Draft

WATER+ TREATMENT PLANTS RESILIENCY AND IMPROVEMENTS PROJECT

Environmental Impact Report

State Clearinghouse No. 2022040138

Prepared for
City of Sacramento

June 2025

ESA

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Acronyms and Other Abbreviations

Abbreviation	Definition
$\mu g/m^3$	micrograms per cubic meter
μPa	micropascals
AB	Assembly Bill
af	acre-feet
afy	acre-feet per year
ARG	American River Group
BCECP	Basic Construction Emissions Control Practices
BERD	Built Environment Resources Directory
bgs	below ground surface
BMP	Best Management Practices
Boards	Regional Water Quality Control Boards
BP	Before Present
CAA	Clean Air Act
CAAP	Climate Action and Adaptation Plan
CAAQS	California Ambient Air Quality Standards
Cal EPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Occupational Health and Safety Administration
CalEEMod	California Emissions Estimator Model
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CARB	California Air Resources Board
Carollo	Carollo Engineers, Inc.
CBC	California Building Code
CCAA	California Clean Air Act
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGP	Construction General Permit

Abbreviation	Definition
CGS	California Geological Survey
CHRIS	California Historical Resources Information System
City	City of Sacramento
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
COA	Coordinated Operations Agreement
County	County of Sacramento
CPUC	California Public Utilities Commission
CR	California Code of Regulations
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
CUPA	Certified Unified Program Agency
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
dB	Decibels
dBA	A-weighted Decibels
DCC	Delta Cross Channel
Delta	Sacramento-San Joaquin River Delta
DNL	Day-night average noise level
DO	dissolved oxygen
DOC	California Department of Conservation
DOT	Department of Transportation
DPM	diesel particulate matter
DPR	California Department of Parks and Recreation
DPS	Distinct Population Segment
DSH	Diameter at Standard Height
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources

Abbreviation	Definition
E/I	export/import
EBMUD	East Bay Municipal Utilities District
EC	electrical conductivity
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EMFAC	Emissions Factor model
EMS	Emergency Medical Services
ESA	Environmental Science Associates
ESU	Evolutionarily Significant Unit
EUU	Existing Utility Upgrades
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHSZ	Fire Hazard Severity Zone
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
FR	Federal Register
FTA	Federal Transportation Administration
FWTP	E.A. Fairbairn Water Treatment Plant
GHG	Greenhouse gas
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWh	gigawatt hour
GWP	global warming potential
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HAP	Hazardous Air Pollutants
HEPA	high-efficiency particulate air
HFC	hydrofluorocarbon
HMBP	Hazardous Materials Business Plan
HME	Habitat Management Element
HRER	Historic Resource Evaluation Report
HVAC	heating, ventilation, and air conditioning
I-5	Interstate 5
I-80	Interstate 80
IBC	International Building Code

Abbreviation	Definition
IEP	Interagency Ecological Program
IPCC	International Panel on Climate Change
ISO	Independent System Operator
ITP	Incidental Take Permit
Ksat	saturated conductivity
kV	kilovolt
kWh	kilowatt hour
L_{90}	background ambient noise level
L_{dn}	day-night equivalent noise level
L_{eq}	equivalent sound level
LESA	land evaluation and site assessment
LID	Low Impact Development
L_{max}	maximum instantaneous noise level experienced during a given period of time
LS	Less than Significant
LSM	Less than Significant with Mitigation
LUST	Leaking Underground Storage Tank
MAF	million acre-feet
MBTA	Migratory Bird Treaty Act
MGD	million gallons per day
MLD	Most Likely Descendant
$MMTCO_2e$	Million metric tons of carbon dioxide equivalent
MOSAC	Museum of Science and Curiosity
MOU	Memorandum of Understanding
mpg	miles per gallon
MRZ	Mineral Resource Zone
$MTCO_2e$	metric tons of carbon dioxide equivalent
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCIC	North Central Information Center
NDOI	Net Delta Outflow Index
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFIP	National Flood Insurance Program

Abbreviation	Definition
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NI	No Impact
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
O&M	operation and maintenance
O_3	ozone
OHP	Office of Historic Preservation
OSHA	Occupation Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCBs	polychlorinated biphenyls
PDC	Planning and Development Code
PFCs	perfluorinated compounds
PG&E	Pacific Gas and Electric Company
PM	particulate matter
PM_{10}	10 microns or less in diameter
$PM_{2.5}$	2.5 microns or less in diameter
ppb	parts per billion
ppd	pounds per day
ppm	parts per million
ppt	parts per thousand
PPV	peak particle velocity
PRC	Public Resource Code
PS	Potentially Significant
PSA	Purveyor Specific Agreement
QSD	Qualified SWPPP Developer
RACM	Regulated Asbestos-Containing Material
Reclamation	United States Bureau of Reclamation

Abbreviation	Definition
Regional San	Regional County Sanitation District
ROG	reactive organic gas
RUSLE	Revised Universal Soil Loss Equation
Sacramento PD	Sacramento Police Department
Sacramento State	California State University, Sacramento
SAFCA	Sacramento Area Flood Control Agency
SB	Senate Bill
SCEMD	Sacramento County Environmental Management District
SDC	seismic design category
SDWA	Safe Drinking Water Act
SEL	sound exposure level
SFD	Sacramento Fire Department
SGMA	Sustainable Groundwater Management Act
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLF	Sacred Lands File
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMARA	Surface Mining and Reclamation Act
SMUD	Sacramento Municipal Utility District
SO_2	sulfur dioxide
SPD	Special Planning District
SPFC	State Plan of Flood Control
SQIP	Stormwater Quality Improvement Plan
SR	State Route
SRFCP	Sacramento River Flood Control Project
SRTS	Sacramento Recycling and Transfer Station
SRWI	Sacramento River Water Intakes
SRWTP	Sacramento River Water Treatment Plant
State Water Board	State Water Resources Control Board
SU	Significant and Unavoidable
SVAB	Sacramento Valley Air Basin
SVP	Society of Vertebrate Paleontology
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan

Abbreviation	Definition
TAC	toxic air contaminants
TAF	thousand acre-feet
TCL	Tribal Cultural Landscape
TCR	Tribal Cultural Resource
TDS	total dissolved solids
TMDL	total maximum daily load
TP	Potable Water Transmission Pipelines
TPI	Treatment Plant Improvements
tpy	tons per year
UAIC	United Auburn Indian Community
UBC	Uniform Building Code
UFC	Uniform Fire Code
US-50	United States Highway 50
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USLE	Universal Soil Loss Equation
UST	Underground Storage Tank
UWMP	Urban Water Management Plan
VdB	vibration decibels
VELB	Valley Elderberry Longhorn Beetle
VMT	vehicle miles traveled
VOC	volatile organic compound
WDR	Waste Discharge Requirement
WEAP	Worker Environmental Awareness Program
WEG	Wind Erodibility Group
WHO	World Health Organization
WUA	Water Use Agreement
WWTP	Wastewater Treatment Plant
X2	kilometers upstream from the Golden Gate Bridge
YOY	young-of-the-year

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EXECUTIVE SUMMARY

ES.1 Introduction

The City of Sacramento (City) is proposing the Water+ Treatment Plants Resiliency and Improvements Project (proposed project) to provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its useful life, and to meet the projected potable water demands. Pursuant to the California Environmental Quality Act (CEQA), the City is the lead agency and has prepared this Draft Environmental Impact Report (EIR) to analyze potentially significant environmental effects of the proposed project and other actions associated with construction and operation of the proposed project.

ES.2 Objectives of the Proposed Project

The general objective of the proposed project is to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand. Specific proposed project objectives include:

- Increase treatment flexibility to address changing water quality in the American and Sacramento Rivers while continuing to meet changing drinking water regulations.
- Improve safety, reliability, and resiliency of both the E.A. Fairbairn Water Treatment Plant (FWTP) and the Sacramento River Water Treatment Plant (SRWTP) facilities.
- Provide for consistent treatment and distribution of potable water to the City's service area.
- Increase reliable water supplies and treatment capacities to meet anticipated water demands.

ES.3 Project Areas

The City's water treatment plants and raw water supply facilities are located within the city of Sacramento (refer to **Figure ES-1**, Regional Location Map). The proposed project involves construction and operation of various components associated with operation of the FWTP (refer to **Figure ES-2**, E.A. Fairbairn Water Treatment Plant Project Area) and the SRWTP (refer to **Figure ES-3**, Sacramento River Water Treatment Plant Project Area).

The FWTP project area, including the approximately 34-acre FWTP property, is located adjacent to the American River and near Sacramento State University (refer to Figure ES-2). Streets adjacent to and within the FWTP project area include State University Drive to the west and College Town Drive to the south. The SRWTP project area, including the approximately 50-acre SRWTP property, is located near the confluence of the Sacramento River and American River (refer to Figure ES-3). Included in the project area are the existing water intake, the proposed new water intake and pump station, and the original intake, all of which are located on the east bank of the Sacramento River, west of Jibboom Street. The project area also includes the location of two new pipelines, each connecting from the existing and new water intakes to the SRWTP. Nearby roads around the SRWTP property include Bannon Street and Richards Boulevard to the north, 7th Street and North B Street to the east, Summit Tunnel Avenue to the south, and Bercut Drive to the west. Figure 2-3 also depicts the project area for improvements to the City's potable water transmission pipelines in the vicinity of the SRWTP.

ES.4 Summary of the Project

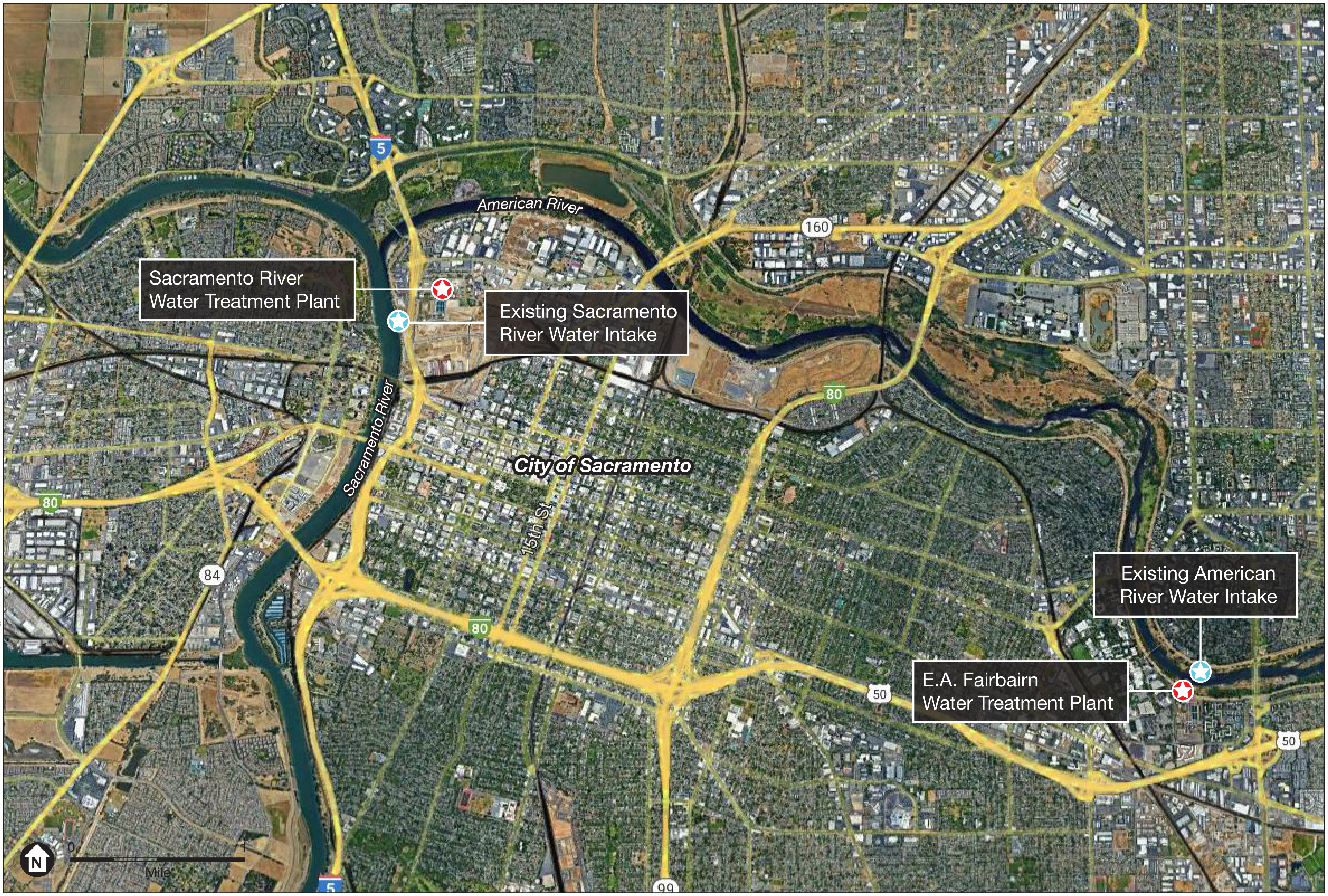
The proposed project is designed to achieve the project objectives through two phases of work relating to the City's water treatment plants, raw water supply, and potable water transmission pipelines: an "initial phase" to occur between 2026 and 2037, followed by a "project buildout" to occur between 2040 and 2050.

