDE LN E 4	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim **1/3/2006** – FEMA Flood Claim
294-0230-001-0063	2225 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0064	2225 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0065	2225 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0066	2225 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0230-001-0067	2229 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0068	2229 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0069	2229 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0230-001-0070	2229 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0015	2233 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0016	2233 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0017	2233 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0018	2233 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0031	2237 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**1/10/1995** – FEMA Flood Claim
294-0220-002-0032	2237 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0033	2237 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**1/10/1995** – FEMA Flood Claim
294-0220-002-0034	2237 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0047	2241 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**1/10/1995** – FEMA Flood Claim
294-0220-002-0048	2241 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0220-002-0049	2241 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**1/10/1995** – FEMA Flood Claim
294-0220-002-0050	2241 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0051	2241 WOODSIDE LN 5	SLAB ON GRADE	GOOD			**1/10/1995** – FEMA Flood Claim
294-0220-002-0052	2241 WOODSIDE LN 6	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0060	2245 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0061	2245 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0062	2245 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
29402200020067	2248 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0068	2248 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0069	2250 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0070	2250 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
29402200020071	2252 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0072	2254 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0073	2254 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0220-002-0074	2254 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0075	2254 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0076	2254 WOODSIDE LN 5	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-002-0077	2254 WOODSIDE LN 6	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0001	2258 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0002	2258 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0003	2258 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0004	2258 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0005	2258 WOODSIDE LN 5	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0006	2258 WOODSIDE LN 6	SLAB ON GRADE	GOOD			**No Record of Flooding**
29402200030007	2262 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0008	2262 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0009	2262 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0010	2262 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0220-003-0015	2266 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0016	2266 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0017	2266 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0018	2266 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0019	2266 WOODSIDE LN 5	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0020	2266 WOODSIDE LN 6	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0021	2270 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0022	2270 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0023	2270 WOODSIDE LN 3	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0024	2270 WOODSIDE LN 4	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0047	2290 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0220-003-0048	2290 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0220-003-0051	2290 WOODSIDE LN 5	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0220-003-0052	2290 WOODSIDE LN 6	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
294-0220-003-0055	2292 WOODSIDE LN 1	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0220-003-0056	2292 WOODSIDE LN 2	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0059	2292 WOODSIDE LN 10	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0220-003-0063	2294 WOODSIDE LN 5	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim
294-0220-003-0064	2294 WOODSIDE LN 6	SLAB ON GRADE	GOOD			**No Record of Flooding**
294-0220-003-0065	2294 WOODSIDE LN 7	SLAB ON GRADE	GOOD			**1/22/1997** – FEMA Flood Claim

Appendix 27

REPETITIVE LOSS AREA 27
BROOKTREE CREEK

SACRAMENTO COUNTY

Department of Water Resources
Repetitive Loss Area Analysis

APPENDIX 26

TABLE OF CONTENTS

A27.1 REPETITIVE LOSS AREA 27

This Report focuses on Area 27, one of the twenty-eight (28) designated RLAs within the Sacramento County. Area 27 analysis includes properties on Rosebud Lane as well as properties on Auburn Boulevard and is defined by **Figure A27**.

A27.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAAs

A27.3 PROBLEM STATEMENT

The location of Area 3 is generally northwest of Auburn Boulevard. The source of flooding was primarily identified as the back water flow from the confluence of Brooktree Creek and Arcade Creek.

There are sixteen (16) properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions.

A27.4 BASIC INFORMATION

The primary methods of property protection are: wet flood-proof portions of the building (so water won't cause damage), direct drainage away from the building, and drainage maintenance.

A27.5 DATA COLLECTION

Sacramento County Plans and studies for Brooktree Creek were not available to be utilized in this analysis.

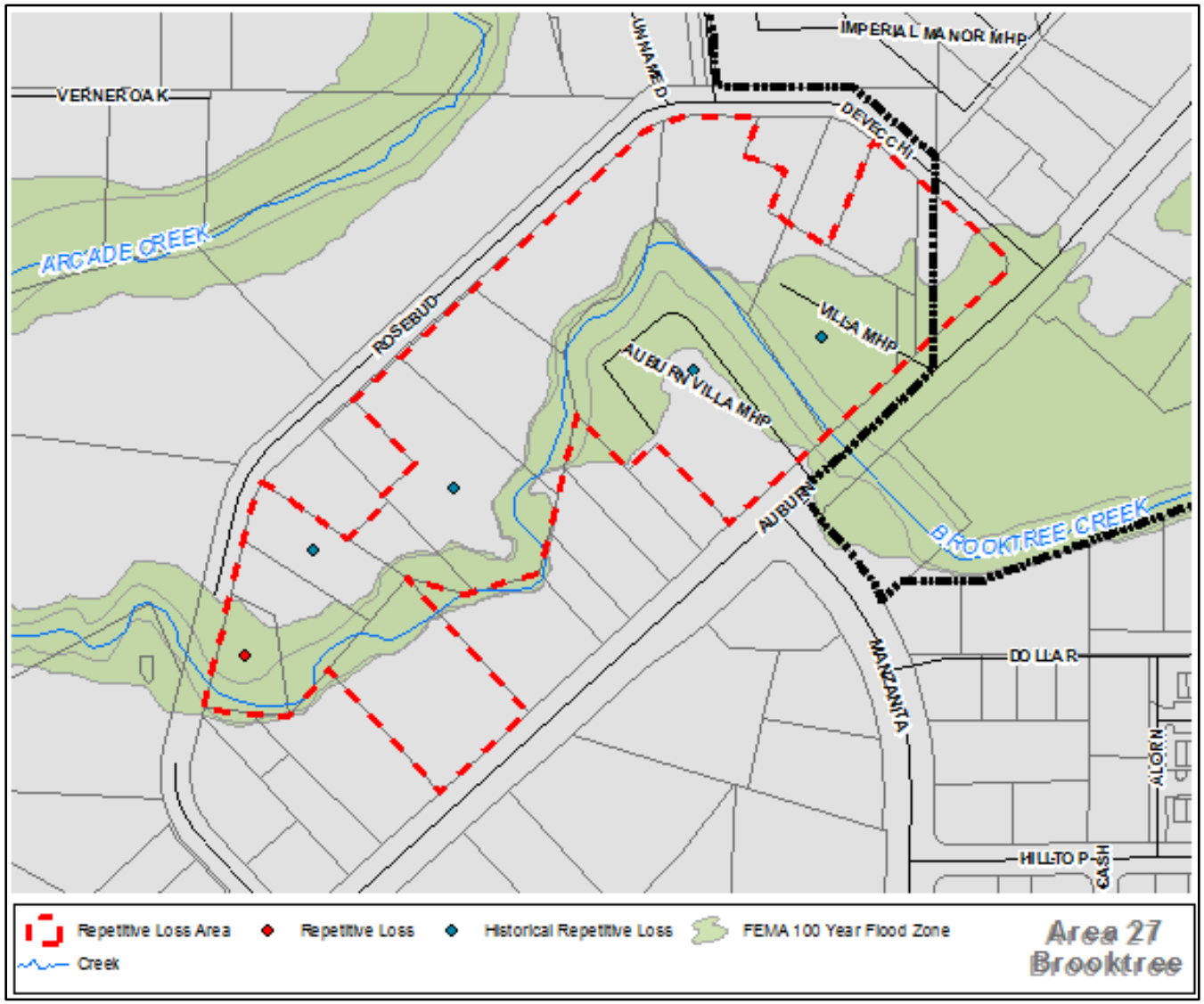
A27.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) 16 properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when Brooktree Creek overflows into a floodplain. The Sacramento County Local Floodplain Map does not cover the Dry Creek Shed for this RLA.

A27.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that three (3) of the overall 17 properties within the Brooktree Creek RLA had reported flooding.

FIGURE A27
Repetitive Loss Area #27



A27.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in January 1995 and December 1999. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A27.5.4 Types of Foundations

The most common type of foundations within the Brooktree Creek flood plain RLA is slab on grade, which constitutes 81.3% of the common foundations found in this RLA within Sacramento County (see Section 2.5.2 of this report for a detailed description of the foundation types mentioned).

A27.6 FUTURE MITIGATION MEASURES

The County continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Through HMGP & FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available.
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

BROOKTREE CREEK FLOODPLAIN

AREA 27

AUBURN BOULEVARD

DEVECCHI AVENUE

BROOKTREE CREEK FLOODPLAIN

DATA ANALYSIS SUMARY

PROPERTIES	**7**
REPETITIVE LOSS PROPERTIES	*0*
HISTORICAL LOSS PROPERTIES	*1*
REPETITIVE LOSS AREA PROPERTIES	*6*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS *(Mobile Home Park)* 1
  - SLAB ON GRADE 6
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
220-0161-035	5825 AUBURN BLVD	SLAB ON GRADE	GOOD			**No Report of Flooding**
220-0161-042	5867 AUBURN BLVD	RAISED (Mobile Homes)	FAIR		Auburn Villa Mobile Home Park	**1/11/2006** - Record Sheriff's office: Major damage to the floors, storage unit underneath. Space 12 - Minor damage to RV, staircase washed away, flooring damaged. Space 15 - damages to batteries at the 5th wheel, carpet. Space 18 - flood water and mud in trailer caused damage to floors, furniture, cabinetts and other misc. items. Space 28 - flood water and mud in 5th wheel damage to all items. Space 37 - Car damage. Space 16 - heating and air gone, carpeting 3 in. water, floor level damaged can not live in. Space 19 - Major damage 3 feet of water everything is lost. Space 5 - flooded a foot carpeting, linoleum, insulation, lower walls, mildew damage. Space 24 - water waist-level inside Al furniture and furnishings, clothing, electronics, carpets, linoleum, beds, computers, tools in shed, and 1990 camero was filled with water. Space 7 - Car submerged in water, severe landscaping destruction porch/patio, water went under skirting water submerged a few feet under. Space 38 - central heat broken, camera and VCT ruined, 1 foot of water, carpeting, furniture ruined, other personal itmes damaged, uninhabitable until repaired. Unknown space caller Virginia Soto - 3 feet of water in home, all furniture damaged, all the electric plugs damaged. Space 17 - water heater destroyed, carpet gone, furniture gone, clothes destroyed. Space 20 - 1 foot of water, carpet damaged.

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
220-0161-031	5859 AUBURN BLVD	SLAB ON GRADE	GOOD		Commercial	**No Report of Flooding**
220-0161-030	5911 AUBURN BLVD	SLAB ON GRADE	GOOD		Commercial	**No Report of Flooding**
229-0042-004	5911 AUBURN BLVD E	SLAB ON GRADE	GOOD		Commercial	**No Report of Flooding**
220-0161-060	5964 DEVECCHI AVE	SLAB ON GRADE	POOR		Commercial	**No Report of Flooding**
220-0161-083	5990 DEVECCHI AVE	SLAB ON GRADE	GOOD		Commercial	**No Report of Flooding**

AREA 27

ROSEBUD LANE

BROOKTREE CREEK FLOODPLAIN

DATA ANALYSIS SUMARY

PROPERTIES	**9**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*2*
REPETITIVE LOSS AREA PROPERTIES	*6*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 1
  - SLAB ON GRADE 7
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION) 1

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
220-0161-018	5800 ROSEBUD LN	RAISED	GOOD	Elevated		**12/22/2000 -** Raise house HMGP. **12/16/1999** – Flooding in garage. **01/22/1997 -** FEMA Flood Claim **1/9/1995** – Depth of flooding in the house 42". Depth of flooding in the garage 48". **12/12/94** - FEMA Flood Claim
220-0161-019	5808 ROSEBUD LN	RAISED	GOOD			**No Report of Flooding**
220-0161-085	5820 ROSEBUD LN	SLAB ON GRADE	FAIR		Commercial	**1/9/1995** – Depth of flooding in the building office 14". Depth of flooding in other buildings 3".
220-0161-022	5854 ROSEBUD LN	SLAB ON GRADE	GOOD		Commercial	**No Report of Flooding**
220-0161-041	5856 ROSEBUD LN	SLAB ON GRADE	GOOD		Commercial	**No Report of Flooding**
220-0161-072	5860 ROSEBUD LN	SLAB ON GRADE	GOOD		Commercial	**No Report of Flooding**
220-0161-073	5920 ROSEBUD LN	SLAB ON GRADE	GOOD		Commercial	**01/10/1995 -** FEMA Flood Claim
220-0161-074	5930 ROSEBUD LN	SLAB ON GRADE	GOOD		Commercial	**No Report of Flooding**
220-0161-025	5940 ROSEBUD LN	SLAB ON GRADE	GOOD		Commercial	**2005 -** Street flooded.

Appendix 28

REPETITIVE LOSS AREA 28
VERDA CRUZ CREEK

SACRAMENTO COUNTY

Department of Water Resources

Repetitive Loss Area Analysis

APPENDIX 28

TABLE OF CONTENTS

A28.1 REPETITIVE LOSS AREA 28

This Report focuses on Area 28, one of the twenty eight designated RLAs within the Sacramento County. Area 14 analyses include Moraga Drive, Crestview Drive, Loma Linda Court, Hackberry Lane, and Verde Cruz Way as defined by **Figure A28**.

A28.2 ADVICE FOR RESIDENTS

Residents have been advised that their property is in or near a flood hazard area by a direct mailer that targeted properties in the RLAs.

A28.3 PROBLEM STATEMENT

The location of Area 14 is made up of six subareas. The first subarea is directly adjacent to Verda Cruz Creek and is generally bounded by Verde Cruz Creek crossing at the intersection of Hackberry Lane, Verde Cruz Way. The fourth section is located at the Verde Cruz Creek crossing near the intersection of Crestview Drive and Heathcliff Drive. The fifth subarea is adjacent to Brooktree Creek and is generally bounded by Auburn Boulevard, Rosebud Lane, and Devecchi Avenue. The sixth subarea is directly adjacent to Verde Cruz Creek near the intersection of Moraga Drive and Dewey Drive.

The source of flooding was primarily identified as the residences being in low lying areas, in some instances adjacent to a creek that is over capacity, and most of the homes having slab-on-grade foundations.

There are 22 properties which include buildings on FEMA's repetitive loss list, historical loss properties and nearby buildings that may have the same or similar flooding conditions.

A28.4 BASIC INFORMATION

From the agencies or organizations that were contacted (Chapter 2.2), the following plans or studies that could affect the cause or impacts to flooding are:

- Drainage Study for 4950 Hackberry Lane

The primary methods of property protection are:

- Home Elevation – Is your floor below the elevation of the floodplain? If so, it may be prudent to elevate the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available to you. In the past, the County has utilized FEMA grant money for dozens of qualified elevation projects.

- Site Modification – Would a small wall, berm, or other site specific grading help keep water out of your house? Often, modification of the area around your home may be

appropriate to minimize flooding depending on the depth of floodwater and site specific constraints.

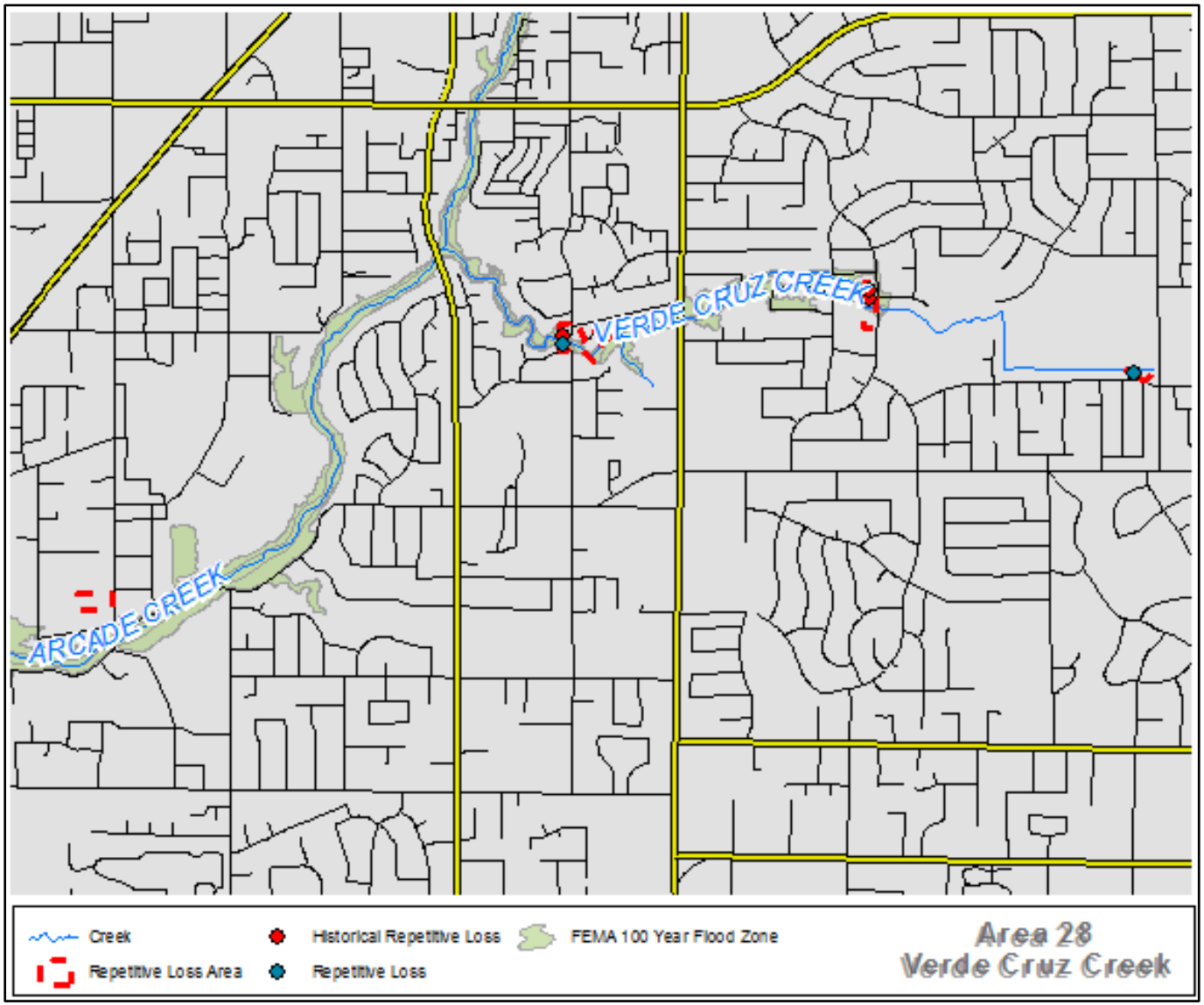
- Temporary Flood Barriers – Perhaps sandbags or other barriers could be employed on site in advance of a storm to help keep water out.
- Home Removal – If necessary, it may be recommended that the County purchase the property and remove the home from the lot.

A28.5 DATA COLLECTION

Sacramento County Plans and studies for Manzanita Avenue were utilized in this analysis. The sources listed below provided additional data related to the causes and impacts of flooding in the RLA.

- Crestview Culvert
- Crestview Oaks
- Moraga Drive and Dewey Drive Drainage Project
- Via Del Campo High School Drainage Project

FIGURE A28
Repetitive Loss Area #28



A28.5.1 Flood Insurance and Flood Event Data

Based on the FIRM (August 2012) 28 properties within the RLA are within the 100-year FEMA floodplain. The flooding occurs when flows exceed the capacity of Arcade Creek, and Verde Cruz Creek. The Sacramento County Local Floodplain on Sycamore Avenue for this RLA floods due to it being a low lying area.

A28.5.2 Flooding Experiences of Property Owners

Water Resources Service Request Tracking System (WR-SRTS) indicates that 4 of the overall 22 properties within the Dry Creek RLA had reported flooding.

A28.5.3 Structure Inspections

On-site inspections of buildings in the RLA were performed in March of 2015. This inspection was performed from both the public right-of-way, when not allowed onto the property and on the effected property by engineering staff (Drainage Maintenance and Operations, Drainage Development, and Drainage Design). As such, staff did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations along with interviewing residence of observed accounts during the storm event to determine the extent of the damage to the structure. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Relative elevation of first floor;
- Garage location and relative elevation;
- Property grading;
- Downspout discharge location; and
- Neighborhood topography and flow routes.
- High-water marks and debris mark levels

A28.5.4 Types of Foundations

The most common type of foundations within the Manzanita Avenue RLA is slab-on-grade.

A28.6 FUTURE MITIGATION MEASURES

The County continues to search for additional funding for future mitigation measures. The County further continues to encourage home owners to raise their structures above the flood hazard.

- **Responsible Office:** Department of Water Resources (Demolition) through HMGP& FMA and Property Owner (Home Elevation)
- **Timeline:** As opportunity and/or funding becomes available
- **Potential Funding:** State and/or Federal Grant

DATA ANALYSIS SUMMARY

VERDA CRUZ CREEK

AREA 14

COLLEGE OAK DRIVE

CRESTVIEW DRIVE

VERDA CRUZ CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**18**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	*3*
REPETITIVE LOSS AREA PROPERTIES	*14*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS 10
  - SLAB ON GRADE 8
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
240-0223-040	4405 COLLEGE OAK DR	SLAB ON GRADE	GOOD			**No Flood Reported**
236-0245-008	4863 CRESTVIEW DR	RAISED	GOOD			**No Flood Reported**
236-0245-004	4881 CRESTVIEW DR	RAISED	GOOD			**12/12/2001 –** FEMA Flood Claim **1/9/2002** – Flooded garage. **1/9/1995** – Flooded 8" in the garage.
236-0245-009	4857 CRESTVIEW DR	RAISED	GOOD			**No Flood Reported**
236-0245-007	4869 CRESTVIEW DR	RAISED	GOOD			**No Flood Reported**
236-0245-005	4875 CRESTVIEW DR	RAISED	GOOD			No EC on file.
236-0245-003	4901 CRESTVIEW DR	SLAB ON GRADE	GOOD			**1/9/1995** – Flooded garage.
236-0245-002	4907 CRESTVIEW DR	RAISED	GOOD			**No Flood Reported**

DATA ANALYSIS TABLE (continued)

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
230-0281-002	4837 HACKBERRY LN	SLAB ON GRADE	GOOD			**3/5/2002 –** FEMA Flood Claim **4/3/1996 –** FEMA Flood Claim **1/12/1980 –** FEMA Flood Claim
230-0281-018	4841 HACKBERRY LN	SLAB ON GRADE	GOOD			**1/24/1998** – Flooded garage 3". **2/7/1983 –** FEMA Flood Claim **1/27/1983 –** FEMA Flood Claim
230-0281-019	4853 HACKBERRY LN	RAISED	GOOD			**No Flood Reported**
230-0352-003	5708 LOMA LINDA CT	RAISED	GOOD			**No Flood Reported**
230-0352-004	5710 LOMA LINDA CT	RAISED	GOOD			**No Flood Reported**
230-0352-005	5712 LOMA LINDA CT	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0352-006	5714 LOMA LINDA CT	RAISED	GOOD			**No Flood Reported**
230-0352-007	5716 LOMA LINDA CT	RAISED	GOOD			**No Flood Reported**
230-0352-008	5718 LOMA LINDA CT	SLAB ON GRADE	GOOD			**No Flood Reported**
230-0352-001	5700 VERDE CRUZ WY					No EC on file.

AREA 14

MORAGA DRIVE

VERDA CRUZ CREEK

DATA ANALYSIS SUMARY

PROPERTIES	**4**
REPETITIVE LOSS PROPERTIES	*1*
HISTORICAL LOSS PROPERTIES	
REPETITIVE LOSS AREA PROPERTIES	*3*

- EXISTING STRUCTURES (UNMITIGATED)
  - RAISED FOUNDATIONS
  - SLAB ON GRADE
- NO STRUCTURES
  - PRIVATELY OWNED

MITIGATED PROPERTIES

- ACQUSITION & DEMO
- AQUSITION – NO STRUCTURE
- ELEVATED (RAISED FOUNDATION)

DATA ANALYSIS TABLE

Parcel Number	Address	Foundation Type	Condition	Mitigation Measure	Property Owner Comment	Additional Information
236-0341-005	6631 MORAGA DR	SLAB ON GRADE	GOOD			No EC on file.
236-0341-004	6637 MORAGA DR	SLAB ON GRADE	GOOD			**1/10/1995 –** FEMA Flood Claim **3/16/1992 –** FEMA Flood Claim
236-0341-003	6643 MORAGA DR	SLAB ON GRADE	GOOD			No EC on file.
236-0341-002	6649 MORAGA DR	SLAB ON GRADE	GOOD			No EC on file.

Appendix H Watershed Master Plan

Watershed Management Plan

2016

Sacramento County

City of Sacramento

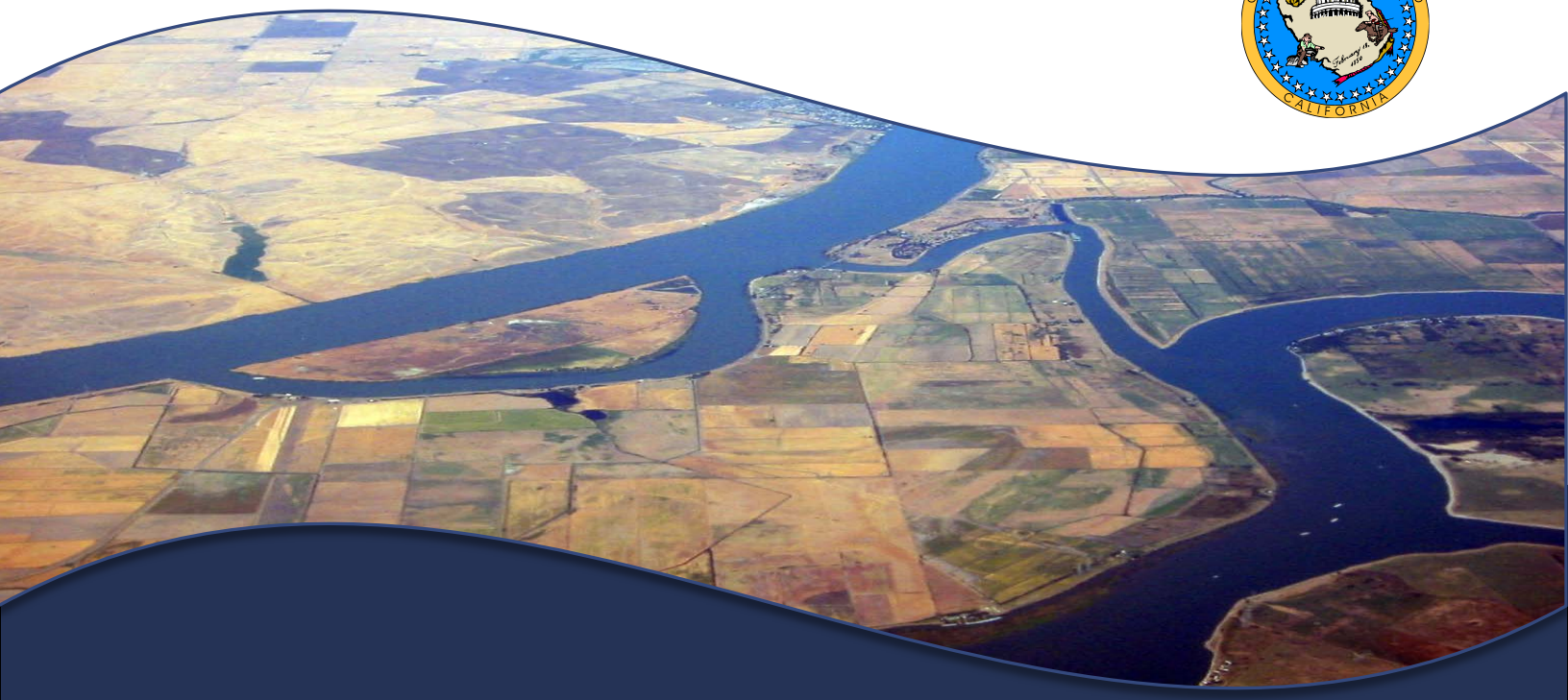


TABLE OF CONTENTS

WATERSHED MANAGEMENT PLAN

PURPOSE AND OVERVIEW

This Watershed Management Plan describes the regulatory framework, planning and coordination to reduce flooding caused by development on a watershed basis in Sacramento County. Development, consisting of buildings, parking lots, streets, gutters, drainage pipes and channels create impervious surfaces and speed up the flow of runoff that result in increases in storm runoff volumes and peak discharges. The impact of proposed development on existing development and hydraulic conveyance systems should always be evaluated.

Sacramento County lies mostly in the trough of the Sacramento Valley in the northern portion of the Central Valley of California. The county is bound on the east by the Sierra Nevada foothills and extends to the southwest into the Sacramento Delta. The county totals 994 square miles and has seven incorporated cities. There are seven incorporated cities in the County of Sacramento including:

- Citrus Heights
- Elk Grove
- Folsom
- Galt
- Isleton
- Ranch Cordova
- Sacramento

The total population of Sacramento County (2015) is 1,501,335. .

Additionally, there are two adjacent counties, Placer County and Sutter County, that have creek watersheds draining into Sacramento County.

The purpose of this plan is to provide an understanding of the region's watershed behaviors to base future decisions on that will reduce the increased flooding from development on a watershed-wide basis.

This plan will:

- Evaluate future conditions
- Identify wetlands and natural areas
- Address the protection of natural channels

- Provided a dedicated funding source for implementing the plan

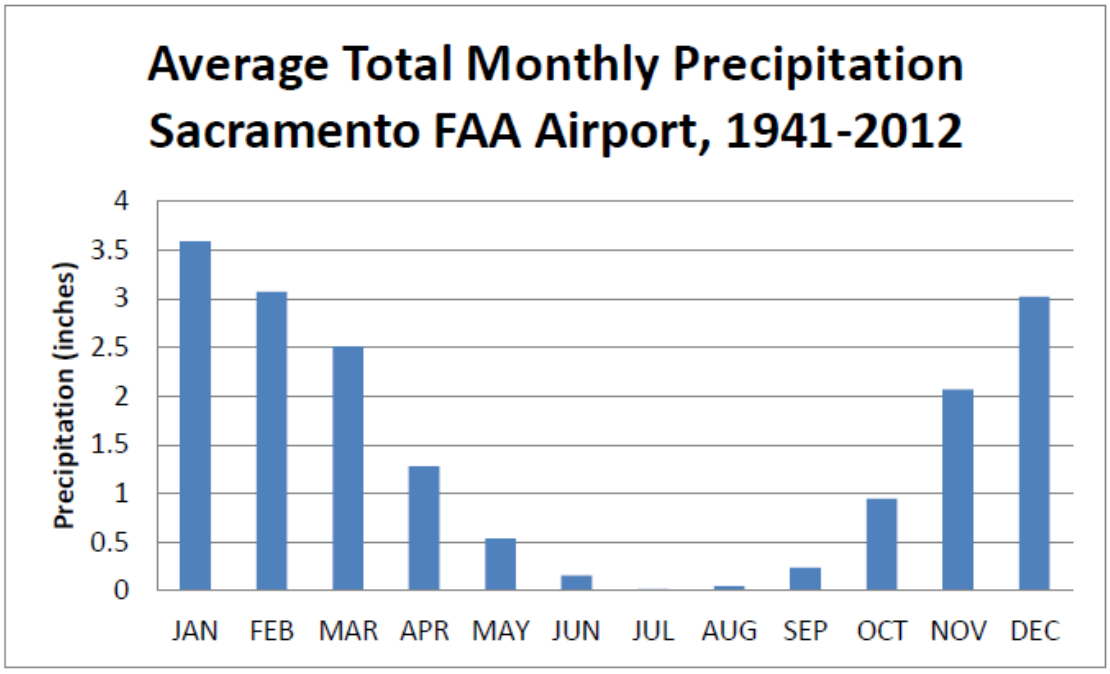
Sacramento County Flood Insurance Rate Maps were first issued March 15, 1979 and the county has continuously been a community in good standing with the National Flood Insurance Program (NFIP). Each city has a Federal Emergency Management Agency (FEMA) NFIP community number and an independent relationship with the NFIP.

The FEMA Community Rating System (CRS), under the Insurance Services Office recommends watershed management planning that is not limited to corporate boundaries. Under CRS Activity 450, a participating community may receive points toward improved rating and lowered flood insurance premiums for preparing a plan such as this and updating that plan every five years.

CONDITIONS

PRECIPITATION

The County experiences most precipitation between November and April. Essentially all of the precipitation that occurs in the area is rain. Based on data gathered at Sacramento FAA Airport between 1941 and 2012, average annual rainfall is approximately 17.54 inches, but can range from wet to dry years. Between 1941 and 2012, recorded annual rainfall ranged from a low of 6.25 inches in 1976 to a high of 33.44 inches in 1983 (Western Regional Climate Center 2012).



Source: Western Regional Climate Center 2012

SOIL TYPE

The prevalent soil in Sacramento County is Soil Conservation Service Type D, tightly bound and low permeability. Summertime humidity is quite low but the winter is more humid with lower temperatures (40 to 60 degrees Fahrenheit). Freezing conditions are rare, but there are often extended periods of fog. Consequently, soil remains quite moist throughout the rainy season. Therefore, land development, in general, has a greater effect on peak flow timing due to routing (gutters, pipes, channels) than volume increases due to increased impervious area (paving and rooftops). Flooding has been a major concern in this county since before the Gold Rush.

FUTURE CONDITIONS

According to the City of Sacramento's General Plan 2035, Cal-Adapt, a climate change scenario planning tool developed by California Energy Commission, average temperatures in the Sacramento region are projected to rise between four and six degrees by 2100, based on low and high emissions scenarios, respectively (Cal-Adapt 2013). Cal-Adapt uses a method to downscale global climate model data to local and regional resolution under two emissions scenarios; the A-2 scenario represents a business-as-usual future emissions scenario, and the B-1 scenario represents a lower GHG emissions future.