The initial phase of the proposed project would improve treatment reliability at both water treatment plants by replacing facilities that have reached the end of their effective lives. The initial phase would also provide resiliency within each treatment system through the addition of ozone treatment, to help address changing water quality in the Sacramento and American Rivers, and the conversion from chlorine gas to sodium hypochlorite, a safer and more reliably available chemical for disinfection. The project buildout phase of the proposed project would be staged to meet the increasing water demands of the City's service area through 2050 by further increasing the capacity of the SRWTP to treat water diverted from the Sacramento River.

In summary, the proposed project includes the following components.

- Facility and treatment process improvements at both the FWTP and the SRWTP including replacement of aging infrastructure; integration of ozone into the treatment processes; and conversion from chlorine gas to sodium hypochlorite as the primary chemical for disinfection of the water.
- Upgrades to existing utilities that serve the FWTP and SRWTP (i.e., storm drainage systems and electrical service line connections).
- Construction of a new Sacramento River water intake and pump station, and installation of a new raw water conveyance pipeline to transfer raw water from the supply source (Sacramento River) to the SRWTP facilities.
- Improvements to the existing Sacramento River water intake and associated facilities, and installation of a second new pipeline to transport sediment deposited within the intake to SRWTP (following approximately the same alignment as the raw water conveyance pipeline described above).
- Improvement of the potable water transmission system in the vicinity of SRWTP to address critical hydraulic constrictions.

A detailed description of each of these components is presented in Chapter 2, *Project Description*.



D201800874.00 - Sacramento River WTP CEQA and Permitting\05 Graphic-GIS Modeling\Illustrator

SOURCE: Carollo, 2022

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure ES-1
Regional Location Map

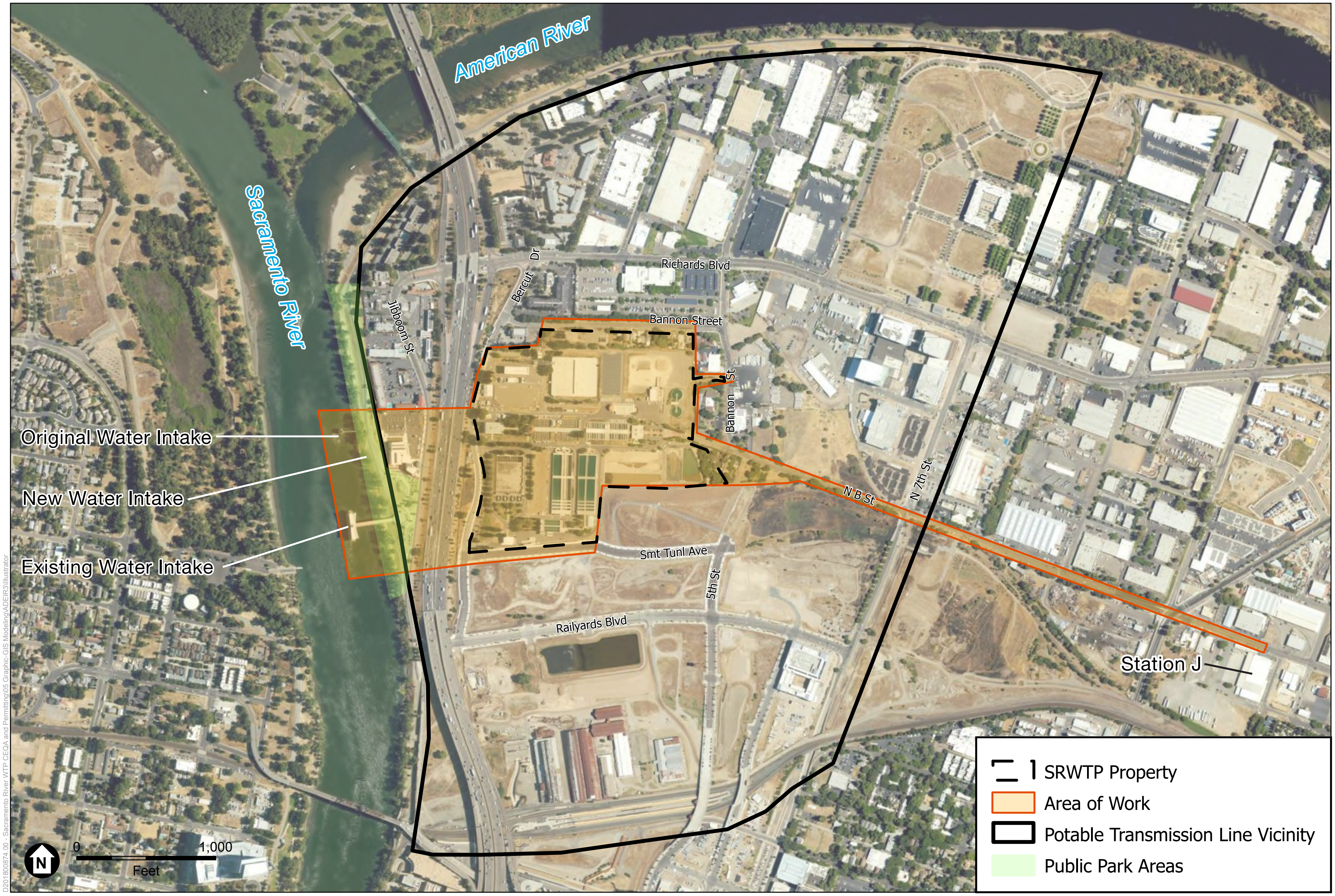
ESA

SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure ES-2
E.A. Fairbairn Water Treatment Plant Project Area

ESA



SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure ES-3
Sacramento River Water Treatment Plant Project Area

ESA

ES.5 Alternatives

Chapter 6, *Alternatives*, describes alternatives to the proposed project and compares the environmental impacts of those alternatives. This chapter also describes alternatives that were considered but eliminated from detailed consideration. The alternatives that were considered but rejected include:

- Alternate treatment processes
- Alternate treatment plant layouts
- Alternate options to meet future water demand
- Alternate water intake location and type

Two alternatives were identified for further evaluation in the Draft EIR as a result of the alternatives development and screening process described in Chapter 6. These two alternatives are:

- No Project Alternative
- Initial Phase Only Alternative

Based on the comparison of environmental impacts of these alternatives to the proposed project, due to the reduced magnitude and duration of impacts, the Initial Phase Only Alternative is the environmentally superior alternative. However, the Initial Phase Only Alternative does not provide the complete buildout capacity of the SRWTP to treat water diverted from the Sacramento River to meet increasing water demands in the City's service area. Therefore, it would not fully achieve the objectives of the proposed project.

ES.6 Potential Areas of Controversy and Concern

The City issued a Notice of Preparation (NOP) on Wednesday April 6, 2022, to satisfy the requirements of CEQA and CEQA Guidelines Section 15082 (State Clearinghouse #2022040138). The NOP was also sent to public agencies, organizations, and individuals that requested receipt of the City's public notices, to invite them to provide input. The NOP was also available for review on the City's Water+ Program website: https://www.cityofsacramento.gov/utilities/projects/waterplus. The public comment period for the NOP closed at 5:00 p.m. on Friday, May 6, 2022. In addition to the public and agency comment period, a virtual public meeting was held at 12:00 p.m. on Wednesday, April 27, 2022, via the Zoom web conference application. Concerns raised in response to the NOP, written comments, and verbal comments received at the scoping meeting were considered during the preparation of this Draft EIR. The NOP and comment letters are included as **Appendix A** of the Draft EIR.

ES.7 Draft Environmental Impact Report

This Draft EIR is available to federal, state, and local agencies and interested organizations and individuals who may want to review and comment on the adequacy of the analysis. The Draft EIR can be reviewed online at the following website:

https://www.cityofsacramento.gov/community-development/planning/environmental/impact-reports

Publication of the Draft EIR marks the beginning of a 45-day public review period. The 45-day public review period for this Draft EIR is Thursday, June 20, 2025, through 5:00 p.m. on Monday, August 4, 2025. During the public review period, written comments should be postmarked by August 4, 2025, and mailed or emailed to:

Charlie Tschudin, Senior Planner
City of Sacramento Community Development Department
300 Richards Blvd., Third Floor
Sacramento, CA 95811
Phone (916) 808-8145
Email: ctschudin@cityofsacramento.org

Please use “Water+ Project Draft EIR Comments” in the subject line. Also, if submitting comments on behalf of an agency, tribal group, or organization, please include the name of a contact person and the name of the group that the comments are coming from. All comments received, including names and addresses, will become part of the official public administrative record.