The increase in average temperature is expected to have the following effects:

- **Sea level rise.** Rising sea levels are expected due to temperature increases that cause ocean water to expand, Arctic and glacial ice to melt, and increased amounts of snowpack runoff to enter the sea. California's ocean surface temperature patterns have been warmer than normal for the past decade, a condition known as Pacific Decadal Oscillation. California sea level appears to have risen by about seven inches over the 20th century and is predicted to rise up to 55 inches by the end of the 21st century. Sacramento's location (70 miles inland coast) limits the most significant effects from sea level rise. However, rising sea levels may lead to levee failures in the Delta causing infrastructure damage, flooding, and saltwater intrusion into groundwater aquifers that may affect Sacramento region groundwater sources. It is also possible that sea level rise could reduce the effectiveness of Delta and nearby Delta levees, or increase flood levels in tidally affected reaches of the Sacramento River, if storm flow and tide conditions coincide. An influx of saltwater would degrade California's inland estuaries, wetlands, and groundwater aquifers. Saltwater intrusion could threaten the quality and reliability of California's biggest fresh water supply that is pumped from the southern edge of the Sacramento/San Joaquin River Delta (City of Sacramento 2011).

- **Changes to precipitation patterns.** Precipitation levels are difficult to predict compared to other indicators of climate change. Annual rain and snowfall patterns vary widely from year to year, especially in California. Generally, higher temperatures increase evaporation and decrease snowfall, resulting in a drier climate. A majority of scientific models have shown that northern California precipitation is expected to decrease after 2030. But, more precipitation is expected to fall as rain rather than as snow. According to DWR, the Sacramento region has actually seen an increase in annual precipitation of about one inch over the last century. DWR research from 1901 to 2000 shows that the Sacramento River system runoff volume has remained stable on an annual basis, but there has been a 9 percent reduction in runoff from April through July. This is likely the result of increased winter rainfall and less snowpack storage. DWR anticipates that over the next century the Sacramento region will likely experience a slight increase in annual precipitation, with larger and more intense storms resulting in flood conditions, and longer drought periods. However, according to Cal-Adapt, the Sacramento region is projected to experience a slight decrease in annual precipitation levels (rain and snow) by 2090. It is expected that there will be less snowfall in the Sierra Nevada and the elevations at which snow falls will rise. Coincidentally, there will be less snowpack water storage to supply runoff water in the warmer months. Already it has been documented that California's snow line is rising (City of Sacramento 2011).

- **Increased frequency of extreme events such as heat waves, drought, and storm events.** Extreme heat waves are expected to increase in number by ten times in the Sacramento region and could become an annual event by 2100. Sacramento could experience up to 100 additional days per year with temperatures above 95°F and by 2090, the average July temperature could reach over 104°F. Changes to air and land temperatures will have an impact on the timing, amount, type, and location of precipitation and runoff in the Sacramento and American Rivers watersheds. This will impact the quantity of water supplies, the management of those quantities, the quality of the source water, and the demand for treated drinking water. DWR has identified anticipated changes to the source water conditions in the watershed that will likely impact the quality of the source waters, including more intense storm events, longer drought periods, reduced snowpack at lower elevations, and earlier spring runoff. Extreme weather is expected to become more common throughout California. More extreme storm events are expected to increase water runoff to streams and rivers during the winter months, heightening flood risks. (City of Sacramento 2011).

These changing conditions are expected to affect our region in the following ways:

- **Impacts to biological resources:** Habitats that currently support local wildlife are expected to change, forcing plants and animals to either adapt to the new environment or move to more

hospitable areas. Some species will be able to adapt to changing habitats by shifting their range or altitudes in order to adjust to rising temperatures. Others, however, might not be able to adapt fast enough to keep pace with the rate of climate change. For some species, climate change may allow them to increase the range of habitat where they can live; however, where plants and animals need to move to survive they may find wildlife corridors blocked or competition from other species (City of Sacramento 2011).

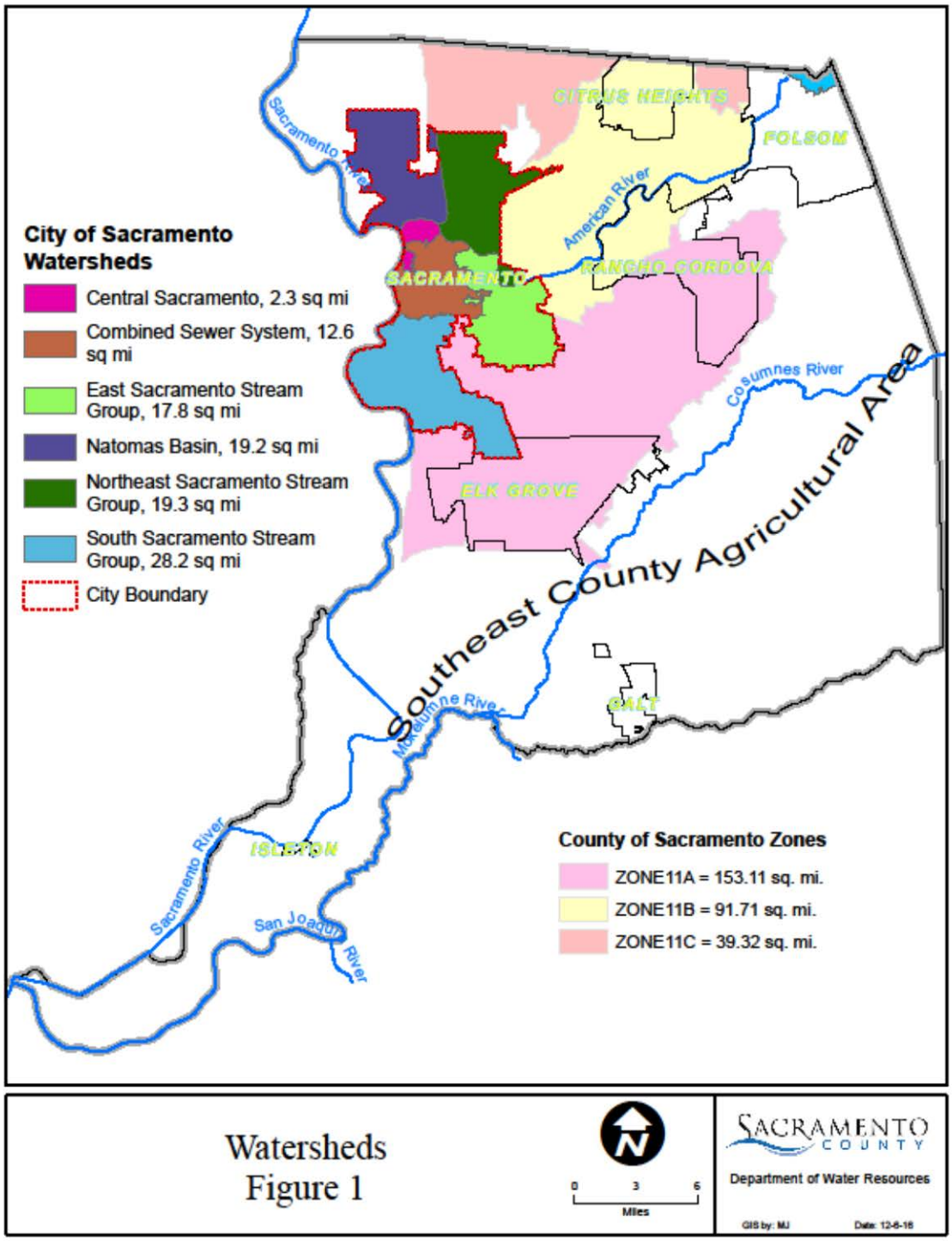
- **Increased risk of flood events:** Warmer ocean surface temperatures have caused warmer and wetter conditions in the Sierra Nevada, increasing flood risk. When the Sacramento or American Rivers are already at peak capacity, additional flows from increased snowpack runoff or storm intensity could cause flooding. During the last 50 years peak flow patterns have increased in the Sacramento River, making floods more likely in the future, especially if there is an increase in intense storms (City of Sacramento 2011).

WATERSHEDS

The urban and urbanizing areas of the County, including the Cities of Rancho Cordova, Elk Grove and Citrus Heights, are divided into three zones of the Sacramento County Water Agency, a statutorily created district operating under the authority of and pursuant to the provisions of the Sacramento County Water Agency Act (West's California Codes, Water Code Appendix, Chapter 66, commencing at Section 66-1, et seq.; Deering's California Codes, Water, Uncodified Acts, Act 6730a). These zones are identified on Figure 1 as 11A, 11B, and 11C.

The City of Sacramento is made up of two major waterways. The confluence of these two major waterways, the Sacramento River and American River, is within the City. The City also encompasses several other streams, creeks, and associated watersheds. The majority of these watersheds drain into the City from the County of Sacramento. The major drainage watersheds in the City can be divided into six groups and geographic areas. These areas are identified on Figure 1 as Natomas Basin, Northeast Sacramento Stream Group, East Sacramento Stream Group, South Sacramento Stream Group, Combined System, and Central Sacramento.

Figure 1: Watershed Boundaries with Calculated Areas



DRY CREEK AND NEMDC AND TRIBUTARIES (ZONE 11C)

The drainage master planning in the Dry Creek and Steelhead Creek (Natomas East Main Drainage Canal, NEMDC) tributary watersheds (Zone 11C) are fully master planned for pending development. These areas are generally large lot agricultural-residential parcels with roadside ditches and culvert crossings. There are two large developments being proposed known as Elverta Specific Plan, and South Placer Vineyard (the latter being in Placer County). The urban area known as Antelope was constructed in the late 1980s and early 1990s and is 86.4% developed and was fully master planned.

WATERSHEDS IN THE DRY CREEK STREAM GROUP

Dry Creek - 4138 acres in Sacramento County draining to the lower NEMDC, then to the American River, there are 48,966 acres upstream in Placer County. The Dry Creek study, dated 1992, was approved by both counties. There is a current effort in Placer County to update the hydrology study for Dry Creek and its tributaries. The two counties have enjoyed a good working relationship and technical cooperative partnership.

Basin A - A tributary to Antelope Creek draining toward Placer County and into Dry Creek. It was part of the Antelope community development master planning in the early 1990's and is fully developed.

Magpie Creek - 3789 acre watershed draining to the former McClellan Air Force Base (now a business park) and is master planned through the Base property and into the City of Sacramento. There is a 2008 study by West Yost that when constructed would serve to reduce flood risk to OptiSolar and adjacent buildings. There is no opportunity for major infill upstream of the McClellan Business Park.

Robla Creek - 5141 acre watershed in the county before it enters the City of Sacramento toward the confluence with Dry Creek and the NEMDC. It is 99.8% developed.

Linda Creek and Tributaries - 3580 acre watershed in Orangevale area draining to the City of Roseville which is a tributary to Dry Creek ultimately draining back to Elverta and Rio Linda in Sacramento County. The Linda Creek watershed is 99.5% developed.

Sierra Creek - 1743 acre watershed draining to Dry Creek in the Antelope community.

The Natomas East Main Drainage Canal (NEMDC) - Also known as Steelhead Creek has a backwater floodplain along the east side. The zoning in the eastern area is generally agricultural residences. American River backwater into the NEMDC is controlled by Pump Station Number D-15, which serves to reduce the base flood elevation upstream. There is a volume concern and there is a mitigation fee component of Zone 11C. No filling is allowed in the NEMDC backwater floodway area unless compensatory excavation is demonstrated. A fee is collected under the Sacramento County

Water Agency Code for the future addition of a pump at this pump station. Currently, floors are set based on a one pump failed scenario which generally provides an extra one foot of freeboard in the backwater area.

NEMDC Tributary 1 flows to the NEMDC and conveys flows from southwest Placer County. There are 1526 acres in Placer County and 865 acres in Sacramento County. South Placer Vineyard Development will pay the Pump Station D-15 mitigation fee.

NEMDC Tributary 2 is a 2744 acre watershed area with no planned infill development, except the Elverta Specific Plan, which will attenuate peak flow and volume impacts with large detention basins.

NEMDC Tributary 3 is a 1567 acre watershed area with no planned infill development, except the Elverta Specific Plan.

East Natomas is an 1816 acre watershed area with no planned infill development.

DRAINAGE STUDIES FOR ZONE 11C (DEVELOPING AREAS, AND AREAS IN NEED OF IMPROVEMENT)

NEMDC Tributaries - Drainage study was developed by Borcalli & Associates in 1994. It is being used by Water Resources to condition development. The precipitation data and land use are still appropriate, as well as the hydrology (HEC-1). The hydraulic model is updated from HEC-2 to HEC-RAS as appropriate.

Elverta Specific Plan - An approved drainage master plan that would include peak flow detention to minimize the impact to Tributaries 1 and 2.

- The Elverta Specific Plan Drainage Master Plan revision was prepared in 2011 by MacKay & Somps Engineers.

Dry Creek Watershed Flood Control Plan - Sponsored by both Placer County Flood Control District and the Sacramento County Water Agency and has been in use since 1992. It is currently being updated by Placer County. It is being used by both Placer County and Water Resources to condition development.

Robla/Magpie Creeks Drainage Study - Developed by Borcalli & Associates for SAFCA, and the City and County of Sacramento in 1998, and updated by Mead & Hunt Engineers in 2007. It is being used by Water Resources to condition development.

Robla and Magpie Creek Diversion Levee CLOMR - Developed by Ensign & Buckley on April 2002.

McClellan Park Magpie Creek Floodplain Improvements - Includes hydrologic and hydraulic modeling for Magpie Creek developed by West Yost in 2011 to revise FEMA floodplain from AO zone to AE zone in area of Idzorek Street. The CLOMR has been approved by FEMA in 2009.

South Placer Vineyard - Drainage study for the County of Placer.

Linda Creek Hydrology - Prepared by Nolte Associates, Inc. (the study contractor) for the Federal Emergency Management Agency (FEMA) under Contract No.EMS-2000-CO-0057 Order No. T002 and completed in September 2004. Both Placer and Sacramento Counties served as a Cooperating Technical Partners (CTP's) for this study.

NATURAL STREAMS GROUP AND TRIBUTARIES (ZONE 11B)

Drainage master planning in the natural streams and areas, draining to the American River (Zone 11B), is deemed 100% master planned. The 'natural streams' are protected by the county zoning code. These natural streams are generally lined with established oak and other vegetation serving as habitat and shade canopy. The county opposes disruption to these sensitive areas encompassing most of the Zone 11B creeks and primary tributaries.

WATERSHEDS IN THE NATURAL STREAM GROUP (ZONE 11B)

American River - 100% master planned and controlled by state and federal regulators. Folsom Dam and a system of certified levees control the flows in this river. Any proposed land development in the lower reach of this 2100 square mile watershed could not have any significant impact on peak flow. RBF Consulting prepared for Sacramento Area Flood Control Agency and the City and County of Sacramento a study and letter of map revision submitted to and approved by FEMA in 2010. MBK Engineers submitted an updated hydrology and hydraulic analysis for the process to certify the levees along the River. This new base flood profile will be mapped with the forthcoming FEMA map revision.

Arcade Creek – 6,508 acre watershed is 98.2% developed with only 54 acres of infill area remaining. There is no valid location for peak flow detention; however, as redevelopment occurs there will be opportunities for installation of stormwater quality treatment devices. Modeling on Arcade Creek was by County Water Resources staff (in 1995-98 and upstream of Auburn Blvd in 2007) and the resulting profile is used where it is higher than recorded high water and FEMA flood insurance study. An additional modeling effort conducted by County Water Resources staff was submitted to FEMA in 2015. The modeling showed 100-year water surface elevations that are significantly higher than the FEMA base flood elevations. **Arcade Creek South Branch** – 1,657 acre watershed in which lies the approved (104 acre) Gum Ranch Specific Plan, which is slated for a peak flow detention basin when the project is constructed by the development interests. The Gum Ranch hydrology study used in the project

environmental impact report is deemed current. Upon completion of Gum Ranch development, this watershed will be about 99% developed.

Brooktree Creek - City of Citrus Heights, is 97.8% developed.

Mariposa Creek - City of Citrus Heights, is 97.2% developed.

Carmichael Creek – 2,725 acre watershed draining to the American River. The watershed is 96.8% developed.

Chicken Ranch Slough – 3,722 acre watershed draining to the American river via Pump Station D-05. The watershed is 98.9% developed.

Cripple Creek – 4,327 acre watershed in Citrus Heights draining to Arcade Creek. The watershed is 98.5% developed.

Diablo Creek - 9,48 acre watershed draining to Arcade Creek and is 95.5% developed.

Fair Oaks Stream Group – Comprised of several smaller watersheds draining to the American River totaling 7819 acres and is 97.8% developed.

Manlove Creek – 1,893 acre watershed is 99.9% developed.

Kohler Creek - Also known also as Date Creek, is a 694 acre watershed draining to Arcade creek and is 97.1% developed.

Minnesota Creek – 1,095 acre watershed draining to the American River and is 95.7% developed.

Strong Ranch Slough – 4,573 acre watershed draining to the American River via Pump Station D-05. The shed is 99.3% developed.

Sunrise Creek – The watershed is entirely in the City of Citrus Heights and is 96.1% developed.

Verde Cruz Creek – 1,226 acre watershed draining to Arcade Creek and is 97.3% developed.

Alder Creek– 7,226 acre watershed draining to Lake Natomas reservoir on the American River. There is no need for flood flow or volume detention since the flow is to a federally operated reservoir. There will be hydromodification attenuation basins as well as low impact development measures. A detailed drainage study for Glenborough/Easton Development, dated 2013, was approved for environmental review, additional analysis is needed before the project can proceed to design.

Buffalo Creek – 9,167 acre watershed draining to the American River. The Westborough Drainage Master Plan accounts for the area known as Aerojet which is slated for development. There will be peak

flow detention in order to not exacerbate the downstream floodplain. The drainage master plan will be incorporated in the environmental impact report for the forthcoming project.

Mayhew Channel – 2,861 acre watershed draining to the American River. The shed is 96.6% developed.

Boyd Channel - Also known as Boyd Station Channel the 2201 acre watershed drains to the American River and is 95.9% developed.

Cordova/Coloma Stream Group – Comprised of several smaller shed areas draining to the American River totaling 1,728 acres and is 92.6% developed. This is in the City of Rancho Cordova.

DRAINAGE STUDIES FOR ZONE 11B (INFILL DEVELOPMENT AND CAPITAL IMPROVEMENT)

The following is a list of current drainage master plans including existing condition and fully development condition hydrology.

Chicken Ranch Slough - Drainage Master Plan was first developed by Water Resources staff in 1991 to identify solutions to flooding problems. Several large public meetings were held. A lack of consensus on an overall solution resulted in only one part of a recommended plan being implemented – revised channel maintenance procedures. Residences with low finish floor elevations were identified for elevating but home owners were not interested. The HEC-1 and HEC-2 models developed in the study were used as best available information until they were updated by staff in 2006 with SacCalc and HEC-RAS models.

Strong Ranch Slough/Sierra Branch - A drainage study was developed by David Ford Engineers for Water Resources in 2006 to analyze flood control alternatives. Staff expanded on the modeling in 2007 and developed a website and flood warning system for the area. The models are used by staff to analyze capital improvement projects.

D-05 - Drainage pump station that serves Strong Ranch and Chicken Ranch Sloughs. A 2003 Corps of Engineers Feasibility Study identified doubling the capacity of the D-05 pump station as the only feasible solution to reducing flooding in the area. There is no cost-effective solution that provides 100-year protection. A project to perform needed maintenance to the pump motor wiring resulted in a significant increase in motor horsepower and capacity to four of the six pumps. The benefit of the increased capacity is currently being modeled.

Arcade Creek - Water Resources commissioned a drainage study at Auburn Boulevard at the City of Sacramento Border in 2003 by a consultant to determine the level of protection for the Evergreen Estates floodwall. The county applied for and received provisional accreditation of this levee in 2009, but has

not submitted the required levee analysis needed to certify the levees. The County submitted as flood study to FEMA in 2015 that included reaches of Arcade and Cripple creeks. The modeling showed 100-year water surface elevations that are significantly higher than the FEMA base flood elevations. The study is under review by FEMA and is currently used for floodplain management.

South Branch Arcade Creek - Drainage studies were performed as referenced in the approved environmental impact reports for the Gum Ranch and Sheltonham developments. Hydrologic models were developed to analyze development impacts and mitigation measures.

Glenborough, Easton, Westborough - Drainage studies were developed associated with the proposed redevelopment of a portion of the GenCorp- Aerojet site in the Alder Creek and Buffalo Creek watersheds. These studies developed hydrologic and hydraulic modeling to determine development impacts and mitigation measures. Current study, by MacKay and Somps is dated 2013 and is being used for environmental review of the project.

Mayhew Drain Levee LOMR - Letter of Map Revision for Mayhew Drain was prepared by RBF Consulting in January 2010 to reflect improvements done by SAFCA, and the ACOE.

American River - American River Letter of Map Revision for American River was prepared by RBF Consulting, LOMR approved by FEMA 2010, mapping 145,000 cfs flow from Folsom Dam as the base flood.

MORRISON CREEK STREAM GROUP (ZONE 11A)

The Morrison Creek Stream Group may be deemed 100% master planned for peak flow, volume, and stormwater pollution prevention. The majority of growth in Sacramento County will occur in this area. Consequently, a great deal of effort has been put forth to master plan the necessary trunk drainage improvements. Ongoing master planning is occurring in the unincorporated County in association with the Vineyard Springs Comprehensive Plan, North Vineyard Station Specific Plan, West Jackson Master Plan, Mather South Community Master Plan, Newbridge Specific Plan, and Jackson Township Comprehensive Plan.

Many of the creeks in this watershed have reaches of natural bed and bank and are home for a variety of plant and animal species. These areas are treated with care and any hydraulic improvements would be only under strict guidance of the state and federal regulators under the Clean Water Act, Endangered Species Act and the California Environmental Quality Act. Thus, permits for creek corridor improvement projects will careful consideration of the habitat value and may include construction of naturalized side slopes, ponds, pools, and native landscaping.

Stormwater pollution prevention during construction and post development storm pollutant discharge treatment are always required. Additional measures are taken, where applicable, to assure minimal hydro-fluvial geomorphology impact due to proposed development by attenuating peak flow and volume.

WATERSHEDS IN THE MORRISON CREEK STREAM GROUP

Elder Creek – 7632 acres, 100% developed condition master planned for the approved North Vineyard Station and Florin Vineyard Specific plans. Master planning is ongoing in the Aspen 8 & 9 mining area, and the Jackson Township Comprehensive Plan area.

Elk Grove Creek- 4019 acres, 100% developed condition master planned for the East Elk Grove Specific Plan, City of Elk Grove.

Florin Creek – 2857 acres, 100% developed condition master planned for the proposed Florin Vineyard Specific Plan. The South Sacramento Stream Group project includes flood protection projects along Florin Creek consisting of channel improvements and construction of a flood control basin which will be completed late in 2016.

Gerber Creek – 2579 acres, 100% developed condition master planned for the approved North Vineyard Station Specific Plan and the approved Vineyard Springs Specific Plan. The latter is superseded by the North Vineyard Station Drainage Master Plan dated 2004 and subsequent revisions to the modeling to incorporate development planning for the Wildhawk North project. Construction of channel improvements began in 2016 in the upper reaches of Geber Creek in association with North Vineyard Station planned development.

Laguna Creek - Headwaters in the City of Rancho Cordova is 100% master planned for the proposed Suncreek Specific Plan. Laguna Creek between the cities of Elk Grove and Rancho Cordova is fully master-planned in the Vineyard Springs Specific Plan approved documents. The primary flood control facility is the Triangle Rock aggregate pit which mitigates the loss of floodplain due to mining activities south of Florin Road. This facility will helps control flood flows that jump from the Laguna Creek to Gerber Creek watershed at the CCTRR railroad embankment. Another detention basin planned just upstream of the railroad embankment will, in combination with the Triangle Rock Basin, fully mitigate cutting off the inter-basin transfer of flows from Laguna Creek to Elder Creek. The total Laguna Creek watershed is 21176 acres draining from just upstream of the City of Rancho Cordova's eastern boundary, through the planned development area over the Folsom South Canal, through Mather Field and preserve areas to the Vineyard Springs development area and into the City of Elk Grove ultimately discharging to Beach Stone Lakes. Elk Grove has modeled the creek up to the northern city boundary (Calvine Road) and County Water Resources has modeled the creek from the top of the shed to Calvine

Road. All models are existing condition and developed condition. The study by Wood Rodgers dated 2006 and the study by MacKay & Somps dated 2009 are superseded by the 2015 LOMR model by West Yost.

Laguna Creek and Tributary 1 in the City of Elk Grove was modeled with the 2009 submitted FEMA letter of map revision.

Morrison Creek – 34592 acres, Upper Morrison Creek is 100% master planned as part of developments in the City of Rancho Cordova. Middle Morrison Creek flood control is occurring at the Aspen 6 aggregate mine where there is a constructed weir. Lower Morrison Creek is in the City of Sacramento and has been fully studied by the Corps of Engineers who are designing a floodwall project. The large Jackson Highway Master Plan area encompasses much of the Morrison Creek watershed immediately upstream of the City of Sacramento. The hydrology study dated 2009 by Wood Rodgers will be succeeded by studies being prepared for the West Jackson Highway Master Plan which encompasses a large area of the Morrison Creek watershed in the county. **Strawberry Creek and Jacinto Creek**– Total 5588 acres partially in cities of Elk Grove and Sacramento is almost fully developed and master planned with several flood control and storm water quality detention basins. The study by/for Water Resources 1993 is deemed current.

Unionhouse Creek – 2193 acres tributary to Strawberry Creek and Morrison Creek is 100% master planned for the proposed Florin Vineyard Specific Plan. The developed condition drainage study by Civil Solutions dated 2007 is deemed current.

Whitehouse Creek – 100% master planned and developed in City of Elk Grove.

The South Sacramento Streams Project promoted by Sacramento Area Flood Control Agency with CA Department of Water Resources and the City of Sacramento intends to control flooding on Elder Creek, Unionhouse Creek, Florin Creek, and Morrison Creek west of Highway 99. The project consists of levee improvements starting south of the town of Freeport and running easterly into the urbanized areas of the City of Sacramento. The project also includes channel improvements along Florin and Unionhouse creeks.

Whitehouse Creek and Elk Grove Creek are tributaries to Laguna Creek which drains to the City of Sacramento then to the Beach Stone Lake Preserve

Strawberry Creek is tributary to Unionhouse Creek draining into the City of Sacramento and the South Sacramento Streams Group flood control project, then to the Beach Stone Lake Preserve.

Beach Stone Lake Tributaries drain the western half of the City of Elk Grove toward the Beach Stone Lake Preserve.

Mitigation of impacts to the Beach Stone Lake floodplain is discussed later in this document.

DRAINAGE STUDIES FOR ZONE 11A (DEVELOPING AREAS)

The following lists the current drainage master plans including existing condition and fully development condition hydrology.

Vineyard Springs Comprehensive Plan - The drainage plan for this planning area was developed by the Spink Corporation in 1999, and updated by Water Resources staff in 2003 and 2007. It was first adopted by the Sacramento County Board of Supervisors in 2003 and most recently in 2007. The plan, along with updates to the design and FEMA model are being used by Water Resources to condition development.

North Vineyard Station Specific Plan - The drainage plan for this planning area was developed by Borcalli & Associates in 2001 and updated by MacKay & Somps Engineers in 2006. It was approved by the Board of Supervisors in 2006. The modeling is going through updates as needed as new information is available, but the plan and revised modeling are being used by Water Resources to condition development.

Florin Vineyard Gap Community Plan - The drainage plan for this planning area was approved by Water Resources in 2007. The modeling is going through updates as needed as new information is available, but the drainage plan and revised modeling are being used by Water Resources to condition development.

Strawberry/Jacinto Creek Drainage Master Plan - This drainage master plan was developed by Water Resources staff in 1993. It was used to regulate pending development in the watersheds at the time, and is still used to condition development. The precipitation data is still appropriate, as well as the hydrology (HEC-1). The hydraulic model is updated from HEC-2 to HEC-RAS as necessary. The land use plan for the remaining undeveloped areas in the watershed is still appropriate.

Lower Laguna Creek Drainage Master Plan - This drainage master plan was developed by Water Resources staff in 1996. It was used to regulate pending development in the watersheds at the time, and is still used to condition development. The precipitation data is still appropriate, as well as the hydrology (HEC-1). The hydraulic model is updated from HEC-2 to HEC-RAS as necessary. The land use plan for the remaining undeveloped areas in the watershed is still appropriate.

Whitehouse Creek Drainage Study - This drainage study was first developed by Water Resources staff in 1996 and updated in 2006. It is being used by Water Resources to condition development.

Upper Morrison Creek - The Rio del Oro, Anatolia, and Sunridge drainage master plans in the City of Rancho Cordova serve to attenuate peak flow at the constraints crossing the Folsom South Canal.

Beach Stone Lake - Zone 11A watersheds converge to Morrison Creek, Laguna Creek which flow though the cities of Sacramento and Elk Grove, respectively, and ultimately to the preserve area known as Beach Stone Lake. In the Zone 11A program, is an impact fee that is collected, and separately accounted, for Beach Stone Lake mitigation. The Beach Stone Lakes Cumulative Impact Analysis dated September 1992 by Ensign and Buckley Consulting Engineers for Sacramento County used the DWR NETWORK unsteady-state hydraulic model to analyze the floodplain and the impacts of Zone 11A development. Subsequently, the Elliott Ranch South floodplain encroachment was presented in the Final Supplemental Environmental Impact Report for Elliott Ranch South General Plan Amendment (County Control Number 98-0617, dated July 1999, and an analysis of the impact of developing Shed B through the East Franklin Specific Plan and Laguna Ridge, in the City of Elk Grove was presented in those EIRs. This model is the current analysis of development impact to Beach Stone Lake.

Arboretum-Waegell Specific Plan - This specific plan for 1,350 acres enclosed by Sunrise Blvd, Jackson Road, and Grant Line Road was prepared by Wood Rodgers on March 24, 2010.

DRAINAGE STUDIES FOR ZONE 11A (CITY OF ELK GROVE)

Laguna Creek and Tributaries (including Elk Grove Creek and Whitehouse Creek)

- Laguna Creek Watershed Management Action Plan, Carmel Brown, CKB Environmental Consulting, Inc., Greg Suba, Environmental Education Services, EDAW, Inc. and Geosyntec Consultants, September 2008.
- Drainage Study for Elk Grove Creek, MacKay & Somps, May 24, 2007.
- Drainage Study for Vintara Park, MacKay & Somps, December 5, 2005.
- East Area Storm Drainage Master Plan Revised Draft Version, Harris & Associates, November 18, 2005.
- Sacramento County Laguna Creek LOMR Hydrologic Data, July 2005.
- Laguna Creek Feasibility Study Final Report, Quincy Engineering, Inc., June 13, 2005.
- Laguna Creek Hydrologic and Hydraulic Analysis, David Ford Consulting Engineers, March 2005.
- Technical Memorandum, Drainage Analysis for Fieldstone Unit 3 and Waterman Ranch Detention Basin within East Elk Grove Specific Plan, Watermark Engineering, Inc., February 10, 2006.
- Upper Laguna Creek Drainage Master Plan, Status Report, Sacramento County Water Resources Division, September 1997.

- East Elk Grove Specific Plan, Preliminary Technical Studies Report, MacKay & Somps, March 1994.
- Laguna Creek Watershed Analysis, David Ford Consulting Engineers, Inc. December 15, 2005.
- Hydrologic and Hydraulic Analysis to Assess Existing Condition for Flood Plain Extents for Whitehouse Creek and Unnamed Tributary to Whitehouse Creek, David Ford Consulting Engineers, Inc, September 2009.
- Storm Drainage Master Plan for Field Stone South, Mackay and Somps, April 6, 2006, revised May 10, 2006.
- Drainage Study for Old Town Mixed Use, RFE Engineers, Inc., revised October, 2006.
- Shops at Calvine, Storm Drainage Study and Plan prepared for Armstrong Development Properties, Inc. Jacobs, June 25, 2009.
- Drainage and Hydraulic Analysis Report Bond Road Widening Project, Engeo Incorporated, September 2, 2004.
- Drainage Report for the bond Road widening Project, David Evans and Associates, January 2007.
- Preliminary Drainage Report for the Bradshaw Widening Project, David Evans and Associates, May 2007.
- Seasons Hydrologic and Hydraulic Study, TSD Engineering, Inc., October 22, 2007, revised January 8, 2008.

Grant Line Channel

- Elk Grove Regional Park and Emerald Lakes Golf Course Storage Capacities, Letter from Psomas to City of Elk Grove, June 2005.
- Grant Line Channel and Pump Station D-39 Hydrologic and Hydraulic Analysis, PSOMAS, March 2005.

Laguna West Lakes

- Design Report, Laguna Creek Unit No.4 Hydrology Study, The Spink Corporation, July 1990.

Lakeside

- Design Report, Lakeside Development Hydrology Study, The Spink Corporation, July 1991.

Sheds A&B

- Drainage Master Plan for Laguna Ridge Specific Plan prepared for the Hodgson Company, updated and revised by WOOD Rodgers, July 2002.

- Laguna Ridge Specific Plan Supplemental Master Drainage Plan for Local Drainage Shed B, Wood Rodgers, May 2005.
- Laguna Ridge Specific Plan Storm Drainage CIP, Wood Rodgers, February 2005.
- East Franklin Interim Drainage Facility Analysis, Wood Rodgers, August 20, 2003.

Shed C

- Laguna Ridge Specific Plan Supplemental Drainage Plan for Local Drainage Shed C, Wood Rodgers, October 2005.
- Master Drainage Plan for Elk Grove Promenade, Local Drainage Area Shed C, Wood Rodgers, October 2005.

Strawberry Creek

- Strawberry and Jacinto Creeks, Drainage Master Plan, Draft Report, County of Sacramento Water Resources Division, July 1993.
- Storm Drainage Master Plan Report, Upper Reach of Middle Branch of Strawberry Creek, Elk Grove/West Vineyard Area, MacKay & Somps, February 5, 1992.