ES.8 Summary of Impacts

Table ES-1 presents a summary of the impacts and mitigation measures identified for the proposed project evaluated in this Draft EIR. The complete impact statements and mitigation measures are presented in the resource sections in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*. The level of significance for each impact was determined using thresholds of significance presented in each resource section of Chapter 3. Significant impacts are those adverse environmental impacts that meet or exceed the standards of significance; less-than-significant impacts would not exceed the standards of significance. For each impact identified, Table ES-1 presents the following information:

- The environmental impact statement.
- The level of significance before mitigation for each project component (LS - Less than Significant; NI - No Impact; PS - Potentially Significant).
- For potentially significant impact, recommended mitigation measures. Each mitigation measure identifies which proposed project component that it applies to using the following abbreviations:
  - Treatment Plant Improvements - TPI (FWTP/SRWTP)
  - Existing Utility Upgrades - EUU (FWTP/SRWTP)
  - Sacramento River Water Intakes - SRWI (Existing/New)
  - Potable Water Transmission Pipelines - TP
  - All Project Components - ALL
- For potentially significant impacts, the level of significance after mitigation for the applicable project component (LSM - Less than Significant after Mitigation; SU - Significant and Unavoidable)

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TABLE ES-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.2 Aesthetics									
3.2-1: Implementation of the proposed project could substantially degrade the existing visual character or quality of public views of the site and its surroundings or conflict with applicable zoning and other regulations governing scenic quality.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None Required	NA	NA	NA	NA
3.2-2: Implementation of the proposed project could create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None Required	NA	NA	NA	NA
3.3 Agriculture Resources									
3.3-1: Implementation of the proposed project could result in changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/New)	LS	None required.	NA	NA	NA	NA
3.4 Air Quality									
3.4-1: Construction of the proposed project could conflict with or obstruct implementation of an applicable air quality plan.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.4-1(a) (TPI-SRWTP, EUU–SRWTP):** Prior to the initiation of construction at SRWTP, including existing utility upgrades, contractor shall ensure that all heavy-duty off-road diesel-powered equipment (including owned, leased, and subcontractor equipment) shall be CARB Tier 4 Final or cleaner. These requirements shall also be included on improvement plans and submitted for review and approval by SMAQMD. **Mitigation Measure 3.4-1(b) (ALL):** The following Basic Construction Emissions Control Practices, required by SMAQMD Rule 403 and enforced by SMAQMD staff, shall be implemented to minimize fugitive dust emissions during construction activities: i. Water all exposed surfaces two times daily. Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and access roads; ii. Cover or maintain at least 2 feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways should be covered; iii. (Use wet power vacuum street sweepers to remove any visible track-out mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited; iv. Limit vehicle speeds on unpaved roads to 15 miles per hour; v. All roadways, driveways, sidewalks, parking lots to be paved should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used; vi. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes [California Code of Regulations, Title 13, Sections 2449(d)(3) and 2485]. Provide clear signage that posts this requirement for workers at the entrances to the site; vii. Provide current certificate(s) of compliance for CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation [California Code of Regulations, Title 13, Sections 2449 and 2449.1]; and viii. Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.4-2: Operation and maintenance of the proposed project conflict with or obstruct implementation of an applicable air quality plan.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA

NOTES: LS—Less than Significant; LSM—Less than Significant with Mitigation; NA—Not Applicable; NI—No Impact; PS—Potentially Significant; SU—Significant and Unavoidable.

Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.4-3: Construction of the proposed project could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.4-2(a) (TPI-SRWTP, EUU–SRWTP):** Implement Mitigation Measure 3.4-1(a). **Mitigation Measure 3.4-2(b) (ALL):** Implement Mitigation Measure 3.4-1(b).	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.4-4: Operation and maintenance of the proposed project could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.4-5: Construction of the proposed project could expose sensitive receptors to substantial pollutant concentrations.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.4-6: Operation and maintenance of the proposed project could expose sensitive receptors to substantial pollutant concentrations.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.4-7: Construction of the proposed project could result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.4-8: Operation and maintenance of the proposed project could result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.5 Biological Resources - Aquatic									
3.5-1: Construction of the proposed project could result in direct or indirect impacts to listed fish species and their associated habitat and could interfere with movement of native resident or migratory fish.	NI (FWTP/ SRWTP)	NI (FWTP/ SRWTP)	LS (Existing) PS (New)	NI	**Mitigation Measure 3.5-1 (SRWI-New):** Prior to the start of any in-water construction that would require pile driving, the City or its contractors shall prepare a sound attenuation monitoring plan to protect fish and submit to NMFS, CDFW, and USFWS for approval. The approved plan shall be implemented during construction. This plan shall provide detail on the sound attenuation system, detail methods used to monitor and verify sound levels during pile driving activities (if required based on projected in-water noise levels), and describe best management practices to reduce impact pile-driving in the aquatic environment to an intensity level less than 183 dB (sound exposure level, SEL) impulse noise level for fish at a distance of 33 feet. The plan shall incorporate, but not be limited to, the following best management practices: (a) To the extent feasible vibratory pile drivers shall be used for the installation of all support piles. (b) If impact hammer pile driving will be used, a soft start technique shall be implemented, at the start of each workday or after a break in impact hammer driving of 30 minutes or more, to give fish an opportunity to vacate the area. (c) If during the use of an impact hammer, established pile driving thresholds are exceeded (greater than 183 dB), a bubble curtain or other sound attenuation method as described in the approved sound attenuation monitoring plan shall be utilized to reduce sound levels below the criteria described above. **Mitigation Measure 3.5-2 (SRWI-New):** Incorporate best practices to avoid and/or minimize potential impacts from in-water construction. These include the following: (a) All in-water construction shall occur during the designated in-water work window of June 1 through October 31 (or as otherwise specified by applicable permits from the Regional Water Quality Control Board, CDFW, NMFS, and/or USACE), when listed fish are least likely to occur. (b) All materials placed into the creek channel shall be nontoxic. Any combination of wood, plastic, cured concrete, steel pilings, or other materials used for in-channel structures shall not contain coatings or treatments or consist of substances toxic (e.g., copper, other metals, or pesticides, petroleum-based products, etc.) to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.	NA	NA	LSM (New)	NA

NOTES: LS—Less than Significant; LSM—Less than Significant with Mitigation; NA—Not Applicable; NI—No Impact; PS—Potentially Significant; SU—Significant and Unavoidable.

Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
					(c) Construction supervisors and managers shall be educated on invasive species identification and the importance of controlling and preventing the spread of invasive species. The Project Applicant will follow the guidelines in the CDFW's California Aquatic Invasive Species Management Plan (CDFW, 2008) and Aquatic Invasive Species Disinfection/Decontamination Protocols (CDFW, 2016). (d) Construction equipment such as portable equipment, vehicles, and supplies, including chemicals, shall be stored at designated construction staging areas or on barges, exclusive of any riparian or wetland areas. Any equipment that may leak shall be stored over impermeable surfaces, if available, and drip pans (or any other type of impermeable containment measure) will be placed under parked machinery and checked and replaced, when necessary, to prevent drips and leaks from entering the environment. (e) Areas for fuel storage, refueling, and servicing of construction equipment shall be located in an upland location and following industry BMPs. (f) The contractor/applicant to the Program shall inspect, maintain and repair all erosion control materials and devices prior to and after any storm event, at 24-hour intervals during extended storm events, and a minimum of every two weeks until all erosion control measures are no longer needed. (g) Immediately after project completion and before the close of the seasonal work window, all exposed soil shall be stabilized with erosion control measures such as mulch, seeding, and/or placement of erosion control blankets. Where straw, mulch, or slash is used on bare mineral soil, the minimum coverage shall be 95 percent with two-inch minimum depth. **Mitigation Measure 3.5-3 (SRWI-New):** During all in-water construction work associated with the installation of the proposed new intake, the City or its contractors shall develop a fish salvage and relocation plan and submit to NMFS, CDFW, and USFWS for approval. The approved plan shall be implemented after cofferdam installation and prior to dewatering to prevent fish stranding during dewatering. The plan will outline methods and procedures for rescue and relocation including: (a) Salvage and relocation activities shall be conducted by Qualified Biologists approved by NMFS, CDFW, and USFWS and in accordance with required permits. (b) Procedures for excluding fish from the construction zone and for removing fish, should they become trapped. (c) Salvage methods including seining, dipnetting, and electrofishing, shall be implemented in a way that minimizes fish stress and mortality. **Mitigation Measure 3.5-4 (SRWI-New):** In order to offset the permanent loss of 0.23 acres of shaded riverine aquatic habitat removed to accommodate the proposed new intake, the City shall purchase mitigation credits from a public or private mitigation bank approved by CDFW. The final number of credits purchased will be in a ratio agreeable to CDFW and other agencies consulted.				
3.5-2: Operation and maintenance of the proposed project could result in near-field direct or indirect impacts to listed fish species and their associated habitat and could interfere with movement of native resident or migratory fish.	NI (FWTP/ SRWTP)	NI (FWTP/ SRWTP)	LS (Existing) LS (New)	NI	None required.	NA	NA	NA	NA
3.5-3: Operation of maintenance of the proposed project could result in far-field indirect impacts to listed fish species and their associated habitat.	NI (FWTP/ SRWTP)	NI (FWTP/ SRWTP)	NI (Existing) LS (New)	NI	None required.	NA	NA	NA	NA
3.6 Biological Resources – Terrestrial									
3.6-1: Construction of the proposed project could impact nesting migratory birds and birds of prey.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.6-1 (ALL):** (a) Project construction shall occur outside of the nesting season to the extent feasible. If project construction begins during the nesting season (**Table ES-2**), a qualified biologist shall conduct a preconstruction survey for active nests on and adjacent to the project area. The pre-construction survey shall be conducted within 14 days prior to commencement of construction activities (e.g. ground disturbing activities, materials staging, demolition activities). If no active nests are found during the pre-construction survey, no additional mitigation measures are required. If construction does not commence within 14 days of the pre-construction survey, or halts for more than 14 days, an additional pre-construction survey is required. Additional survey requirements for Swainson's hawk are provided below.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM

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</thead>
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<tr><td></td><td></td><td></td><td></td><td></td><td>
TABLE ES-2
NESTING SEASON FOR SPECIAL-STATUS AND COMMON NESTING BIRDS
<table>
<tr><th>Species</th><th>Nesting Season[a]</th></tr>
<tr><td>White-tailed kite</td><td>February 1 to September 30</td></tr>
<tr><td>Swainson's hawk</td><td>March 1 to September 15</td></tr>
<tr><td>Common nesting birds (raptors, passerines, herons, and egrets)</td><td>February 1 to August 31</td></tr>
</table>
(b) If an active nest is located on or adjacent to the project area, an appropriate buffer zone shall be established around the nest, as determined by the qualified biologist. The biologist shall mark the buffer zone with construction tape or pin flags and maintain the buffer zone until the end of breeding season or until the young have successfully fledged or the nest is determined to no longer be active. Buffer zones are typically 50−100 feet for migratory bird nests and 250−500 feet for bird of prey nests (excluding Swainson's hawk). Buffer size shall be determined by the qualified biologist based on the species of bird, the location of the nest relative to the project, project activities during the time the nest is active, and other project-specific conditions.
(c) If establishing the typical buffer zone is impractical, the qualified biologist may reduce the buffer depending on the species and daily monitoring would be required to ensure that the nest is not disturbed, and no forced fledging occurs. Daily monitoring shall occur until the qualified biologist determines that the nest is no longer active.
Additional Measures for Swainson's Hawk
(d) If construction activities are anticipated to commence during the Swainson's hawk nesting season (March 1 to September 15), a qualified biologist shall conduct a minimum of two pre-construction surveys during the recommended survey periods in accordance with the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's Hawk Technical Advisory Committee, 2000). All potential nest trees within 0.25 mile of the project areas shall be visually examined for potential Swainson's hawk nests, as accessible. If no active Swainson's hawk nests are identified on or within 0.25 mile, no additional mitigation measures are required.
(e) If an active Swainson's hawk nest is found within 0.25 mile of the project areas, the following measures will be implemented to avoid and minimize impacts to the nest:
i. A Worker Awareness Training Program shall be conducted prior to the start of construction;
ii. A no-disturbance buffer zone shall be established and work shall be scheduled to avoid impacting the nest during critical periods. To the extent feasible, no work shall occur within 500 feet of the nest while it is in active use. If work would occur within 500 feet of the nest, then construction shall be monitored daily by a qualified biologist to ensure no disturbance occurs to the nest;
iii. A biological monitor shall conduct weekly monitoring of the nest during construction activities; and
iv. The biologist may halt construction activities if they determine that the construction activities are disturbing the nest. CDFW shall be consulted prior to re-initiation of activities that may disturb the nest.
</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3.6-2: Operation and maintenance of the proposed project could impact nesting migratory birds and birds of prey.</td><td>LS (FWTP/ SRWTP)</td><td>LS (FWTP/ SRWTP)</td><td>LS (Existing/ New)</td><td>LS</td><td>None required.</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr>
<tr><td>3.6-3: Construction of the proposed project could impact valley elderberry longhorn beetle.</td><td>PS (FWTP/ SRWTP)</td><td>PS (FWTP/ SRWTP)</td><td>PS (Existing/ New)</td><td>PS</td><td>Mitigation Measure 3.6-2(a) (TPI - FWTP/SRWTP, EUU-FWTP/SRWTP, SRWI-Existing/New): The following measures shall be implemented for avoided elderberry shrubs:
i. Activities that may damage or kill an elderberry shrub (e.g., trenching, paving, etc.) shall have an avoidance area of at least 20 feet from the dripline of the elderberry shrub.
ii. All areas within 165 feet of an elderberry shrub to be avoided during construction activities shall be fenced using high visibility construction fencing, followed by silt fencing, as close to construction limits as feasible. The silt fencing shall be installed to prevent migration of soils into the protected zone around the elderberry shrubs.
iii. A qualified biologist shall provide training for all contractors, work crews, and any onsite personnel on the status of the VELB, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for non-compliance.
iv. During work within 165 feet of any elderberry shrub, a qualified biologist shall monitor the work area on a weekly basis to ensure that all avoidance and minimization measures are implemented. Time spent onsite will be sufficient to verify that no damage to elderberry shrubs has occurred, to ensure that protective fencing is in place and in good working order, and to coordinate any concerns with the client/contractor.
v. As much as feasible, all activities that occur within 165 feet of an elderberry shrub shall be conducted outside the flight season of the VELB (March – July).</td><td>LSM (FWTP/ SRWTP)</td><td>LSM (FWTP/ SRWTP)</td><td>LSM (Existing/ New)</td><td>LSM</td></tr>
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vi. Herbicides shall not be used within the dripline of any elderberry shrub. Insecticides shall not be used within 98 feet of an elderberry shrub. All chemicals shall be applied using a backpack sprayer or similar direct application method.
vi. Mechanical weed removal within the dripline of an elderberry shrub shall be limited to the season when adults are not active (August – February) and shall avoid damaging the elderberry.