Miscellaneous

- Elk Grove General Plan adopted by the City Council November 19, 2003 and reflecting Amendments through January 5, 2005.
- Draft Laguna West Levee Certification Study, City of Elk Grove and Wallace Kuhl, 2011.

NORTHEAST SACRAMENTO STREAM GROUP

The Northeast Sacramento Stream Group contains 15 internal drainage basins. The existing drainage system serving this area is comprised of storm drains and open drainage channels. Runoff within the watershed is conveyed to sumps through the existing drainage system.

WATERSHEDS IN THE NORTHEAST SACRAMENTO STREAM GROUP

- American River
- Natomas East Main Drainage Canal (NEMDC, a.k.a. Steelhead Creek)
- Dry Creek
- Rio Linda Creek
- Robla Creek
- Magpie Creek Diversion
- Upper Magpie Creek

- Don Julio Creek
- Lower Magpie Creek (a.k.a. Historic Magpie Creek)
- Arcade Creek
- Hagginwood Creek
- Icehouse Ditch
- Sears Ditch
- Chicken Ranch/Strong Ranch Slough (D-05)

DRAINAGE STUDIES IN THE NORTHEAST SACRAMENTO STREAM GROUP

- Basin 83 Master Plan – June 1992
- Basin 95 Master Plan – June 2004
- Basin 109 Master Plan – June 2004
- Basin 117 Master Plan – February 1998
- Basin 144 Master Plan – February 2001
- Basin 151 Master Plan – April 1996
- Basin 152 Master Plan – September 2016
- Basin 153 Master Plan – April 1992
- Basin 157 Master Plan – September 2007
- Basin 158 Master Plan – September 1997
- Magpie Creek Diversion Drainage Study – Brown & Caldwell - May 1985
- Magpie Creek Floodplain Analysis – David Ford – November 2001
- Historic Magpie Creek Memo and Magpie Creek Supplemental Analysis – David Ford –August 2003 & June 2005
- Robla and Magpie Creek Diversion Levee CLOMR, Ensign & Buckley – April 2002
- Magpie Creek 100-year and 200-year Floodplain Mapping – June 2016
- Arcade Creek Watershed Plan – June 2003

EAST SACRAMENTO STREAM GROUP

The East Sacramento Stream Group contains 31 internal drainage basins. The existing drainage system serving this area is comprised of storm drains and open drainage channels. Runoff within the watershed is conveyed to sumps through the existing drainage system.

WATERSHEDS IN THE EAST SACRAMENTO STREAM GROUP

- American River
- Morrison Creek

- Sacramento State Ditch
- PG&E Ditch
- Procter Gamble Ditch
- Florin Creek
- Lake House Acres Creek

DRAINAGE STUDIES IN THE EAST SACRAMENTO STREAM GROUP

- Basin 5 Master Plan – June 1996
- Basin 8 Master Plan – June 1996
- Basin 10 Master Plan - February 2000
- Basin 19 Master Plan – June 1996
- Basin 31 Master Plan – May 1999
- Basin 37 Master Plan – April 1996
- Basin 43 Master Plan – April 1996
- Basin 51 Master Plan – August 2006
- Basin 96 Master Plan – June 1996
- Basin 101 Master Plan – June 1996
- Basin 113 Master Plan – May 1999
- Basin 155 Master Plan – October 1997
- Basin G209 Master Plan – February 1997
- Basins G248 Master Plan Drainage Study - January 1998
- Basins G249 Master Plan Drainage Study - January 1998
- Basin G258 North Master Plan – June 2003
- Aspen Basins Drainage Study

SOUTH SACRAMENTO STREAM GROUP

The South Sacramento Stream Group contains 49 internal drainage basins. The existing drainage system serving this area is comprised of storm drains and open drainage channels. Runoff within the watershed is conveyed to sumps through the existing drainage system.

WATERSHEDS IN THE SOUTH SACRAMENTO STREAM GROUP

- Sacramento River
- South Sacramento Drainage Canal

- Willow Slough
- Anderson Slough
- Morrison Creek
- Elder Creek
- Florin Creek
- Unionhouse Creek
- Strawberry Creek
- Laguna Creek
- Jacinto Creek

DRAINAGE STUDIES IN THE SOUTH SACRAMENTO STREAM GROUP

- Sacramento River & Morrison Creek Letter of Map Revision – Wood Rodgers – November 2006
- Morrison Creek Letter of Map Revision – Wood Rodgers – September 2009
- South Sacramento Streams Group Letter of Map Revision – Wood Rodgers – May 2014
- 200-year South Sacramento Streams Group Floodplain Mapping – June 2014 Laguna Creek 200-year and 500-year Floodplain Mapping – June 2016
- Basin 22 Master Plan – November 2003
- Delta Shores Drainage Study
- Basin 23 Master Plan – September 2000
- Basin 25 Master Plan – February 2007
- Basin 26 Master Plan – September 2000
- Basin 35 Master Plan – November 2004
- Basin 54 Master Plan – April 2008
- Basin 108 Master Plan – November 2003
- Basin 67 Master Plan – April 1998
- Basin 68 Master Plan – April 1998
- Basin 69 Master Plan – April 1998
- Basin 115 Master Plan – July 2006
- Basin 139 Master Plan – April 1998
- Basin G252 Master Plan - March 2000
- Basins G269 South Master Plan – November 1996
- Basins G273 Master Plan – November 1996

CENTRAL SACRAMENTO

The Central Sacramento contains 4 internal drainage basins. The existing drainage system serving this area is comprised of storm drains and open drainage channels. Runoff within the watershed is conveyed to sumps through the existing drainage system.

WATERSHEDS IN CENTRAL SACRAMENTO

- American River
- Sacramento River

DRAINAGE STUDIES IN CENTRAL SACRAMENTO

-
- Basin 52 Master Plan – May 1996
- Railyards Development Drainage Study

COMBINED SEWER SYSTEM

The City of Sacramento owns and operates a combined sewer system (CSS) that conveys residential and commercial wastewater and storm water runoff from approximately 11.7 square miles in downtown Sacramento, East Sacramento, Oak Park, and the Land Park area. There are 5.8 square miles of separated areas of the City north, east, and south of the CSS that contribute sanitary flows to the CSS. The CSS serves approximately 205,000 people. The CSS includes four key facilities to manage the collected flow: Sumps 1/1A, Sumps 2/2A, Pioneer Reservoir, and the Combined Wastewater Treatment Plant (CWTP). Sumps 1/1A and 2/2A pump up to 60 million gallons per day (mgd) of flows to the Sacramento Regional County Sanitation District's Regional Wastewater Treatment Plant (SRWTP). Pioneer Reservoir and CWTP provide additional storage and, when needed, primary treatment, and disinfection of combined sewage prior to discharge to the Sacramento River.

WATERSHEDS IN THE COMBINED SYSTEM

- American River
- Sacramento River

DRAINAGE STUDIES IN THE COMBINED SYSTEM

- Combined Sewer System Improvement Plan – July 1995
- Combined Sewer System Improvement Plan Update Report - December 2015

NATOMAS BASIN (COUNTY OF SACRAMENTO)

Located in the northwestern corner of Sacramento County is Natomas Basin Reclamation District 1000. 53,548 acres includes areas of Sutter County, the City of Sacramento, and Unincorporated Sacramento County. 26,449 acres of this reclamation district area is in Sacramento County. Sacramento Area Flood

Control Agency with the State of California and the Corps of Engineers is constructing a massive levee improvement project to bring the levees protecting the basin up to FEMA standards and 200-year level of protection (0.5% annual recurrence). The US Army Corps of Engineers lifted their previous certification of this levee system and FEMA remapped the area as an AE flood zone effective December 8, 2008. Building permits will no longer be issued after that date awaiting reaccreditation of the levees and revised flood insurance rate maps. In 2014, SAFCA, the City of Sacramento and the County requested FEMA remap the Natomas Basin into the Zone A99 floodplain citing the progress made to improve the levees and in securing federal authorization for the project. In 2015, FEMA remapped the entire basin into the Zone A99 floodplain and reincorporated the underlying Zone A floodplain that existed before the remap in 2008. In 2016, the City of Sacramento and Sutter and Sacramento counties contracted to have West Yost study and determine the 100-year and 200-year internal floodplain elevations in the Natomas Basin. The key source of floodwater within the Natomas Basin occurs when the river system spills over a low-hardened section of the northeast levee during very large storms events. Internal drainage canals and pumps to the river system are operated by Reclamation District 1000. Developments are conditioned to attenuate discharge flows to predevelopment levels in areas where Reclamation District 1000 (RD1000) pumps are not being improved.

There is industrial development in the unincorporated county in the Natomas area all draining to reclamation district channels and pump plants. The unincorporated portion of the Natomas area is 87.5% agricultural and 5% developed and 7.5% developing. The 2,000 acre Metro Air Park is currently under development and attenuates its peak flow discharge to the RD1000 channels and pumps. The 6,000 acre North Precinct Plan area is currently under design and will include internal levees and control peak discharge to the RD1000 channel and pumps.

This is the very bottom of the 2100 square mile American River watershed and nearly the bottom of the 27,000 square mile Sacramento River watershed so discharge from RD1000 would not exacerbate peak flow in the river.

NATOMAS BASIN (CITY OF SACRAMENTO)

Southern portions of the Natomas Basin are located in the City of Sacramento. As mentioned above, the Natomas interior drainage canals drain the Natomas Basin. Developments in the area are conditioned to attenuate discharge flows to predevelopment levels using a 2016 unified model. The unified model is maintained by RD1000. The portion of the Natomas Basin that is within the City of Sacramento is mostly built out. Currently, development is proposed in the Panhandle and Greenbriar.

Within the City of Sacramento, Drainage Master Plans (internal drainage) have been prepared for the entire area of Natomas located north of I-80 and west of Natomas East Main Drainage Canal. This area

was, until recently, a "greenfield" area, served only by natural, primitive, rural, and agricultural drainage systems. The master-planned drainage systems for this area have been installed, and continue to be installed, concurrent with, or just ahead of, urban development.

WATERSHEDS IN THE NATOMAS BASIN (CITY OF SACRAMENTO)

- Sacramento River
- Natomas East Main Drainage Canal (NEMDC, a.k.a. Steelhead Creek)
- East Canal
- West Canal
- Main Canal
- San Juan Ditch
- Bannon Creek

DRAINAGE STUDIES IN THE NATOMAS BASIN (CITY OF SACRAMENTO)

- 200-year Natomas Basin Interior Drainage Study - May 12, 2016
- Basin 11 Master Plan - December 1997
- Basin 12 Master Plan – March 1999
- Basin 13 Master Plan - August 2001
- Basin 14 Master Plan – August 1997
- Basin 15 Master Plan – December 1997
- Basin 16 Master Plan – December 1997
- Basin 17A and 17B Master Plan – June 1997
- Basin 18 Master Plan - June 1997
- Basin 19 Master Plan - December 1997
- Basin 20 Master Plan – November 1993
- Basin 61 Master Plan – August 2001
- Basin 62 Master Plan – January 2004
- Basin 64 Master Plan – September 2006
- Basin G206 Master Plan – December 1999
- Basin G207 Master Plan – April 2006
- Basin G208 Master Plan – July 1999

SOUTH COUNTY AGRICULTURAL AREA

The Southeastern part of the County is primarily zoned large lot agricultural with a population of 23,509 at an average density of 39 people per square miles. This area is controlled as agricultural land by the County General Plan. The FEMA special flood hazard designation envelopes 31% of the land in this

area. The FEMA flood insurance studies and California Department of Water Resources advisory floodplain study suffice to protect the modest amount of expected construction in this area.

Within this area is a proposed specific plan named Cordova Hills. This specific plan area mainly drains to Coyote Creek and Deer Creek. Impacts to these two creeks are being identified through master planning and FEMA mapping.

Cosumnes River is a wild and scenic river with agricultural levees and no flood control. The floodplain assumes levee breaches and is quite wide. The zoning within the floodplain area is large lot agricultural.

Beach Stone Lake floodplain is caused by Laguna and Morrison Creek watershed, Cosumnes River and backwater from the Delta. This expansive floodplain area is zoned large lot agricultural.

The Delta area is protected by levees that were first built during the Gold Rush era and have been subsequently improved by various state and federal programs. The Delta is an integral feature in the state water project providing water to the greater central and southern California agricultural and urban areas. The state and federal governments are working on long term solutions to problems in the delta concerning flood control, habitat, water quality and water supply.. The communities of Walnut Grove, Locke, Courtland, Hood, and Freeport in the unincorporated county and incorporated City of Isleton lie in areas of flood risk should there be levee failure on various Delta islands. Internal drainage is managed by Reclamation Districts who are also charged with maintenance of the levee systems. There are 100,000 acres in the FEMA floodplain in the Delta due to levee that are not accredited or were de-accredited in the 2012 DFIRM remap of Sacramento County. With the exception of the towns listed above, the Delta is large lot agricultural zoning.

DRAINAGE STUDIES FOR SOUTH COUNTY AGRICULTURAL AREAS

Upper Cosumnes River Flood Mapping Study - Hydrologic and hydraulic modeling was performed in 2008 by Civil Engineering Solutions, Inc. to update and revise the existing Zone A of the Flood Insurance Rate Map. The total study reach is approximately 9.8 miles from the upstream side of Dillard Road Bridge to approximately one mile upstream of Michigan Bar Road Bridge. FEMA is incorporated the revised flood data into a physical map revision which is expected to be effective in 2017.

Dry Creek Watershed Update Plan - This drainage study was prepared by Civil Solutions in April 2011.

Easton Drainage Master Plan - Alder Creek and Buffalo Creek Sheds - 1,400 acre Specific Plan located in Rancho Cordova between Sunrise Blvd, Jackson Road, and Grantline Road was prepared by McKay & Somps in March 2010. A detailed drainage study for the Glenborough/Easton Development

was approved for environmental review in 2013, additional analysis is needed before the project can proceed to design.

Cordova Hills Drainage Master Plan - 2,668 acre Specific Plan area is located between Grant Line Road and Scott/Stonehouse Road and south of White Rock Road. The study was prepared by McKay & Somps in March 2011 and is being updated pending comment from Sacramento County.

LIMITED LAND USE AREAS (COUNTY OF SACRAMENTO)

There are large areas of the County that are excluded from the Watershed Management Plan and CRS Activity 450 because of their land use and lack of impact to urban and urbanizing watersheds. Natomas is surrounded by levees and all of the stormwater is pumped from the basin to the river. The south county agricultural areas are zoned large lot agriculture and there is an extremely small level of proposed development.

ORIGINATING OUTSIDE SACRAMENTO COUNTY

The three counties with watersheds draining into Sacramento County are Placer, El Dorado, and Amador counties.

PLACER COUNTY

Dry Creek is the main creek entering Sacramento County from Placer County. It is a master planned creek described later in this report in Zone 11C Drainage Master Plans, and Watershed Agreements. The upper portions of the NEMDC and tributaries drain from Placer County. They are also described in Zone 11C.

EL DORADO COUNTY

Most of the area draining into Sacramento County from El Dorado County is undeveloped. Within that, however, is El Dorado Hills, an 18-square mile residential/commercial master planned community that was developed periodically between 1962 and recent years. It drains into Carson Creek, a tributary to Deer Creek, which feeds into the Consumnes River and has had negligible impact on Sacramento County. This area is included in the South County Agricultural Area.

AMADOR COUNTY

About 11 square miles of undeveloped (agricultural) watershed drains either directly into, or to Arkansas Creek and then into, the Cosumnes River. This area is included in the South County Agricultural Area.

WETLANDS AND NATURAL AREAS

All grading projects of more than 5-cares size must obtain a Clean Water Act Section 401 Certification from the State. All work in or near waters of the State and water of the U.S. must obtain permits from Fish and Game and/or Corps of Engineers.

It is noted in the City of Sacramento General Plan that grasslands throughout much of Sacramento historically supported vernal pools and seasonal wetlands. However, much of this habitat has been lost with development. The largest remaining concentration of vernal pool and seasonal wetland habitat is in North Sacramento and Natomas, though significant areas also occur in the Airport-Meadowview and south Sacramento areas and in undeveloped.

Vernal pools are ephemeral wetlands that form in shallow depressions underlain by a substrate near the surface that restricts the percolation of water. These depressions fill with rainwater during the fall and winter and can remain inundated until spring or early summer, sometimes filling and emptying numerous times during the rainy season. A flowering community, dominated by characteristic wetland plants, differentiates vernal pools from other seasonal wetlands. Vernal pool plant species likely to occur within the area include the winged water-starwort (Callitriche marginata), annual hairgrass (Deschampsia danthonioides), horned downingia (Downingia ornatissima), coyote thistle (Eryngium vaseyi), bractless hedge-hyssop (Gratiola ebracteata), slender popcorn flower (Plagiobothrys stipitatus), spine-fruit butter-cup (Ranunculus bonariensis), and purslane speedwell (Veronica peregrina).