Mitigation Measure 3.6-2(b) (TPI - FWTP/SRWTP, EUU-FWTP/SRWTP, SRWI-Existing/New): The following measures shall be implemented for elderberry shrubs which cannot be avoided:
i. If elderberry shrubs cannot be avoided, or if indirect effects would result in death of the shrub, elderberries shall be transplanted. Where possible, the elderberry shrubs shall be relocated as close as possible to their original location. If not possible, the shrub may be transplanted to a USFWS-approved mitigation site.
ii. A qualified biologist shall be on-site for the duration of transplanting activities to assure compliance with avoidance and minimization measures and other conservation measures.
iii. Exit-hole surveys shall be completed immediately before transplanting. The number of exit holes found, GPS location of the plant to be relocated, and the GPS location of where the plant is transplanted shall be reported to the USFWS and to the CNDDB.
iv. Elderberry shrubs shall be transplanted when the shrubs are dormant (November through the first two weeks in February) and after they have lost their leaves. Transplanting during the non-growing season will reduce shock to the shrub and increase transplantation success.
v. Transplanting shall follow the most current version of the ANSI A300 (Part 6) guidelines for transplanting.
vi. Trimming shall occur between November and February and should minimize the removal of branches or stems that exceed 1 inch in diameter.
vii. In addition to transplanting, mitigation credits at a USFWS-approved bank shall be purchased whenever direct impacts cannot be avoided to elderberry shrubs. All elderberry shrubs in the project areas and with potential to be directly impacted are non-riparian. Directly impacted non-riparian elderberry shrubs with exit holes present or directly impacted non-riparian elderberry shrubs located within 165 feet of elderberry shrubs with exit holes present shall be mitigated using the compensation ratio outlined in Table ES-3 below, based on the USFWS Framework (USFWS, 2017):

TABLE ES-3
VALLEY ELDERBERRY LONGHORN BEETLE SHRUB-LEVEL IMPACT COMPENSATION
<table>
<tr><th>Habitat</th><th>Compensation Ratio[1]</th><th>If the entire shrub will be removed[2]</th></tr>
<tr><td>Non-riparian (exit holes present on or within 165 feet of project site)</td><td>1:1</td><td>Transplant the shrub + 1:1 compensation</td></tr>
</table>
1 number of credits: number of shrubs trimmed
2 One credit (unit) = 1,800 square feet or 0.041 acre

Mitigation Measure 3.6-2(c) (TP): After the location of the potable water transmission pipelines are known, and prior to commencement of construction (e.g. ground disturbing activities, materials staging, demolition activities), a survey for elderberry shrubs will be conducted of the pipeline alignment and areas within 165 feet. If no elderberry shrubs with diameter at ground level of one inch are found, no further measures will be required. If elderberry shrubs with at least one stem with a diameter at ground level of one inch or greater are found, Mitigation Measure 3.6-2a shall be implemented.
</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3.6-4: Operation and maintenance of the proposed project could impact valley elderberry longhorn beetle.</td><td>LS (FWTP/ SRWTP)</td><td>LS (FWTP/ SRWTP)</td><td>LS (Existing/ New)</td><td>LS</td><td>None required.</td><td>NA</td><td>NA</td><td>NA</td><td>NA</td></tr>
<tr><td>3.6-5: Construction of the proposed project could impact riparian habitat.</td><td>NI (FWTP/ SRWTP)</td><td>NI (FWTP/ SRWTP)</td><td>PS (Existing/ New)</td><td>NI</td><td>
Mitigation Measure 3.6-3(a) (SRWI – Existing/New):
i. Tree removal shall be minimized to the extent possible.
ii. Prior to the removal of any protected tree as defined by City Code 12.56, the applicant shall submit a tree removal permit application for the removal of protected trees and comply with all conditions of any issued permit.

Mitigation Measure 3.6-3(b) (SRWI- Existing/New):
i. High-visibility fencing shall be erected at the edge of the project footprint to prevent encroachment into unpermitted areas by construction equipment and personnel. Trucks and other vehicles will not be allowed to park beyond the fencing, nor shall equipment be stored beyond the fencing. No vegetation removal or ground disturbing activities will be permitted beyond the fencing.
ii. After project work is completed, any temporary fill and construction debris will be removed, and temporarily disturbed areas will be restored to pre project or better conditions. Before restoration, all non-biodegradable materials will be removed. Restoration may include recontouring disturbed areas to their original configurations.
</td><td>NA</td><td>NA</td><td>LSM (Existing/ New)</td><td>NA</td></tr>
</table>

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Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
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3.6-6: Operation and maintenance of the proposed project could impact riparian habitat.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.6-7: Construction of the proposed project could result in net reduction of waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters.	NI (FWTP/ SRWTP)	NI (FWTP/ SRWTP)	LS (Existing) PS (New)	PS	**Mitigation Measure 3.6-4(a) (SRWI - New):** i. All fueling and maintenance of vehicles and other equipment and staging areas shall occur in designated areas away from any water body. ii. Diesel fuel and oil shall be used, stored, and disposed of in accordance with standard protocols for handling of hazardous materials. All personnel involved in the use of hazardous materials shall be trained in emergency response and spill control. iii. All concrete washing and spoils dumping shall occur in a designated location away from any water body. iv. Construction stockpiles shall be covered within 24 hours of a weather event to prevent blow off or runoff during weather events. v. All excavated material will be placed in previously disturbed upland areas where it will not be subject to regular flooding. vi. Erosion control measures shall be placed in areas that are upslope of aquatic habitat to prevent any soil or other materials from entering aquatic habitat. Silt fencing and natural/biodegradable erosion control measures (i.e., straw wattles and hay bales) shall be used. vii. Turbidity curtains, temporary barriers, or similar methods shall be used during in-channel work to control silts and sediments. viii. Areas temporarily disturbed on the banks of the Sacramento River will be revegetated and reseeded with native grasses and other native herbaceous annual and perennial species or as specified by USACE. Reseeded areas will be covered with a biodegradable erosion control fabric to prevent erosion and downstream sedimentation. The project engineer will determine the specifications needed for erosion control fabric (e.g., sheer strength) based on anticipated maximum flow velocities and soil types. ix. The City will purchase mitigation credits at a USACE-approved mitigation bank for placement of fill in the Sacramento River, as required by the 404 permit. Alternatively the City may contribute to the USACE in-lieu fee program. **Mitigation Measure 3.6-4(b) (TP):** After the location of the potable water transmission pipelines are known, and prior to commencement of construction (e.g. ground disturbing activities, materials staging, demolition activities), a survey will be conducted to map wetlands and waters potentially subject to USACE and State jurisdiction along the pipeline alignment. If no wetlands and waters potentially subject to USACE and State jurisdiction are found, no further measures will be required. If wetlands and waters potentially subject to USACE and State jurisdiction are found, Mitigation Measure 3.6-4(a) would be implemented.	NA	NA	LSM (New)	LSM
3.6-8: Operation and maintenance of the proposed project could result in net reduction of waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.6-9: Construction of the proposed project could conflict with local policies protecting trees.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.6-5 (ALL):** Implement Mitigation Measure 3.6-3(a).	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.6-10: Operation and maintenance of the proposed project could conflict with local policies protecting trees.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.7 Cultural Resources									
3.7-1: Construction of the proposed project could cause a substantial adverse change in the significance of a historical resource.	NI (FWTP) PS (SRWTP)	NI (FWTP) LS (SRWTP)	LS (Existing/ New)	PS	**Mitigation Measure 3.7-1(a) (TPI-SRWTP):** Any proposed new project construction within 200 feet of contributing elements of the SRWTP (including the Pump House, Coagulant Building, or Head House buildings) shall be designed in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties, specifically the standards for rehabilitation and new construction within a historic district. While the SRWTP is considered an individual historical resource and not a historic district, the discontiguous nature of the contributing buildings on the site makes it appropriate to treat them under these standards. Standards 9 and 10 for Rehabilitation state that: • <u>Standard 9.</u> New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and shall be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.	SU (SRWTP)	NA	NA	LSM