COUNTY OF SACRAMENTO WETLANDS AND NATURAL AREAS

Careful consideration of endangered species and their habitat is an integral part of all projects in the county. Further, the County General Plan addresses open space under the conservation element. The County Planning Department addresses open space during public outreach and the preferred land use is incorporated in the DMP.

CITY OF SACRAMENTO WETLANDS AND NATURAL AREAS

The City has two land use zones, which are used to preserve open space. The first is Open Space, which means land and water essentially without improvements and used for public recreation, enjoyment or scenic beauty, conservation or use of natural resources, production of food or fiber, light and air or an environmental amenity. The second is the American River Parkway- Flood zone (ARP-F), which is an open space zone, which constitutes a designated floodway likely to be inundated by a flood having a one percent per annum chance of occurrence or greater. The ARP-F zone is intended to protect the natural features of property within the floodplain of the American River to prevent erosion and siltation and to preserve valuable open space in accordance with the provisions of the general plan.

MITIGATION ACTIVITIES

The mitigation activities outlined in this plan focus on future peak flows and volumes so that they do not increase over present values. The region deploys different forms of mitigation, but the mitigation tool is regulatory standard. Each community has adopted and enforces standards to insure future development will not impact current 10-year, 100-year, and 200-year peak flows.

Additionally, the management of the Sacramento region's watershed is heavily directed by regulatory standards that pertain to its major flood control systems. These systems are governed by project partnership agreements, the Urban Level of Flood Protection Plan, Executive Order 13690 and the Federal Flood Risk Management Standard, and eventually the American River Common Features General Reevaluation Report. These standards are designed to reduce the impacts of future flood events and preserve current levels of flood protection. Because of these regulations, the region's desired level of protection for its flood control systems is a minimum of 200-year level of protection or protection from 0.5 percent annual chance flood event.

Below is a detailed description of the mitigation activities that are currently in place in the Sacramento region.

STORMWATER AND WATERSHED MANAGEMENT

Regional Stormwater and Watersheds Management Standards

- The *Sacramento City/County Drainage Manual*, Volume 2: Hydrology Standards, 2006 [www.saccounty.net -search: volume 2 hydrology standards]
  The *Sacramento City/County Drainage Manual*, Volume 2: Hydrology Standards, was developed jointly by the Sacramento County Water Resources Division and the City of Sacramento Department of Utilities Division of Engineering Services. This volume presents the accepted methods for estimating surface water runoff peak flows and volumes for the analysis and design of drainage facilities in the City and County of Sacramento.

- Stormwater Quality Design Manual, 2007 [www.saccounty.net -search: stormwater quality design]
  The *Stormwater Quality Design Manual for the Sacramento and South Placer Regions* outlines planning tools and requirements to reduce urban runoff pollution to the maximum extent practicable from new development and redevelopment projects.

COUNTY OF SACRAMENTO MANAGEMENT STANDARDS

- Improvement Standards, 2006 [www.saccounty.net -search: improvement standards]
- Floodplain Management Ordinance, 2014, County Zoning Code [www.saccounty.net -search: floodplain management ordinance]
- County of Sacramento General Plan, 2011, and as currently being updated to address State required 200-year protection standards.
- Sacramento County Code, 2008 [www.saccounty.net -search: county code]
- Local Floodplain Management Plan, 2001 for Sacramento County was replaced with Multi-Hazard Mitigation Plan, 2004, Chapter 6.1 [www.saccounty.net -search: hazard mitigation plan]
- Title 1 and 2 of the Sacramento County Water Agency Code and the Zone 11 Fee Plan, 2004 [www.saccounty.net -search: zone 11]

CITY OF SACRAMENTO MANAGEMENT STANDARDS

- City of Sacramento Design and Procedures Manual and Improvement Standards, 2001
- Floodplain Management Regulations, City Code Chapter 15 Buildings and Construction, 2015
- Comprehensive Flood Management Plan, 2016
- City of Sacramento General Plan, 2016

COMMUNITY RATING SYSTEM ACTIVITIES

SACRAMENTO COUNTY CRS ACTIVITY 450 – PREREQUISITE

One of the prerequisites to be a Class 4 CRS community or higher is that the community manage runoff from all storms up to and including the 100-year storm (Activity 211.c(b)(ii)). Drainage planning in the County is directed by General Plan Policies, the County Zoning Code including the Floodplain Management Ordinance, and Improvement Standards. Together, these requirements ensure development is protected from flood damage and increased runoff is appropriately mitigated. Additionally, hydrology standards have been adopted by the County for use in drainage planning and design.

Stormwater and Floodplain Management Planning has been County policy since March 9, 1993 with Board of Supervisors adoption of floodplain management policies, and subsequently incorporated into the County's General Plan, adopted December 15, 1993, and amended November 9, 2011. These policies are intended to minimize the loss of life, injury, and property damage due to flood hazards and to strengthen regional flood protection and flood preparedness.

http://www.per.saccounty.net/PlansandProjectsIn-Progress/Pages/GeneralPlan.aspx

From the safety element of the General Plan:

Several key General Plan policies related to watershed and floodplain management are listed here;

SA-5 A comprehensive drainage plan for major planning efforts shall be prepared for streams and their tributaries prior to any development within the 100-year floodplain defined by full watershed development without channel modifications. The plan shall:

a. Determine the future 100-year flood elevations associated with planned and full development of the watershed;
b. Determine the future 100-year floodplain boundaries for both flood elevations (planned and full development) based on minimum 2-foot contour intervals;
c. Assess the feasibility of gravity drainage into the existing flowline of the stream;
d. Assess the feasibility of alternative means of drainage into the stream;
e. Identify potential locations for sedimentation ponds and other stormwater treatment facilities;
f. Determine practical channel improvements and/or detention basins to provide the flood control needs of the proposed development;
g. Determine the location and extent of marsh, vernal pool and riparian habitat;
h. Develop measures for protecting and mitigating natural habitat;
i. Develop measures for protecting and mitigating for federal and state listed endangered species;
j. Develop and ensure implementation of measures that would reduce vector larvae;
k. Identify appropriate plant species to be included as part of the natural features of the comprehensive drainage plan.

SA-10. Fill within the 100-year floodplain of creeks outside of the Urban Service Boundary is permissible to accommodate structures (e.g., residential, commercial, accessory) and septic systems, and only when the Board of Supervisors finds that the fill will not impede water flows or storm runoff capacity. Such development shall not cause an increase in base flood elevation of the 100-year floodplain exceeding 0.10 feet, unless analysis clearly indicated that the physical and/or economic use of adjacent property within the floodplain will not be adversely affected. A permit is required if the fill is within the jurisdiction of the Central Valley Flood Protection Board.

SA-13. Where new upstream development in Sacramento County will increase or potentially impact runoff onto parcels downstream in a neighboring jurisdiction, such as the City of Sacramento, Sacramento County will coordinate with the appropriate neighboring jurisdiction to mitigate such impacts.

SA-14. The County shall require, when deemed to be physically or ecologically necessary, all new urban development and redevelopment projects to incorporate runoff control

measures to minimize peak flows of runoff and/or assist in financing or otherwise implementing Comprehensive Drainage Plans.

AG-29. The County shall minimize flood risks to agricultural lands resulting from new urban developments by:

- Requiring that such developments incorporate adequate runoff control structures and/or
- Assisting implementing comprehensive drainage management plans to mitigate increased risks of farmland flooding resulting from such developments.

Floodplain Management Ordinance Requirements:

http://www.waterresources.saccounty.net/Drainage/2014%20Floodplain%20Management%20Ordinance.pdf

906-06 (H) No new construction or substantial improvements or development may occur without the approval of the Floodplain Administrator and without demonstrating that the cumulative effect of the proposed development when combined with all other existing and anticipated development will not have adverse impacts to downstream, upstream, or adjacent properties, and the FEMA mapping requirements of section 905-08 are met.

Improvement Standards requirements:

http://www.engineering.saccounty.net/Pages/ImprovementStandards.aspx 9-1.G- All new structures shall be protected from the 100-year (1-%) flood event. Certified pad elevations shall be set at least one and two tenths foot (1.2') above all sources of 100-year flooding.

9-1.H- The design of a new storm drain system shall include consideration of the downstream creek or storm drain. The consulting engineer shall show that the existing storm water system can convey the proposed drainage without adverse flooding, erosion or other water quality impacts to upstream, downstream or adjacent facilities or areas; or that such facilities or areas are being improved or protected to the point where the drainage can be conveyed without adverse impacts.

SacCalc is freeware developed by the Sacramento County Department of Water Resources and is available by searching SacCalc at www.saccodwr.org. SacCalc is a Windows platform for the Sacramento hydrology preprocessor and is used with Army Corps of Engineers HEC-1 program to analyze the 100-year storm. Hydraulics is calculated using Army Corps of Engineers HEC-RAS, UNET, or other appropriate software. There is no limitation on how large or small the project is nor where it is located within a drainage shed area. All projects must account for their impacts and mitigate as appropriate.

COUNTY CRS ACTIVITY 450- CREDIT CRITERIA

Another prerequisites to be a Class 4 CRS community or higher is to obtain 90 points (before the impact adjustment map) for meeting all the credit criteria for the Watershed Management Plan activity.

Sacramento County and the Cities of Elk Grove, Rancho Cordova and Citrus Heights are located within Zone 11 of the Sacramento County Water Agency Zone 11 programs. Zone 11 is subdivided by regional watershed areas 11A (draining to Morrison Creek / Beach Stone Lakes), 11B (draining to American River), and 11C (draining to Dry Creek / Natomas East Main Drainage Canal). The Zone 11 drainage impact fees pay for the installation and improvement of trunk drainage systems. The Sacramento County Water Agency is a separate subdivision of the state enveloping the cities of Citrus Heights, Rancho Cordova, and Elk Grove.

The Stormwater Utility was established in 1995 over an area of the Water Agency known as Zone 12. This program funds drainage maintenance and capital improvements in the urban areas of unincorporated Sacramento County and the cities of Citrus Heights, Rancho Cordova, and Elk Grove.

Activity 450 of the Community Rating System calls for certain prerequisites listed and responded to below:

a. *"The community must have adopted a watershed management master plan for one or more of the watersheds that drain into the community, and the plan must identify the natural drainage system and constructed channels."*

Sacramento County has adopted the following Drainage Master Plans (DMP) associated with watersheds, or particular development projects. The Zone 11 and watershed is indicated in parenthesis:

- Vineyard Springs Comprehensive Plan (Zone 11A, Upper Laguna Creek)
- North Vineyard Station Specific Plan (Zone 11A, Elder and Gerber Creeks)
- Florin Vineyard Gap Community Plan (Zone 11A, Morrison, Florin, Elder, Gerber, Unionhouse, and Strawberry Creeks)
- Dry Creek Watershed Flood Control Plan (Zone 11C, Dry Creek and Linda Creek)
- Strawberry/Jacinto Creek Drainage Master Plan (Zone 11A, Strawberry/Jacinto Creeks)
- Lower Laguna Creek Drainage Master Plan (Zone 11A, Laguna Creek)
- Whitehouse Creek Drainage Study (Zone 11A, Whitehouse Creek)
- Robla/Magpie Creeks Drainage Study (Zone 11C, Robla and Magpie Creeks)
- Chicken Ranch Slough Drainage Master Plan (Zone 11B, Chicken Ranch Slough)

- Strong Ranch Slough/Sierra Branch Drainage Study (Zone 11B, Strong Ranch Slough and Sierra Creek)
- NEMDC Tributaries (Zone 11C, NEMDC tributaries)
- West Galt Drainage Study (Stormwater Utility)
- East Elk Grove (Zone 11A, Laguna Creek and Elk Grove Creek)
- East Franklin (Zone 11A, Beach-Stone Lakes)
- Metro Air Park Master Drainage Study (Natomas Basin)
  Easton Glenborough Specific Plan (Alder Creek)

The following DMP's are pending adoption:

- Sunridge Specific Plan (the upper reaches of Morrison and Laguna Creeks), part of the Sunrise-Douglas Comprehensive Plan (Zone 11A)
- Elverta Specific Plan (NEMDC tributaries) (Zone 11C)
- Arcade Creek Flood Insurance Study (Zone 11B)
- Cordova Hills Specific Plan (Deer Creek)
- Mather South Specific Plan (Zone 11A, Morrison Creek)
- Newbridge Specific Plan (Zone 11A, Morrison Creek, Laguna Creek)
- Jackson Township Specific Plan Drainage Report (Zone 11A, Morrison Creek, Elder Creek and Laguna Creek)
- West Jackson Highway Specific Plan Area Master Drainage Plan (Zone 11A, Morrison Creek)
- Natomas North Precinct Master Drainage Plan (Natomas Basin)

The following DMP's have been adopted (with the County as one of the local agencies) in projects with the US Army Corps of Engineers:

- South Sacramento County Steams Investigation (Lower Morrison Creek and Tributaries) (Zone 11A and City of Sacramento)

Additional watershed management plans are being planned and will be coordinated by the Sacramento Area Flood Control Agency (SAFCA) to regulate drainage through State and Federal flood control projects. SAFCA will assist in the development of watershed management plans associated with SAFCA sponsored flood control projects along Arcade Creek, Dry Creek (North), and the Morrison Creek Stream Group.

b. "*The community must have adopted regulatory standards that are based on the plan and receive credit under SMR in Section 452.a* " Each DMP must be consistent with Sacramento County General

Plan Policies and Improvement Standards, and 1996 Hydrology Standards. The countywide policies are described in the document and further described in the Multi-Hazard Mitigation Plan. Drainage analysis is required for every project. Each DMP is incorporated in the Environmental Impact Report and the subsequent Mitigation and Monitoring Report Program (MMRP). The MMRP gives mitigation (e.g. construct channel improvements consistent with DMP) and timelines (e.g. prior to building Permits) and entity responsible for overseeing implementation (e.g. improvement plans shall be consistent with DMP and shall be approved by Sacramento County Department of Water Resources). The implementation of the DMP and MMRP becomes a condition of approval of the project.

c. *"The plan's regulatory standards manage future peak flows so that they do not increase over present values."*

Sacramento County has constructed many detention basins and is in the process of developing many more.

New development must show that any impacts are mitigated prior to the Sacramento County Board of Supervisors adoption of an EIR for the development to proceed. Each creek or watershed is unique, and is analyzed accordingly. Depending on the location in the watershed, the state of existing drainage facilities and/or existing residences, and downstream hydraulic conditions, the mitigation measures for impacts of development could range from no increase in flows (and/or volumes) for the 2- through 500-year event, or no measures at all. If management of peak flows runoff was not necessary, then the comprehensive drainage master plan established that existing structures and/or storm drain systems were not affected by the increase in peak flow. Typically however, DMP's result in detention that provides no increase in peak flows for the 10-year (because it could impact existing storm drain outfalls) and 100-year (because it could affect residential finish-floor elevations). This usually results in mitigation of the 10- through 100-year events.

d. *"The plan's regulatory standards require management of runoff from all storms up to and including the 25-year event."*

Watershed areas that have already been urbanized must abide by the County stormwater permit issued by the state Water Board. Policies are being developed regarding low impact development and hydro-modification measures that will protect stream systems by controlling discharges from developed areas to pre-development flow rates up to the 10-year event. Development will be required to incorporate follow the process and standards described in the Sacramento Stormwater Quality Partnership Hydromodification Management Plan in order to implement the hydromodification management in accordance with the stormwater permit.

For developing areas, depending on the location in the watershed, the state of existing drainage facilities and/or existing residences, and downstream hydraulic conditions, the mitigation measures for impacts of development could range from no increase in flows (and/or volumes) for the 2- through 500-year event or no measures at all. Typically, however, drainage master plans (DMP) result in detention that provides no increase in peak flows for the 10-year (because it could impact existing storm drain outfalls) and 100-year (because it could affect residential finish-floor elevations). This usually results in mitigation of the 10- through 100-year events.

COUNTY WATERSHED MASTER PLAN (WMP)

The CRS credit criteria for Activity 450 and County policies and standards require certain analyses in planning for new development. Activities defining this watershed management plan are listed and responded to below:

a. Up to and including 100-yr event (Activity 452.b (1) credit criteria.

All drainage master plans and drainage studies in the County consider storms from return frequencies ranging up to the 1% annual probability storm (100-year event) and include mitigation for more frequent events as required. The 10-year water surface elevation or hydraulic grade line are required to evaluate a development project's compliance with improvement standards. Additionally, some studies are required to demonstrate a project is protected from the 200-year storm event.

b. Management of future peak flows and volumes (Activity 452.b (1) credit criteria).

All drainage master plans must consider future condition hydraulic impacts and projects in the watershed must take appropriate mitigation actions. General Plan Policy SA-14 requires projects to incorporate runoff measures to reduce flooding. Project impacts and mitigation measures are included in the environmental document and projects are appropriately conditioned during the entitlement process.

c. The plan manages runoff from all storms up to and including the 25-year event (Activity 452.b (4) credit criteria).

The Sacramento County's Hydrology Standards are available online at www.saccodwr.org. Drainage master plans must consider effect of design storms ranging in duration from 6-hour to 10-day and frequency from 2-year to 500-year. The critical duration is defined for each project and used for the design of the channel and/or detention basin.

d. Plan identifies existing wetlands and/or other natural open space to be preserved from development to provide natural attenuation, retention, or detention of runoff.