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					• Standard 10. New additions and adjacent or related new construction shall be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired. The new construction design shall be consistent with these standards. In addition to compliance with the above, the City shall ensure that any new construction involving the design of a new building shall not have a significant impact on the SRWTP's contributing resources or its features and characteristics. The City of Sacramento Preservation Director, or the Commission, as appropriate per Preservation Development Project Site Plan & Design Review requirements of Title 17 of the City Code, shall review any proposed project's site plan and design to ensure its compatibility with the Secretary of the Interior's Standards. **Mitigation Measure 3.7-1(b) (TPI-SRWTP):** Vibration during construction could cause the physical destruction, damage, or alteration of susceptible historic properties. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration and is often used in monitoring of vibration because it is related to the stresses experienced by structures. The FTA building damage thresholds typically applied and described in the City of Sacramento 2035 General Plan Master Environmental Impact Report are 0.2 PPV for historic buildings and 0.5 PPV for non-historic buildings. To mitigate vibration related damage to historical resources, the proposed project shall include measures to limit exposure of historic buildings to less than 0.2 PPV to prevent building damage. i. Pre-Construction: a. To assist with measures regarding impacts to historical resources, the City and construction contractor shall solicit input and review of plan components from a person(s) who meets the Secretary of the Interior's Professional Qualification Standards for Architectural History, and, as appropriate, an architect that meets the Secretary of the Interior's Professional Qualification Standard for Historic Architect. These qualification standards are defined in Title 36 Code of Federal Regulations Part 61. b. A conditions assessment report including photos and narrative descriptions of current conditions of the Pump House, Coagulant Building, and Head House shall be completed. This includes photos of existing damage and other material conditions present on or at the surveyed buildings. Images of interior conditions shall be included if possible. Photos in the report shall be labeled in detail and dated. c. The construction contractor shall determine the number and placement of vibration receptors at the affected historic buildings in consultation with the consulting architectural historian and/or architect. The number of units and their locations shall take into account proposed construction activities so that adequate measurements can be taken illustrating vibration levels during the course of the project, and if/when levels exceed the established threshold. ii. During Demolition and Construction: a. The construction contractor shall collect vibration data from receptors and report vibration levels to the City Preservation Director or their environmental staff on a monthly basis. The reports shall include annotations regarding project activities as necessary to explain changes in vibration levels, along with proposed corrective actions to avoid vibration levels approaching or exceeding the established threshold. b. With regards to historic structures, if vibration levels exceed the threshold and monitoring or inspection indicates that the project is damaging the building, the historic building shall be provided additional protection or stabilization. If necessary, the construction contractor shall install temporary shoring or stabilization to help avoid permanent impacts. Stabilization may involve structural reinforcement or corrections for deterioration that would minimize or avoid potential structural failures or avoid accelerating damage to the historic structure. Stabilization shall be conducted following the Secretary of the Interior's Standards Treatment of Preservation. This treatment shall ensure retention of the historical resource's character-defining features. Stabilization may temporarily impair the historic integrity of the building's design, material, or setting, and as such, the stabilization must be conducted in a manner that will not permanently impair a building's ability to convey its significance. Measures to shore or stabilize the building shall be installed in a manner that when they are removed, the historic integrity of the building remains, including integrity of material. iii. Post-Construction: a. Following completion of planned construction activities within 100 feet of the contributing elements of the SRWTP, the applicant (and its construction contractor) shall provide a report to the City Preservation Director or their environmental staff regarding vibration monitoring conducted during demolition and construction. In addition to a narrative summary of the monitoring activities and their findings, this report shall include photographs illustrating the post-construction state of material conditions that were presented in the pre-construction assessment report, along with images of other relevant conditions showing the impact, or lack of impact, of project activities. The photographs shall sufficiently illustrate damage, if any, caused by the project and/or show how the project did not cause physical damage to the historic and non-historic buildings. The report shall include annotated analysis of vibration data related to project activities, as well as summarize efforts undertaken to avoid vibration impacts.				

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					b. The project applicant (and its construction contractor) shall be responsible for repairs from damage to historic buildings if damage is caused by vibration during the demolition and/or construction activities. Repairs may be necessary to address, for example, physical damage visible in post-construction assessment, or holes or connection points that were needed for shoring or stabilization. Repairs shall be directly related to project impacts and will not apply to general rehabilitation or restoration activities of the buildings. Repairs on historic structures shall be conducted in compliance with the Secretary of the Interior Standards Treatment of Historic Properties. The project applicant shall provide the City Preservation Director or their environmental staff for review and comment both a work plan for the repairs and a completion report to ensure compliance with the Secretary of the Interior's Standards. **Mitigation Measure 3.7-1(c) (TPI-SRWTP):** Prior to demolition and construction, the project applicant shall prepare a Historic American Buildings Survey (HABS)-like recordation package for the SRWTP to be filed with the City's Preservation Office and Center for Sacramento History. The HABS-like document shall be prepared by a qualified architectural historian, historic architect, or historic preservation professional who satisfies the Secretary of the Interior's Professional Qualification Standards for History, Architectural History, or Architecture, pursuant to 36 CFR 61. This document shall record the history of the SRWTP, its contributing architecture, and detail the important events or other significant contributions to the patterns and trends of history with which the property is associated, as appropriate. The SRWTP physical condition, both historic and current, shall be documented through design plans; historic maps and photographs; large format photographs; and written data. The SRWTP's contributing elements and character-defining features, specifically the Pump House, Head House, Coagulant Building, West Filter Building and Filters, Sedimentation Basin 1, the 5-MG Clearwell, as well as the property Beaux Arts setting and contextual views shall be documented. The completed HABS-like documents shall be sent to the City as well as tote the Center for Sacramento History. The original intake facility has already been subject to HAER recordation in 2003, which can be appended or incorporated into the current HABS package, and does not need to be redocumented as part of this mitigation. **Mitigation Measure 3.7-1(d) (TPI-SRWTP):** Following completion of Mitigation Measure 3.7-1(c), the City or its qualified contractor, shall create and install an interpretive exhibit discussing the historic significance of the SRWTP. This exhibit shall be publicly accessible, such as an informational kiosk or a website and installation of a temporary exhibit (in the Public Library or City Hall). The exhibit will be created using information previously compiled in the HABS-like recordation package, as well as information and materials compiled in consultation with the City's Preservation Commission in order to determine the ideal format, informational content, and installation location of the interpretive exhibit. **Mitigation Measure 3.7-1(e) (TP):** i. Following identification of the project footprint associated with the proposed potable water transmission pipelines and associated construction activities, the City shall engage a professional architectural historian meeting the U.S. Secretary of the Interior's Standards to review the proposed project for historical resources located adjacent to or intersecting the alignment or its associated elements. This will include a records search at the NCIC of the CHRIS, and initial reconnaissance survey for all project components that involve ground disturbance or alterations to buildings dating 50 years or older. If no resources previously determined eligible or unevaluated resources dating 50 years or older are identified, no further measures are needed. ii. If the architectural historian determines that known historical resources or potentially eligible historic age buildings or structures may be impacted by project construction, the City shall re-route the pipeline alignment to avoid identified historic resources. iii. If the alignment cannot be re-routed to avoid adversely effecting an identified historic resource, a Historic Resource Evaluation Report (HRER) shall be completed. This report shall include the results of an intensive survey, identification of known historical resources within or adjacent to the project footprint, and recordation/evaluation of all previously unrecorded potential historical resources within the study area. In the unlikely event that proposed project activities shall directly or indirectly impact historical resources identified in the HRER, additional mitigation measures such as project redesign, resource protection plans, or HABS/HAER recordation would be recommended and implemented as appropriate. The HRER detailing the results of the research and impact analysis shall be prepared and submitted for review by the City and a final draft shall be submitted to the NCIC.				

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Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.7-2: Construction of the proposed project could cause a substantial adverse change in the significance of an archaeological resource.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.7-2(a) (ALL):** i. If pre-contact or historic-era archaeological resources are encountered during project construction and implementation, all construction activities within 100 feet shall halt and the City shall be notified. Pre-contact archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish food remains from precontact populations; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-age materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and archaeological deposits of metal, glass, and/or ceramic refuse indicating historic period refuse. An archaeologist meeting the U.S. Secretary of the Interior's Standards for Archeology shall inspect the findings within 24 hours of discovery. ii. If the City determines that the resource qualifies as a historical resource or a unique archaeological resource (as defined pursuant to the CEQA Guidelines) and that the project has potential to damage or destroy the resource, mitigation shall be implemented in accordance with PRC Section 21083.2 and CEQA Guidelines Section 15126.4, with a preference for preservation in place. iii. If avoidance is not feasible, the City shall consult with appropriate Native American tribes (if the resource is pre-contact), and other appropriate interested parties to determine treatment measures to avoid, minimize, or mitigate any potential impacts to the resource pursuant to PRC Section 21083.2, and CEQA Guidelines Section 15126.4. This shall include documentation of the resource and may include data recovery (according to PRC Section 21083.2), if deemed appropriate, or other actions such as treating the resource with culturally appropriate dignity and protecting the cultural character and integrity of the resource (according to PRC Section 21084.3). **Mitigation Measure 3.7-2(b) (ALL):** Before any ground-disturbing and/or construction activities, an archaeologist meeting or under the supervision of an archaeologist meeting the Secretary of the Interior's Standards for Archeology shall conduct a training program for all construction and field personnel involved in ground disturbance. Native American tribal representative(s) associated with compliance with Mitigation Measures 3.18-1(a) through (c) will be invited to participate in the training program. On-site personnel shall attend mandatory pre-project training that shall outline the general archaeological sensitivity of the area and the procedures to follow in the event an archaeological resource and/or human remains are inadvertently discovered. A training program shall be established for new project personnel before they begin project work. **Mitigation Measure 3.7-2(c) (ALL):** i. Following 30 percent design of the underground utility installation plans, the City shall engage an archaeologist that meets the U.S. Secretary of the Interior's Standards for Archeology to conduct a records search at the NCIC of the CHRIS for all project components that require ground disturbance (i.e., excavation, trenching, grading, etc.) in areas that have not been reviewed as part of the project-level analysis. ii. If the archaeologist determines that known cultural resources or potential archaeologically sensitive areas may be impacted by the project, a pedestrian survey must be conducted under the supervision of a qualified archaeologist of all accessible portions of the project area, if one has not been completed within the previous five years. A cultural report detailing the results of the research shall be prepared and submitted for review by the City and a final draft shall be submitted to the NCIC. Once the report has been approved by the City, the City may issue appropriate permits. iii. Additional research, including subsurface testing or monitoring during construction may be required to identify, evaluate, and mitigate impacts to archaeological resources, as recommended by the qualified archaeologist. If avoidance is not feasible, the City shall consult with California Native American tribes identified by the NAHC to be affiliated with the proposed project area (if the resource is pre-contact or indigenous) and the tribal representative(s) associated with compliance with Mitigation Measure 3.18-1(a), to determine treatment measures to avoid, minimize, or mitigate any potential impacts to the resource pursuant to PRC Section 21083.2 and CEQA Guidelines Section 15126.4. This shall include documentation of the resource and may include data recovery (according to PRC Section 21083.2), if deemed appropriate, or other actions such as treating the resource with culturally appropriate dignity and protecting the cultural character and integrity of the resource (according to PRC Section 21084.3).	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM

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Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.7-3: Construction of the proposed project may disturb human remains, including those interred outside of designated cemeteries.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.7-3 (ALL):** Procedures of conduct following the discovery of human remains have been mandated by Health and Safety Code Section 7050.5, PRC Section 5097.98 and the California Code of Regulations Section 15064.5 (CEQA). According to the provisions in CEQA, if human remains are encountered, the Project applicant shall ensure that all work in the immediate vicinity of the discovery shall cease and necessary steps are taken to ensure the integrity of the immediate area. The Sacramento County Coroner shall be notified immediately. The Coroner shall then determine whether the remains are Native American. If the Coroner determines the remains are Native American, the Coroner shall notify the NAHC within 24 hours, who will, in turn, notify the person the NAHC identifies as the Most Likely Descendant (MLD) of any human remains. Further actions shall be determined, in part, by the desires of the MLD. The MLD has 48 hours to make recommendations regarding the disposition of the remains following notification from the NAHC of the discovery. If the MLD does not make recommendations within 48 hours, the landowner shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.8 Energy									
3.8-1: Implementation of the proposed project could result in wasteful, inefficient, or unnecessary consumption of energy resources during construction or operation.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.8-2: Implementation of the proposed project **could** conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.9 Geology, Soils, Paleontological Resources, and Mineral Resources									
3.9-1: Implementation of the proposed project could directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death due to fault rupture, strong seismic ground shaking, seismic-related ground failure or landslides.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.9-2: Implementation of the proposed project could result in substantial soil erosion or the loss of topsoil.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.9-3: Implementation of the proposed project could be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.9-4: Implementation of the proposed project would be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.9-5: Implementation of the proposed project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.10 Greenhouse Gas Emissions									
3.10-1: Construction of the proposed project could generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA

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Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.10-2: Operation and maintenance of the proposed project could generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.10-3: Construction of the proposed project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.10-4: Operation and maintenance of the proposed project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.11 Hazards and Hazardous Materials									
3.11-1: Construction of the proposed project could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.11-2: Operation and maintenance of the proposed project could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.11-3: Implementation of the proposed project could involve the handling of hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing school.	LS (FWTP) NI (SRWTP)	LS (FWTP) NI (SRWTP)	NI (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.11-4: Construction of the proposed project components could be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, could create a significant hazard to the public or the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.11-5: Operation and maintenance of the proposed project could be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, could create a significant hazard to the public or the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.11-6: Construction of the proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.11-1 (ALL):** Prior to the start of construction, the construction contractor shall prepare a Traffic Control Plan in accordance with City of Sacramento Municipal Code Sections 12.20.020 and 12.20.030 that shall be subject to review and approval by the City of Sacramento Utilities Department, in consultation with local emergency service providers including the City of Sacramento Fire and Police departments. The plan shall ensure that acceptable operating conditions on local roadways are maintained. A copy of the approved Traffic Control Plan shall be submitted to local emergency response agencies, and these agencies shall be notified at least 30 days before the commencement of construction that would partially or fully obstruct roadways. At a minimum, the plan shall include: (a) The number of truck trips, time, and day of street closures. (b) Time of day of arrival and departure of trucks.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM

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Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
					(c) Limitations on the size and type of trucks, provision of a staging area with a limitation on the number of trucks that can be waiting. (d) Provision of a truck circulation pattern. (e) Identification of detour routes and signing plan for street closures. (f) Provision of driveway access plan so that safe vehicular, pedestrian, and bicycle movements are maintained (e.g., steel plates, minimum distances of open trenches, and private vehicle pick up and drop off areas). (g) Identification of safe and efficient access routes for emergency vehicles and transit. (h) Manual traffic control when necessary. (i) Proper advance warning and posted signage concerning street/lane closures. (j) Provisions for pedestrian and bicycle safety.				
3.11-7: Operation and maintenance of the proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.11-8: Implementation of the proposed project could expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.12 Hydrology, Water Quality, and Water Supply									
3.12-1: Construction of the proposed project could violate any water quality standards or waste discharge requirements or otherwise degrade surface or ground water quality.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.12-2: Operation and maintenance of the proposed project could violate any water quality standards or waste discharge requirements or otherwise degrade surface or ground water quality.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.12-3: Increased diversions associated with operation of the new water intake could violate any water quality standards or otherwise degrade surface or groundwater quality.	NA	NA	NI (Existing)/ LS (New)	NA	None required.	NA	NA	NA	NA
3.12-4: Construction of the proposed project could substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.12-5: Operation and maintenance of the proposed project could substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.12-6: Construction of the proposed project could substantially alter existing drainage patterns.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.12-7: Operation and maintenance of the proposed project could substantially alter existing drainage patterns.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA

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	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.12-8: Construction of the proposed project could in a flood hazard zone risk release of pollutants due to project inundation.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.12-9: Operation and maintenance of the proposed project could in a flood hazard zone risk release of pollutants due to project inundation.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.12-10: Implementation of the proposed project could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.12-11: Increased diversions associated with operation of the proposed new intake could result in substantial decreases in water supply deliveries because of changes in surface water flows and/or changes in water supply system operations, as measured by substantial changes in reservoir storage or timing or rate of river flows.	NA	NA	NI (Existing) PS (New)	NA	None required.	NA	NA	SU (New)	NA
3.13 Land Use and Planning									
3.13-1: Implementation of the proposed project could cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.14 Noise and Vibration									
3.14-1: Construction of the proposed project could generate a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.14-1 (ALL):** The City shall require its contractors to implement the measures below, as a condition of contract, to avoid and minimize temporary and short-term construction noise effects on sensitive receptors. These measures will be implemented during construction, to avoid and minimize temporary and short-term construction noise effects on sensitive receptors: (a) All construction activity on the project sites shall comply with the provisions of City Code Chapter 8.68 relating to noise between the hours of 7:00 a.m. and 6:00 p.m. Monday through Saturday, and between the hours of 9:00 a.m. and 6:00 p.m. on Sunday. Construction outside of these hours may be approved through a development permit based on a site-specific "construction noise mitigation plan" and a finding by the Director of Community Development or their designee that the Construction noise mitigation plan is adequate to prevent excessive noise disturbance of affected residential uses. Because it is anticipated that certain construction activities (such pipeline work outside the treatment plants at major street intersections) may require work outside normally permitted construction hours (e.g., overnight), the project's Development Permit would allow for such construction activities, subject to conditions of approval, including performance standards, imposed by the City to limit noise impacts. (b) All construction equipment shall be equipped with noise-reduction devices, such as mufflers, to minimize construction noise, and all internal combustion engines will be equipped with exhaust and intake silencers, in accordance with manufacturers' specifications. (c) The use of bells, whistles, alarms, and horns will be restricted to safety warning purposes only. (d) Excessive noise-generating activities such as concrete cutting and pile driving shall be conducted during daytime hours only. (e) Impact tools shall be restricted to daytime construction hours. (f) Impact tools and equipment that are particularly loud (e.g., concrete saws) shall have the working area/impact area shrouded or shielded, with intake and exhaust ports on power equipment muffled or suppressed. The use of temporary or portable, application-specific noise shields or barriers, or temporary construction barriers adjacent to or at the boundary of the construction area may be necessary to reduce associated noise levels. (g) Stationary noise-generating equipment such as air compressors or portable power generators shall be located as far as possible from sensitive receptors. Temporary noise barriers shall be constructed, if needed, to screen stationary noise-generating equipment when located near adjoining noise-sensitive land uses.	LSM (FWTP) SU (SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM

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	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.14-2: Operation and maintenance of the proposed project could generate a substantial permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.14-3: Construction of the proposed project could generate excessive groundborne vibration or groundborne noise levels.	LS (FWTP) LS (SRWTP)	PS (FWTP) LS (SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.14-2 (EUU-FWTP - storm drainage improvements only, SRWI-Existing/New, TP):** The City shall require contractors to implement the following measures at work sites within 90 feet of sensitive receptors during project construction to avoid and minimize the effects of temporary and short-term construction-related groundborne vibration on sensitive receptors. (a) Equipment shall be operated as far away as practical from vibration-sensitive receptors. (b) As a condition of the construction contract, compaction activities shall be limited to the hours of 8:00 a.m. to 6:00 p.m. when work is within 90 feet of a sensitive land use. (c) Where practicable, contractors use smaller vibratory rollers to minimize vibration levels during compaction activities where needed to meet vibration standards.	NA	LSM (FWTP)	LSM (Existing/ New)	LSM
3.14-4: Operation and maintenance of the proposed project could generate excessive groundborne vibration or groundborne noise levels.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.15 Public Services									
3.15-1: Implementation of the proposed project could result in substantial unplanned adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.16 Recreation									
3.16-1: Implementation of the proposed project could increase the use of existing recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.17 Transportation									
3.17-1: Construction of the proposed project could conflict with a program, plan, ordinance, or policy addressing the circulation system.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.17-2: Operation and maintenance of the proposed project could conflict with a program, plan, ordinance, or policy addressing the circulation system.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.17-3: Construction of the proposed project could conflict with CEQA Guidelines Section 15064.3(b).	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.17-4: Operation and maintenance of the proposed project could conflict with CEQA Guidelines Section 15064.3(b).	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.17-5: Construction of the proposed project could result in inadequate emergency access.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.17-1 (ALL):** Implement Mitigation Measure 3.11-1.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM

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	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.17-6: Operation and maintenance of the proposed project could result in inadequate emergency access.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.18 Tribal Cultural Resources									
3.18-1: Implementation of the proposed project may cause a substantial adverse change to tribal cultural resources	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measures 3.18-1(a) (ALL):** Prior to Ground-Disturbing Activities, the City shall require the contractor to provide a tribal cultural resources sensitivity and awareness training program (Worker Environmental Awareness Program [WEAP]) conducted by a qualified archaeologist or representative from a culturally affiliated tribe for all personnel involved in project construction, including field consultants and construction workers in conjunction with Mitigation Measure 3.7-2(b). The WEAP will be developed in coordination with the culturally affiliated Tribe. The WEAP shall be conducted before any project-related construction activities begin at the project site. The WEAP will include relevant information regarding sensitive tribal cultural resources, including applicable regulations, protocols for avoidance, and consequences of violating State laws and regulations. The WEAP will also describe appropriate avoidance and impact minimization measures for tribal cultural resources that could be located at the project site and will outline what to do and who to contact if any potential tribal cultural resources are encountered. The WEAP will emphasize the requirement for confidentiality and culturally appropriate treatment of any discovery of significance to Native Americans and will discuss appropriate behaviors and responsive actions, consistent with Native American tribal values. **Mitigation Measure 3.18-1(b) (ALL):** If any suspected TCRs or resources of cultural significance to Native American Tribes, including but not limited to features, anthropogenic/cultural soils, cultural belongings or objects (artifacts), shell, bone, shaped stones or bone, or ash/charcoal deposits are discovered by any person during construction activities including ground disturbing activities, all work shall pause immediately within 100 feet of the find, or an agreed upon distance based on the project area and nature of the find. Work shall cease in and within the immediate vicinity of the find regardless of whether the construction is being actively monitored by a qualified Tribal Monitor, cultural resources specialist, or professional archaeologist. A representative from the culturally affiliated Tribe and the proposed project's City representative shall be immediately notified, and the representative from the culturally affiliated Tribe in coordination with the City's representative shall determine if the find is a TCR (PRC Section 21074) and the representative from the culturally affiliated Tribe shall make recommendations for further evaluation and treatment as necessary. i. Further evaluation and treatment of an identified TCR may include but is not limited to: a. identification of the boundaries of the new TCR; b. recordation of the resource; c. if feasible, appropriate preservation in place and avoidance measures, including redesign or adjustments to the existing construction process, and long-term management; or d. if avoidance is infeasible, a reburial location in proximity of the find where no future disturbance is anticipated. Permanent curation of TCRs shall not take place unless approved in writing by the culturally affiliated Tribe. ii. The construction contractor(s) shall provide secure, on-site storage for culturally sensitive soils or objects that are components of TCRs that are found or recovered during construction. Only representatives from the culturally affiliated Tribe shall have access to the storage. Storage size shall be determined by the nature of the TCR and can range from a small lock box to a conex box (shipping container). A secure (locked), fenced area can also provide adequate on-site storage if larger amounts of material must be stored. iii. The construction contractor(s) and the City, in consultation with the culturally affiliated Tribe shall facilitate the respectful reburial of the culturally sensitive soils or objects. This includes providing a reburial location that is consistent with the culturally affiliated Tribe's preferences, excavation of the reburial location, and assisting with the reburial, upon request. iv. Any discoveries shall be documented on a Department of Parks and Recreation (DPR) 523 form within 2 weeks of the discovery and submitted to the appropriate CHRIS center in a timely manner. v. Work at the TCR discovery location shall not resume until authorization is granted by the City in coordination with the culturally affiliated Tribe. vi. If articulated or disarticulated human remains, or human remains in any state of decomposition or skeletal completeness are discovered during construction activities, the City of Sacramento Coroner and the culturally affiliated Tribe shall be contacted immediately. Upon determination by the City of Sacramento County Coroner that the find is Native American in origin, the Native American Heritage Commission will assign the Most Likely Descendent who will work with the City to define appropriate treatment and disposition of the burials.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM

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Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
					Mitigation Measure 3.18-1(c) (ALL): The following measures shall be implemented to assist with identification of TCRs at the earliest possible time during proposed project construction-related activities that involve ground disturbance: i. The City of Sacramento, or the designated construction project manager, shall reach out to and retain the services of a qualified Tribal Monitor(s)in a reasonable amount of time prior to initiating any proposed project construction-related ground disturbing activities. The schedule of construction-related ground disturbing activities shall be made available to the identified qualified Tribal Monitor so that the monitoring schedule can be coordinated. ii. Prior to initiating monitoring activities, the qualified Tribal Monitor(s) shall participate in all required on-site safety training and shall comply with all required safety measures, including wearing required safety gear while on the construction site. iii. A qualified Tribal Monitor(s) shall monitor project construction-related ground disturbing activities including vegetation grubbing, stripping, grading, trenching, and other ground disturbing activities in the project area. All project construction related ground disturbing activities, including rebuild or previously disturbed, shall be subject to Tribal Monitoring unless otherwise determined unnecessary by the qualified Tribal Monitor. iv. The qualified Tribal Monitor(s) in coordination with the City of Sacramento and the designated contracted construction project manager r shall have the authority to direct that work be temporarily paused, diverted, or slowed within 100 feet of the immediate impact area if sites, cultural soils, or objects of potential significance are identified. The temporary pause/diversion shall be of an adequate duration for the culturally affiliated Tribal representative to be notified and to examine the resource and determine the appropriate treatment of the identified TCR consistent with the measures included in Mitigation Measure 3.18-1(b).				
3.19 Utilities and Service Systems									
3.19-1: Implementation of the proposed project could require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.19-2: Implementation of the proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future developments during normal, dry and multiple dry years.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.19-3: Implementation of the proposed project would result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.19-4: Implementation of the proposed project could generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.20 Wildfire									
3.20-1: Construction of the proposed project could potentially impair an adopted emergency response plan or emergency evacuation plan.	PS (FWTP/ SRWTP)	PS (FWTP/ SRWTP)	PS (Existing/ New)	PS	**Mitigation Measure 3.20-1 (ALL):** Implement Mitigation Measure 3.11-1.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM

NOTES: LS—Less than Significant; LSM—Less than Significant with Mitigation; NA—Not Applicable; NI—No Impact; PS—Potentially Significant; SU—Significant and Unavoidable.

Impact Statement	Significance Before Mitigation				Mitigation Measures	Significance After Mitigation			
	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines		Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.20-2: Operation and maintenance of the proposed project could potentially impair an adopted emergency response plan or emergency evacuation plan.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.20-3: Implementation of the proposed project could due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby exposure people or structures to pollutant concentrations from a wildfire or uncontrolled spread of a wildfire.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.20-4: Implementation of the proposed project would require the installation of utilities that may exacerbate fire risk or result in temporary impacts to the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA
3.20-5: Implementation of the proposed project could expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS	None required.	NA	NA	NA	NA

SOURCE: ESA, 2025

NOTES: LS—Less than Significant; LSM—Less than Significant with Mitigation; NA—Not Applicable; NI—No Impact; PS—Potentially Significant; SU—Significant and Unavoidable.

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CHAPTER 1
Introduction

1.1 Introduction

The City of Sacramento (City) is proposing the Water+ Treatment Plants Resiliency and Improvements Project (proposed project) to provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its useful life, and to meet the projected potable water demands. Pursuant to the California Environmental Quality Act (CEQA), the City is the lead agency and has prepared this Draft Environmental Impact Report (EIR) to analyze potentially significant environmental effects of the proposed project and other actions associated with construction and operation of the proposed project. Chapter 2, *Project Description*, includes discussion of the proposed project background and a detailed description of the proposed project components that are evaluated in this Draft EIR.

1.2 Purpose of the Draft EIR

This Draft EIR has been prepared in conformance with CEQA (Public Resources Code [PRC] Sections 21000, et seq.) and the *Guidelines for Implementing the California Environmental Quality Act* (CEQA Guidelines) (California Code of Regulations, Title 14, Sections 15000, et seq.). As described in CEQA Guidelines Section 15121(a), an EIR is a public information document that objectively assesses and discloses potential environmental effects of proposed project and other actions associated with construction and operation of the proposed project and identifies mitigation measures and alternatives to the proposed project that would reduce or avoid adverse environmental impacts. CEQA requires that lead, responsible, or trustee agencies consider the environmental consequences of projects over which they have discretionary authority. As the lead agency for the proposed project, the City will use the information in this EIR to: evaluate the proposed project's potential environmental impacts; determine whether any feasible mitigation measures and alternatives are necessary and available to reduce potentially significant environmental impacts; and approve, modify, or deny approval of the proposed project.

1.3 Environmental Review and Approval Process

Preparation of an EIR involves multiple steps. The public is given the opportunity to review and comment on the scope of the analysis, the content of the EIR, results and conclusions presented, and the overall adequacy of the document to meet the substantive requirements of CEQA. This section describes the steps in the environmental review process for the proposed project.

1.3.1 Notice of Preparation and Public Scoping Period

The City issued a notice of preparation (NOP) on Wednesday April 6, 2022, to satisfy the requirements of CEQA and CEQA Guidelines Section 15082 (State Clearinghouse #2022040138). The purpose of the NOP is twofold: (1) to notify the public, responsible agencies, trustee agencies, the Governor's Office of Planning and Research, potentially affected public agencies, involved federal agencies, and tribes regarding the City's intent to prepare an EIR for the proposed project; and (2) to solicit input from the public and those agencies as to the scope and content of the environmental information to be included in the EIR.

The issuance of the NOP began the 30-day public comment period, which closed at 5:00 p.m. on Friday, May 6, 2022. In accordance with PRC Section 21080.4(a) and CEQA Guidelines Section 15082(b), each responsible agency, trustee agency, and involved federal agency was requested to provide, in writing, the scope and content of the environmental information to be included in the Draft EIR related to its area of statutory responsibility. The NOP was also sent to public agencies, organizations, and individuals that requested receipt of the City's public notices, to invite them to provide input. The NOP was also available for review on the City's Water+ Program website: https://www.cityofsacramento.gov/utilities/projects/waterplus.

A virtual public meeting was held during the 30-day NOP review period to solicit comments on the scope and content of the EIR, and to provide information to the public, including a description of the proposed project. The meeting was held at 12:00 p.m. on Wednesday, April 27, 2022, via the Zoom web conference application. Written comments were accepted throughout the 30-day public NOP comment period and at the scoping meeting; verbal comments were recorded at the scoping meeting. Written comments were accepted via both U.S. Mail and email. A total of five comment letters were received and are included in **Appendix A**, *Notice of Preparation*, along with a copy of the NOP.

1.3.2 Notification of California Native American Tribes

In accordance with the requirements of PRC Section 21080.3, City staff conducted Native American outreach and consultation efforts. On April 1, 2022, the City sent tribal outreach letters to Native American representatives on the City's Assembly Bill (AB) 52 consultation list. United Auburn Indian Community of the Auburn Rancheria (UAIC) responded on April 29, 2022, that the project area is sensitive for tribal cultural resources and requested consultation. No other tribe responded to the outreach notification in accordance with PRC 21080.3.1.

1.3.3 Draft EIR

This Draft EIR is available to federal, state, and local agencies and interested organizations and individuals who may want to review and comment on the adequacy of the analysis. The Draft EIR can be reviewed online at the following website:

https://www.cityofsacramento.gov/community-development/planning/environmental/impact-reports

Publication of the Draft EIR marks the beginning of a 45-day public review period. The 45-day public review period for this Draft EIR is Thursday, June 20, 2025, through 5:00 p.m. on Monday, August 4, 2025. During the public review period, written comments should be postmarked by August 4, 2025, and mailed or emailed to:

> Charlie Tschudin, Senior Planner
> City of Sacramento Community Development Department
> 300 Richards Blvd., Third Floor
> Sacramento, CA 95811
> Phone (916) 808-8145
> Email: ctschudin@cityofsacramento.org

Please use "Water+ Project Draft EIR Comments" in the subject line. Also, if submitting comments on behalf of an agency, tribal group, or organization, please include the name of a contact person and the name of the group that the comments are coming from. All comments received, including names and addresses, will become part of the official public administrative record.

1.3.4 Final EIR and Mitigation Monitoring and Reporting Program

Written and verbal comments received on the Draft EIR during the public review period will be addressed in the response to comments document that, together with the Draft EIR and any changes to the Draft EIR made in response to comments received, will constitute the Final EIR. The Draft EIR and Final EIR together will compose the EIR for the proposed project. As part of the approval process, the City will prepare and adopt a mitigation monitoring and reporting program, as required by PRC Section 21081.6(a), for any mitigation measures in this Draft EIR.

1.3.5 Approval Process

Under CEQA Guidelines Section 15090(a), the City must certify that the EIR has been completed in compliance with CEQA; that the City has reviewed and considered the information in the EIR; and that the EIR reflects the City's independent judgment and analysis.

1. CEQA requires the City to adopt appropriate findings as part of project approval, as set forth in CEQA Guidelines Section 15091. Under CEQA Guidelines Section 15092, a lead agency may approve or carry out a project subject to an EIR only if it determines the following: The project will not have a significant effect on the environment; OR

2. The agency has eliminated or substantially lessened all significant effects on the environment where feasible; AND

   Any remaining significant effects on the environment that are found to be unavoidable are acceptable due to overriding considerations, in which case it will adopt a statement of overriding considerations pursuant to CEQA Guidelines Section 15093.

After certification of the EIR and project approval, the City will file a Notice of Determination (NOD) in compliance with CEQA Guidelines Section 15094.

1.3.6 Trustee and Responsible Agencies

A trustee agency under CEQA is a public agency having jurisdiction by law over natural resources that may be affected by a project that are held in trust for the people of the state of California. In addition, under CEQA, responsible agencies are state and local public agencies, other than the lead agency, that have the authority to carry out or approve a project or are required to approve a portion of the project for which a lead agency is preparing or has prepared an EIR. Chapter 2, *Project Description*, includes a list of trustee and responsible agencies for the proposed project.

1.4 Scope of the Draft EIR

As mentioned, the Draft EIR will analyze potentially significant impacts that result from construction and operation of the proposed project. As described in the NOP (see Appendix A), this Draft EIR evaluates the following environmental issues: aesthetics; agriculture resources; air quality; aquatic biological resources; terrestrial biological resources; cultural resources; energy; geology, soils, mineral resources and paleontology; greenhouse gas emissions; hazards and hazardous materials; hydrology, water quality, and water supply; land use and planning; noise and vibration; public services; recreation (including park facilities); transportation; tribal cultural resources; utilities and service systems; wildfire; growth inducement; and cumulative impacts. This Draft EIR does not evaluate forestry resources because there would be no impact due to lack of forestry resources that could be affected by implementation of the proposed project.

1.5 Organization of the Draft EIR

This Draft EIR is organized as follows:

- **Executive Summary:** The Executive Summary provides a summary of the Draft EIR.
- **Chapter 1, Introduction:** This chapter introduces the proposed project and describes the CEQA environmental review and approval process, and the scope and organization of the Draft EIR.
- **Chapter 2, Project Description:** This chapter describes the proposed project, including background on development of the proposed project, proposed project objectives, the project area, and construction and operations activities associated with development of the proposed project, and the anticipated required permits and approvals.
- **Chapter 3, Environmental Setting, Impacts, and Mitigation Measures:** The introduction to the environmental analysis chapter describes what project components are evaluated at a project-level versus program level. The resource sections in this chapter evaluate the potential environmental impacts of the proposed project. Each section of Chapter 3 describes the existing environmental conditions (environmental setting), existing relevant regulations (regulatory setting), thresholds of significance, and analysis methodology and assumptions. Each resource section then evaluates anticipated changes to existing environmental conditions resulting from construction and operation of the proposed project. For any potentially significant impact that could result, mitigation measures are presented, and the significance level with implementation of mitigation measures is determined.