Projects involving the discharge of fill material into the waters of the United States and wetlands must obtain a Clean Water Act Section 401 certificate from the state. All work in or near waters of the state and waters of the US must obtain permits from Fish and Game and/or the Corps of Engineers. Careful consideration of endangered species and their habitat is an integral part of all projects in the county. Further, the County General Plan addresses open space under the conservation element. The County Planning Department addresses open space during public outreach and the preferred land use is incorporated in the DMP.

e. Prohibiting development, alteration, or modification of existing natural channels.

There are a number of policies and implementation measures in the Conservation Element of the General Plan that protect natural stream functions, and discourage channel modifications and concrete lining.

f. Requiring that channel improvement projects use natural or "soft" approaches.

The above DMP's included natural channels. For example:

- The Lower Laguna DMP used a bypass channel to preserve the natural channel and wetlands.
- The East Franklin Specific Plan channel will incorporate meandering low flow, benching for habitat, and specific plantings to enhance storm water quality filtering.

All channels associated with DMPs are earthen, with no concrete lining, with appropriate roughness and side slope stability taken into account in the analysis.

Stormwater detention basins are designed to be aesthetically pleasing and habitat friendly. On some occasions, detention basins are designed as joint-use parks facilities.

There are several opportunities for active and passive park and recreation use of detention basins.

g. If the watershed plan was prepared in coordination or as a part of the floodplain management plan credited in Activity 510.

All of the DMP's are consistent with the Multi-Hazard Mitigation Plan and County Standards.

Freeboard for New Buildings in B, C, D, and X Zones (FRX) - regulations that require the applicant provide positive drainage away from the building site

The county improvement standards and floodplain management ordinance require, in addition to FEMA flood studies that all new structures be protected from the 1% annual recurrence storm with at least 18 inches of freeboard. This requirement is found in the Improvement Standards Section 9-15, Section 10-

4 and Section 10-5. It is also seen in the floodplain management ordinance that a local flood hazard is treated the same as a FEMA special flood hazard area.

(State Manadated) California's adoption of the IBC and the IRC which require positive drainage away from the foundation.
Legal basis: California Health and Safety Code, Sections 18901 and 18949, administered by the California Building Standards Commission. Positive drainage requirement is Section 1804.3 of the California Building Code.

Erosion and Sedimentation Control Regulations (ESC) - minimize erosion from land disturbed due to construction or farming.

(State Mandated) Requirement that construction projects of greater than 1 acre require erosion and sediment control measures.
Legal basis: 2009-0009-DWQ Construction general permit:
http://www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

Water Quality Regulations (WQ) - regulations that improve the quality of stormwater runoff.

(State Mandated) Participation in the State NPDES Program.
Legal basis: California Regional Water Quality Control Board MS4 permit, Order No. R5-2008-0142 (NPDES No. CAS082597)

CITY OF SACRAMENTO CRS ACTIVITY 450 – PREREQUISITE

The City of Sacramento is not part of the Sacramento County Water Agency, but the City and County have a long-standing cooperative understanding on stormwater mitigation. The City of Sacramento responds to the CRS perquisites as follows:

a. "The community must have adopted a watershed master plan for one or more of the watersheds that drain into the community, and the plan must identify the natural drainage system and constructed channels."

The City has Drainage Master Plans for many of its watersheds for localized flooding, natural drainage system and constructed channels, and development driven studies.

b. "The community must have adopted regulatory standards for new construction in the watershed based on the plan that are based on the plan and receive credit under SMR in Section 452.a."

The City has adopted regulatory standards for new construction which are in alignment with this plan.

13.08.145 Mitigation of drainage impacts; design and procedures manual for water, sanitary sewer, storm drainage, and water quality facilities.

A. When property that contributes drainage to the storm drain system or combined sewer system is improved or developed, all stormwater and surface runoff drainage impacts resulting from the improvement or development shall be fully mitigated to ensure that the improvement or development does not affect the function of the storm drain system or combined sewer system, and that there is no increase in flooding or in water surface elevation that adversely affects individuals, streets, structures, infrastructure, or property.

The City's Design & Procedures Manual also requires that developments within the City of Sacramento shall be provided with storm drainage facilities that will, at minimum, provide 100-year protection to structures and 10-year protection to streets.

c. "The plan's regulatory standards manage future peak flows so that they do not increase over present values."

Our Drainage Master Plans identify a "preferred plan" that is usually the least-cost alternative that provides the required level of performance to mitigate peak flows and volumes. By virtue of being on the downstream half of local stream systems, the City can control the release of water with the City's pump stations and drainage basins without increasing peak flows in the receiving streams.

The City of Sacramento has also emphasized the value of detention basins in solving flooding problems. The primary purposes of a detention basin are to mitigate flooding, to lessen the impact of peak flows on existing or proposed infrastructure (pump stations, channels and pipelines) and to improve water quality. Detention basins are also effective because they lessen the impact on receiving streams, they provide the best opportunity to obtain mandated water quality benefits, and they provide a variety of secondary use benefits.

d. "The plan's regulatory standards require management of runoff from all storms up to and including the 25-year event."

The City's drainage system consists of 94 sumps and pumps, 140 drainage basins, many miles of improved channels and a vast network of pipes and drainage inlets that control runoff. Detention basins have been constructed in Sacramento since 1955. Ten were built before 1985. In the last 14 years, 50 more detention basins have been constructed and there are plans to build many more to help eliminate flooding. he City's Master Planning Program requires performance standards include eliminating street flooding during a 10-year storm and to prevent property damage and public safety hazards for a 100-year storm.

e. "Any plan that is more than five years old, the community must evaluate the plan to ensure that it remains applicable to current conditions."

The WMP will be evaluated and revised every five years along with the County-wide Multi-Hazard Mitigation Plan (Section 510).

CITY OF SACRAMENTO WATERSHED MASTER PLAN (WMP)

The City of Sacramento requires certain analyses in planning for new development. Activities defining this watershed management plan are listed and responded to below:

a. Up to and including the 100-year event (Activity 452.b (1) credit criteria).

The City's Master Planning Program has performance standards include eliminating street flooding during a 10-year storm and to prevent property damage and public safety hazards for a 100-year storm. Where applicable by State of California standards, many areas of the city are required to meet the 200-year storm.

b. Management of future peak flows and volumes (Activity 452.b (1) credit criteria).

The City's Master Planning Program and requires performance standards that include eliminating street flooding during a 10-year storm and to prevent property damage and public safety hazards for a 100-year storm for future development. By virtue of the City being on the downstream half of local stream systems, the peak flows and volumes can be controlled by the City's pump stations and detention basins in the receiving stream.

In addition, the City's Floodplain Ordinance (Section 15.104.040) states that, "proposed construction or development shall not result in any increase in flood levels during the occurrence of the base flood". Development driven Drainage Master Plans must consider future condition hydraulic impacts and projects in the watershed must take appropriate mitigation actions. Development projects impacts and mitigations measures are included in environmental documents and conditioned during the entitlement process.

c. The plan manages runoff from all storms up to and including the 25-year event (Activity 452.b (4) credit criteria).

The City's Design and Procedure Manual requires managing runoff for development up to a 100-year storm. The specific criteria differentiates for a greenfield development, infill development and for upgrading an existing drainage system, but all require plans to manage runoff up to the 100-year.

Non-leveed channels shall, at a minimum, must be designed to accommodate the 100-year, 10-day storm event with 1 foot of freeboard. Leveed channels shall, at a minimum, be designed to accommodate the 200-year, 10-day storm with 3 feet of freeboard.

d. Plan identifies existing wetlands and/or other natural open space to be preserved from development to provide natural attenuation, retention, or detention of runoff.

All grading projects of more than 5-cares size must obtain a Clean Water Act Section 401 Certification from the State. All work in or near waters of the State and water of the U.S. must obtain permits from Fish and Game and/or Corps of Engineers.

The City has two land use zones, which are used to preserve open space. The first is Open Space, which means land and water essentially without improvements and used for public recreation, enjoyment or scenic beauty, conservation or use of natural resources, production of food or fiber, light and air or an environmental amenity. The second is the American River Parkway- Flood zone (ARP-F), which is an open space zone, which constitutes a designated floodway likely to be inundated by a flood having a one percent per annum chance of occurrence or greater. The ARP-F zone is intended to protect the natural features of property within the floodplain of the American River to prevent erosion and siltation and to preserve valuable open space in accordance with the provisions of the general plan.

e. Plan was prepared in coordination with or as part of the community's floodplain management plan credited under Activity 510.

This Plan was prepared in coordination as an appendix with the County Local Hazard Mitigation Plan.

STANDARDS FOR DEVELOPMENT

DESIGN STANDARDS AND REVIEW – COUNTY OF SACRAMENTO

Piped storm drain systems are designed to convey the County design flow which approximates the peak run off from a 5-year storm event. The larger less frequent storm events exceed the pipe capacities and travel through streets and overland from the upper shed areas to the receiving creek. Water is typically allowed to pond in streets up to 30-minutes (+/-) until the storm subsides. Development designers must analyze the 100-year, 1% annual recurrence, storm event and assure that ponding and overland flow is safely managed and that freeboard is adequate for each new structure. The impact downstream and adjacent to the proposed development must also be analyzed and mitigated.

Large development plan areas, known as specific plans and community plans, must prepare a detailed drainage study often including channel improvements and peak flow detention basins. Computer modeling is done for a watershed downstream to a point of confluence and/or hydraulic constraint. By doing so, the peak flow and volume as well as routing and storm centering are correctly analyzed using dynamic modeling tools.

New levees to reclaim floodplain are discouraged and whenever such are proposed they must be constructed to at least a 200-year (0.5% annual recurrence) level of protection in areas subject to State Urban Level of Protection criteria, and meet FEMA certification standards (44CFR65.10).

All discretionary applications are routed to Water Resources for comments and conditions. The County has a computer system that tags all parcels with known flood hazards and all building permits for those parcels are routed to Water Resources for review and approval.

From the safety element of the General Plan:

- SA-14. The County shall require, when deemed to be physically or ecologically necessary, all new urban development and redevelopment projects to incorporate runoff control measures to minimize peak flows of runoff and/or assist in financing or otherwise implementing Comprehensive Drainage Plans.

Improvement Standards require:

- 9-1G All new structures shall be protected from the 100-year (1-%) flood event.
  9-1H The design of a new storm drain system shall include consideration of the downstream creek or storm drain. The consulting engineer shall show that the existing storm water system can convey the proposed drainage without adverse flooding, erosion or other water quality impacts to upstream, downstream or adjacent facilities or areas; or that such facilities or areas are being improved or protected to the point where the drainage can be conveyed without adverse impacts.

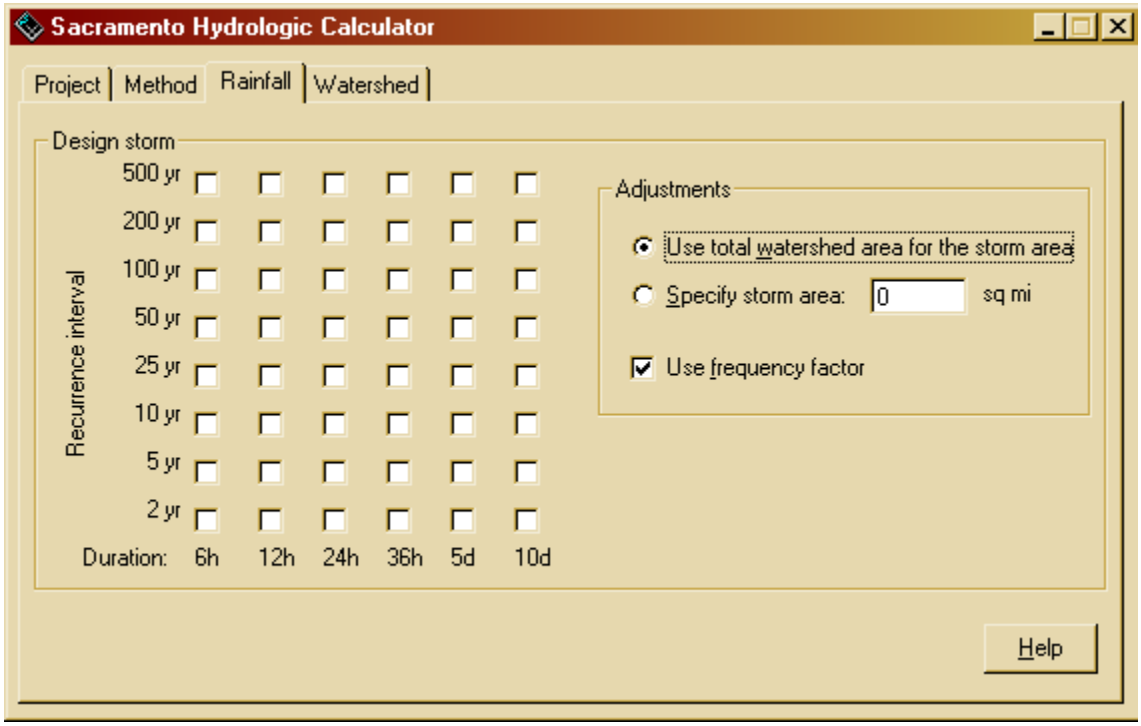
HYDROLOGY STANDARDS

Sacramento County developed hydrology standards that were adopted in 1996 and have been approved for FEMA map revisions. These standards include regional rainfall tables of depth-duration-frequency; design storms of various durations, infiltration rates based on land use and soil type, and employ the unit hydrograph theory. Hydrology is modeled using the SacCalc Sacramento Calculator and hydraulics is modeled using tools from the US Army Corps of Engineers Hydraulic Engineering Center (HEC) or proprietary tools like XPSWIMM and Mike- 11.

Hydrology modeling includes a range of storms from 6-hours to 10-days, from 50% annual recurrence to 1% annual recurrence. Small watersheds tend to respond to short duration storms while larger shed

areas and those with basins and convergences must consider the volume and routing characteristics of the longer duration storm event. There is also the ability to model record storm events and continuous simulation.

The County has three hydrologic rainfall zones. Sacramento County developed a hydrology calculator known as SacCalc, which is available at no cost to consulting engineers. SacCalc is a preprocessor to the US Army Corps of Engineers HEC-1 hydrology computer program. The program (freeware found at www.saccodwr.org search: SacCalc) allows modeling of a wide range of storm events, table shown below. The user may develop a hydrograph for a watershed of specified size, shape, slope, roughness, soil type and land use for a range of storms 2 year 6 hour through 500 year 10 day.



Flood control detention basins are constructed when there is need to attenuate impacts to peak flow in a watershed. Such basins are generally designed as off-line taking the peak flow off of an open channel. Stormwater quality basins are used to treat storm water pollution by maintaining a residence time at zero velocity allowing suspended solids to settle before the water is discharged, normally by gravity, to the adjacent open channel. Combined basins have a flood control volume over a permanently wet volume serving as storm water pollution prevention. Basins are designed to be aesthetic amenities for the developing community.

Urban drainage is conveyed by piped storm drain systems to the nearest open channel, creek or stream. Water quality treatment is required in accordance with the county's storm water permit from the State

Regional Water Quality Control Board under Section 401 of the Clean Water Act. This is a joint permit with the cities, the County and our neighboring county of Placer as well as the City of Roseville. The group prepared a Stormwater Quality Design Manual, dated 2007. www.saccodwr.org click on Stormwater Quality.

Hydromodification and geomorphologic studies are being prepared for urbanizing watersheds to assure minimized impact to the erosion and deposition characteristics of the streambed. This is regulated by the State Regional Water Quality Control Board and the findings will be made a part of the forthcoming regional permit. It is not anticipated that mitigation for hydromodification will have an impact on the FEMA 100-year floodplain but it will likely require additional care in the design of developments including low impact development features, attenuating flows below the 10-year event.

The Sacramento County Department of Water Resources Drainage Development and Hydrology Section reviews all grading and drainage projects in the County for conformance with drainage improvement standards and the Floodplain Management Ordinance. A grading permit is required for any project that moves more than 350 cubic yards of soil. Improvement plans are required for any on-site or off-site development and for any drain pipe other than a driveway culvert. All grading plans and improvement plans are reviewed and approved by Water Resources to assure adherence to design standards. Staff also assures that new homes are constructed safely above the highest determined base flood elevation whether mapped on the FEMA Flood Insurance Rate Map or designated by County study including future condition hydrology.

COOPERATIVE TECHNICAL PARTNERSHIPS AND WATERSHED AGREEMENTS

Sacramento County has a cooperative technical partnership agreement with each of its seven cities as part of the FEMA map modernization project.

SACRAMENTO COUNTY AND PLACER COUNTY

Dry Creek conveys flows from Placer County. The Dry Creek drainage study dated 1992 was a joint effort of both the counties of Placer and Sacramento. Placer County agreed to attenuate peak flow impacts. Sacramento County agreed to pay a fair share impact fee for development in watersheds draining toward Placer County (Linda Creek and north flowing Dry Creek Tributaries such as Parkway Greens).

Placer County has prepared an update flood study for Dry Creek, Civil Engineering Solutions and RBF Consulting 2011.

The South Placer Vineyard proposed development north of the Sacramento County line drains mostly to Steelhead Creek, known also as Natomas East Main Drainage Canal, tributaries. The development is conditioned to pay the Steelhead Creek Fair Share Fee as described in the Zone 11C Engineer's Report dated August 16, 2004.

SACRAMENTO COUNTY AND CITY OF SACRAMENTO

The following watersheds flow from the County to the City: Morrison, Elder, Gerber, Florin, Unionhouse, Strawberry, Whitehouse, Laguna and Elk Grove Creeks in the south. Dry, Magpie, Robla, and Arcade Creek and the American River in the north. Natomas interior drainage canal, NEMDC, and the Sacramento River in the Natomas basin.

The South Sacramento Streams Group Project is an ongoing US Army Corps of Engineers project working in partnership with the State and the Sacramento Area Flood Control Agency as the local sponsors for the benefit of the County and City. The project included a floodwall project in the City of Sacramento on the following creeks:

- Lower Morrison
- Florin
- Elder
- Unionhouse

The South Sacramento Stream Group Project also includes channel work along the Florin and Unionhouse Creek and the construction of a flood control detention basin along Florin Creek. The County of Sacramento, the City of Sacramento, and SAFCA are coordinating on a plan to ensure these flood protection measures are not compromised by upstream development.

A drainage study was performed on Upper Morrison Creek by a consultant for Water Resources. The study focused on a reach of aggregate strip mines from the City boundary upstream to the Aspen VI/Vineyard I mining pit just upstream of Jackson Road. High flows from the channel are diverted into the Aspen VI/Vineyard pit over a weir constructed in a realigned channel. This weir controls peak flows downstream. The study developed hydrologic (SacCalc) and hydraulic (HEC-RAS) models that are being used for planned development throughout the reach. It also ensures that design flows for the South Sacramento Streams Group flood control projects will not be exceeded. Additional analysis is being conducted in relation to the master planning for the West Jackson Highway Plan which will include a revision to the FEMA floodplain for the upper reaches of Morrison Creek.

SACRAMENTO COUNTY AND CITY OF RANCHO CORDOVA

Rancho Cordova has their own drainage and floodplain management staff. Rancho Cordova is located within Zone 11 A and B of the Sacramento County Water Agency which charges a development fee to new projects to fund the planning, design and construction of new trunk drainage systems. The City of Rancho Cordova charges city residents a Rancho Cordova Stormwater Utility Fee to pay for the bulk of drainage program services. Generally, Rancho Cordova is upstream of the unincorporated county.

SACRAMENTO COUNTY AND CITY OF ELK GROVE

Elk Grove has their own drainage and floodplain management staff but the City still lies within Zone 11A of the Sacramento County Water Agency and participates in the regional trunk drainage development fee program. City residents pay an Elk Grove Storm Water Utility Fee for drainage services provided by the City. All of the watersheds in the City have been master-planned. The city sits low in the county watersheds and drains to the Beach Stone Lake floodplain. Development in Zone 11A pay a Beach Stone Lake volume mitigation fee held in a trust for a future project. The Laguna West and Laguna Stonelake projects paid lump sum fees toward Beach Stone Lake Mitigation. Proposed projects for agricultural residences in the Beach Stone Lake floodplain include elevation, berms, and walls. The County Department of Water Resources pays flood insurance premiums for many homes in this floodplain from interest earned on funds held in the account.

Upstream watersheds draining into the City of Elk Grove include Strawberry Creek and Laguna Creek. Strawberry Creek is built out. Laguna Creek is master-planned and there is a flow rate at the city border that will be held as the maximum 100-year peak. This is memorialized in a FEMA Letter of Map Revision. The County is planning to utilize a large aggregate mine as a peak flow detention basin, known as Triangle Rock, to control flood flows while allowing a range of lower frequency flows to maintain aquatic habitat and geomorphologic characteristics.

COUNTY OF SACRAMENTO AND CITY OF CITRUS HEIGHTS

Citrus Heights is almost entirely built-out and is located in the upstream (northeast) portion of the natural stream watersheds. The largest infill is at Gum Ranch on South Branch Arcade Creek, which is slated for a regional detention basin. This basin will serve to attenuate peak flow immediately downstream and at the confluence with Arcade Creek.

The City of Citrus Heights is in Zone 11B and residents pay the Stormwater Utility Fee. The City's General Services Department provides over site for its drainage program, however, the bulk of City drainage services are provided by under an agreement with the County of Sacramento.

CITY OF FOLSOM

The City of Folsom is at the top of its watersheds and drains directly to the American River. Because of this there is little interaction between agencies regarding drainage and floodplain issues.

CITY OF GALT

The City of Galt is located in the middle of the rural unincorporated south County and is a pass-through for upstream rural County runoff as it drainage southwest. Deadman's Gulch and Hen Creek are the two primary watersheds serving the City. There is much cooperation between the City of Galt and the County of Sacramento Department of Water Resources associated with managing flows in these watersheds. Peak flow detention is not deemed necessary on the main branches of these streams, but there is need for detention basins to attenuate flow where there are storm drain system deficiencies. Much of the area is topographically flat and the defined drainage systems handle about a 2-year storm event.

West Galt Drainage Study

This drainage study was developed by Water Resources in 2003. It was approved for use by Sacramento County and the City of Galt. It is being used by Water Resources to condition development. The precipitation data and land use are still appropriate, as well as the hydrologic (HEC-1) and hydraulic (HEC-RAS) methods.

CITY OF ISLETON

The City of Isleton is a relatively small area of development on the rural and agricultural lands of Andrus Island. All runoff on Andrus Island drains to agricultural/ drainage ditches operated by RD545 and then pumped to the Sacramento River. The RD545 drainage system is sized for all runoff including Isleton, and discharges to the Sacramento River are not significant.

FUTURE MITIGATION STRATEGIES

To help determine mitigation strategies for the region, an accurate and comprehensive picture of the future conditions is needed. The development of a watershed modeling project to create models for each major waterway impacting the region would provide a foundation for all stakeholders to plan for the

future and not increase peak flows and volumes. Information from a unified model can be utilized to determine high priority mitigation projects and the impacts of proposed development projects.

The County, City of Sacramento, and SAFCA will work to together to development mitigation strategies that ensure future development does not increase the risk of flooding in these communities. Additional watershed management plans and agreements will be developed related to development and drainage facilities in the Dry Creek (North), Arcade Creek, and South Sacramento Stream Group (Morrison Creek) watersheds.

FUNDING

SACRAMENTO COUNTY FUNDING

Sacramento County Storm Water Utility funds maintenance and improvement of existing storm drain systems within the urban services area. This fee is billed bi-monthly on the County Utility Bill. Routine repairs and improvements are made on a continuous basis throughout the unincorporated county. Citizens are encouraged to call the drainage hotline at (916)875-RAIN to request immediate maintenance, improvement projects, or on-site technical assistance related to all drainage matters. The County Stormwater Utility is defined as the area known as Zone 12 of the Sacramento County Water Agency and includes the urban areas of unincorporated county and the cities of Elk Grove, Citrus Heights, and Rancho Cordova.

The Sacramento County Water Agency Zone 11 Drainage Impact Fee Program has been in existence since 1965. New storm drainage systems are generally constructed by contractors working for private developers. Drainage fees are collected prior to improvement plan approval on a schedule rate based on percent impervious area impact to the watershed. Components of the fee include piped storm drain, open channel peak flow impact, detention volume impact, and stormwater quality. Zone 11 is divided into three sheds, 11A is the Morrison Creek and Beach Stone Lake Stream Groups, 11B is natural streams draining toward the American River, 11C is the Dry Creek and Natomas East Main Drainage Canal shed area. The fees collected are used to finance comprehensive drainage plans for urban streams.

Developers are credited and reimbursed for construction of trunk drainage facilities that are permanent and efficient systems in accordance with County standards. Trunk drainage is defined as a 30-acre water shed area or greater within a Zone of the Sacramento County Water Agency Drainage Fee Plan.

Supplemental drainage fee plans are prepared for specific plan areas where there are costs associated with trunk drainage that are not covered by Zone 11, such as environmental mitigation and channel rights-of-way.

CITY OF SACRAMENTO FUNDING

Operation, maintenance, repair and rehabilitation (OMR&R) of the City's water, sewer, drainage, and flood control facilities is the Department of Utilities'(DOU) first task. For this reason, the revenues that make up the DOU budget are first allocated to OMR&R. Any surplus may be used for new facilities, and/or improvements to existing facilities.

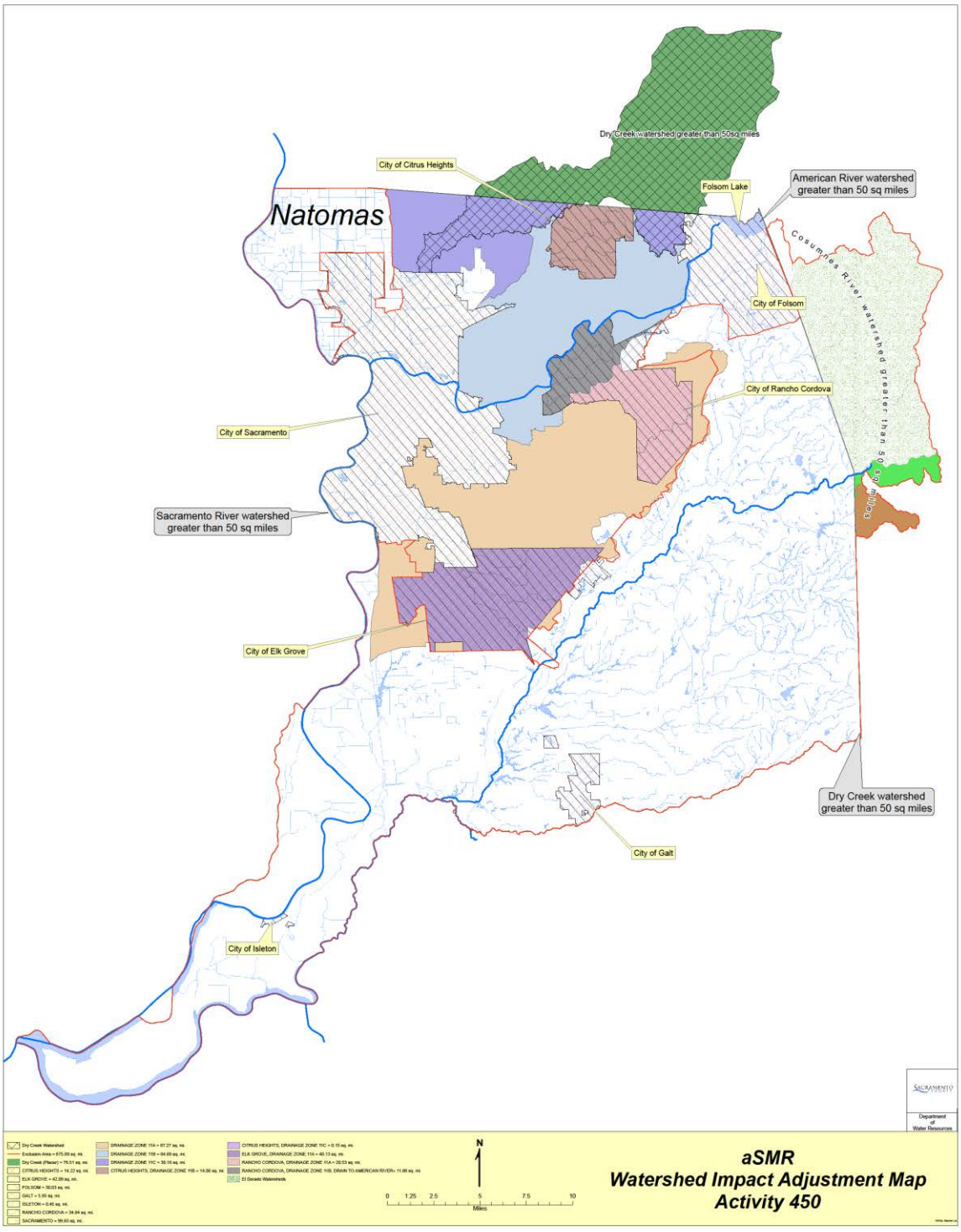
DOU has an annual budgeting process, which determines whether any funds will be available for capital improvements, and, if so, how much will be allocated to water, sewer, drainage, and flood control. DOU's drainage unit has a Drainage Master Planning process that identifies desirable drainage improvement projects, and a prioritization process, which sorts the recommended projects according to cost-effectiveness.

When the annual budget for drainage improvements is known, the drainage unit looks through the recommended drainage improvement projects, focusing on the ones that have highest priority. From this list, the decision-makers will usually set aside any projects whose estimated cost exceeds available funds, and make final selections among the remaining projects.

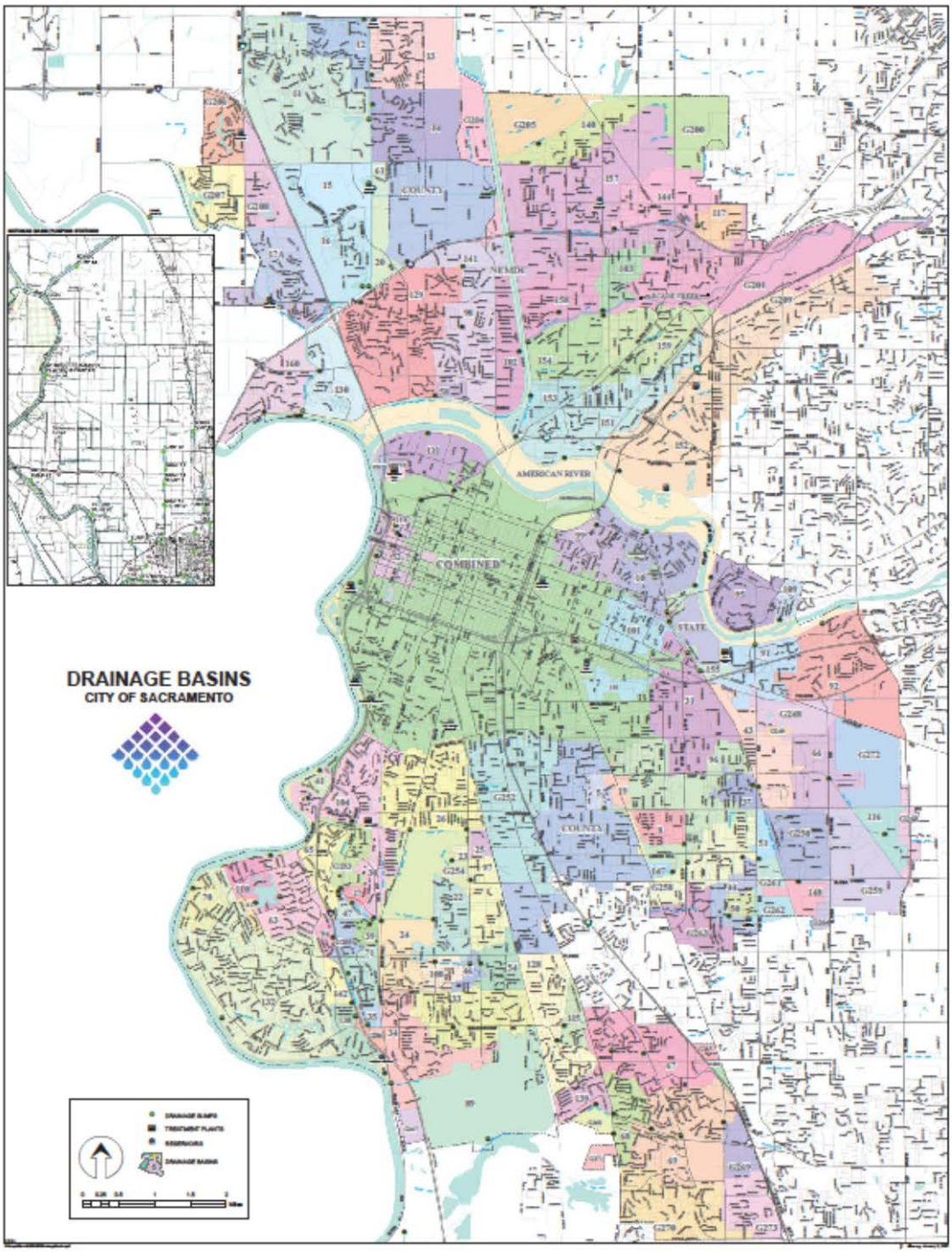
ATTACHMENTS

A. Sacramento County Stormwater Impact Adjustment Map (Activity 450 SMR)
B. City of Sacramento Map of Drainage Basins
C. Existing County of Sacramento Detention Basins

Attachment A: Sacramento County Stormwater Impact Adjustment Map (Activity 450 SMR)



Attachment B: City of Sacramento Map of Drainage Basins



Attachment C: Sacramento County Detention Basins

Detention Basin Map