- **Chapter 4, Cumulative Impacts:** This chapter describes the CEQA requirements for cumulative impacts, geographic scope and timeframe for cumulative analysis, existing conditions context for past activities, related projects and plans, and cumulative impact analysis.
- **Chapter 5, Other CEQA Considerations:** This chapter describes the significant unavoidable impacts and significant irreversible environmental changes, if applicable.
- **Chapter 6, Project Alternatives:** This chapter describes the CEQA requirements for alternatives, description of alternatives to the proposed project, alternatives eliminated from detailed analysis, comparative analysis of impacts from the alternatives to the proposed project (greater than, equal to, or lesser than), and the environmental superior alternative.
- **Chapter 7, List of Preparers:** This chapter lists the individuals who helped to prepare this Draft EIR and identifies the qualifications and affiliations of those individuals.
- **Chapter 8, References:** This chapter identifies the references used as sources of information in this Draft EIR.
- **Appendices:** contain information that support the analyses presented in this Draft EIR.

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CHAPTER 2
Project Description

2.1 Background

The City owns and operates water treatment and distribution facilities that provide drinking water to nearly half a million customers in a 100-square-mile service area. These facilities include two surface water treatment plants, approximately 1,800 miles of distribution pipelines, and 30 permitted groundwater wells. The City's two surface water treatment plants, the E.A. Fairbairn Water Treatment Plant (FWTP) and the Sacramento River Water Treatment Plant (SRWTP), currently have a combined maximum surface water supply and treatment capacity of 260 million gallons per day (MGD) (City of Sacramento, 2021).

The FWTP treats surface water diverted from the American River and the SRWTP treats surface water diverted from the Sacramento River drawn through the existing Sacramento River water intake. Originally constructed in 1961, the FWTP underwent significant improvements in 2014 with the installation of a new dewatering facility. Originally constructed in 1923, the SRWTP underwent significant improvements in 2004 with expanded treatment systems and a replacement water intake within the Sacramento River, and again in 2014 with the installation of a new high lift pump station and a new dewatering facility.

The City's comprehensive surface water treatment process removes harmful materials, including sand, sediment, bacteria, and viruses (City of Sacramento, 2022). Both surface water treatment plants use conventional treatment processes including flocculation, sedimentation, filtration, and chemical treatment, to produce drinking water in compliance with state and federal requirements. The water treatment process generally involves the following steps:

- **Water Intake:** Water intake structures on the Sacramento and American rivers pump raw water into a grit basin, or a series of grit basins.
- **Grit Basin:** Sand and other heavy particles settle out in the grit basins and then water flows over a weir at the top of the basins to the next step.
- **Flash Mix:** Prior to flocculation, chemicals are added to raw water to foster coagulation while attracting particles that do not settle or cannot be filtered.
- **Flocculation:** In the flocculation process, coagulants are added and the water is gently mixed, which causes particles to join together into larger particles that are heavy enough to settle out in the sedimentation process.
- **Sedimentation Basins:** The water flows through weirs from the flocculation process and into sedimentation basins where particles are able settle to the bottom. The combined process of flocculation and sedimentation removes about 85 percent of suspended matter in the water.

- **Filters:** Water moves from the sedimentation process into channels that feed through filters of sand and anthracite (hard coal), where the filtered water comes out crystal clear.
- **Reservoirs:** The final steps of chlorination and fluoridation of the water are then completed and the water is then moved through contact basins and storage reservoirs until needed in the distribution system.

Consistent with the City's 2040 General Plan (City of Sacramento, 2024), the City is proposing the Water+ Treatment Plants Resiliency and Improvements Project (proposed project) to provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its effective life, and to provide diversion and treatment capacity in order to meet projected water demand within the service area.

According to the City's 2020 Urban Water Management Plan (UWMP), the City's projected retail water demand is 155,219 acre-feet (af) and wholesale water demand is 97,060 af, or a total projected water demand of approximately 252,279 af (225 MGD) by 2050 (City of Sacramento, 2021). This future projected water demand could be accommodated under the City's existing surface water entitlements, consisting of five appropriative water rights permits issued by the State Water Resources Control Board (State Water Board), pre-1914 rights, and a water rights settlement contract with the United States Department of the Interior Bureau of Reclamation (Reclamation) (Reclamation, 1957). The amount of water the City may divert from the Sacramento and American Rivers is established in state-issued water rights permits, agreements made by the City with Reclamation in 1957, agreements made by the City with the Sacramento Municipal Utilities District (SMUD) in 1957, and through a voluntary agreement made through the regional Water Forum in 2000 (City of Sacramento, 2021). The majority of the City's surface water rights are senior to those held by Reclamation for operation of the Central Valley Project (CVP).

To reliably meet current and future water demands, the City has evaluated several projects, in addition to the proposed project, to increase long-term water supply and treatment capacities. For example, the City is evaluating the RiverArc project that proposes a new regional water treatment plant to benefit the greater Sacramento area. The City's Groundwater Master Plan also recommends the City expand its groundwater program (City of Sacramento, 2021). These additional efforts to increase long-term water treatment capacity and supply are not evaluated in this document.

2.2 Proposed Project Objectives

CEQA requires that an EIR contain a "statement of the objectives sought by the proposed project." Under CEQA, "[a] clearly written statement of objectives will help the Lead Agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations. The statement of objectives should include the underlying fundamental purpose of the project" (CEQA Guidelines Section 15124[b]).

The general objective of the proposed project is to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand. Specific proposed project objectives include:

- Increase treatment flexibility to address changing water quality in the American and Sacramento Rivers while continuing to meet changing drinking water regulations.
- Improve safety, reliability, and resiliency of both FWTP and SRWTP facilities.
- Provide for consistent treatment and distribution of potable water to the City's service area.
- Increase reliable water supplies and treatment capacities to meet anticipated water demands.

2.3 Project Areas

The City's water treatment plants and raw water supply facilities are located within the city of Sacramento (refer to **Figure 2-1**, Regional Location Map). The proposed project involves construction and operation of various components associated with operation of the FWTP (refer to **Figure 2-2**, E.A. Fairbairn Water Treatment Plant Project Area) and the SRWTP (refer to **Figure 2-3**, Sacramento River Water Treatment Plant Project Area).

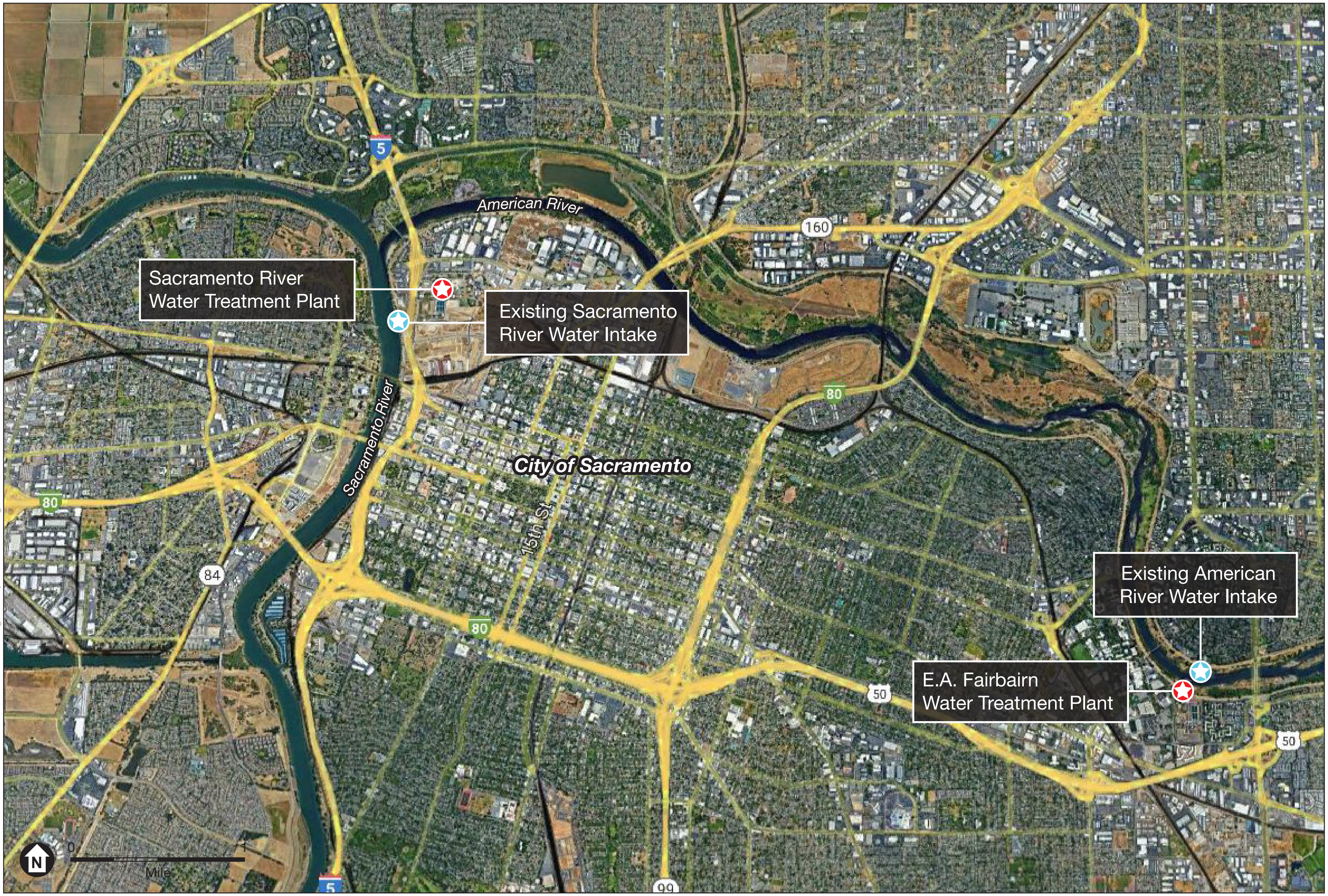
The FWTP project area, including the approximately 34-acre FWTP property, is located adjacent to the American River and near Sacramento State University (refer to Figure 2-2). Streets adjacent to and within the FWTP project area include State University Drive to the west and College Town Drive to the south.

The SRWTP project area, including the approximately 50-acre SRWTP property, is located near the confluence of the Sacramento River and American River (refer to Figure 2-3). Included in the project area are the existing water intake, the proposed new water intake and pump station, and the original intake, all of which are located on the east bank of the Sacramento River, west of Jibboom Street. The project area also includes the location of two new pipelines, each connecting from the existing and new water intakes to the SRWTP (described in more detail in subsection 2.4). Nearby roads around the SRWTP property include Bannon Street and Richards Boulevard to the north, 7th Street and North B Street to the east, Summit Tunnel Avenue to the south, and Bercut Drive to the west. Figure 2-3 also depicts the project area for improvements to the City's potable water transmission pipelines in the vicinity of the SRWTP.

2.4 Project Description

The proposed project is designed to achieve the project objectives through two phases of work relating to the City's water treatment plants, raw water supply, and potable water transmission pipelines: an "initial phase" to occur between 2026 and 2037, followed by a "project buildout" to occur between 2040 and 2050 (refer to subsection 2.5.5, *Construction Schedule and Phasing*).

The initial phase of the proposed project would improve treatment reliability at both water treatment plants by replacing facilities that have reached the end of their effective lives.



SOURCE: Carollo, 2022

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 2-1
Regional Location Map

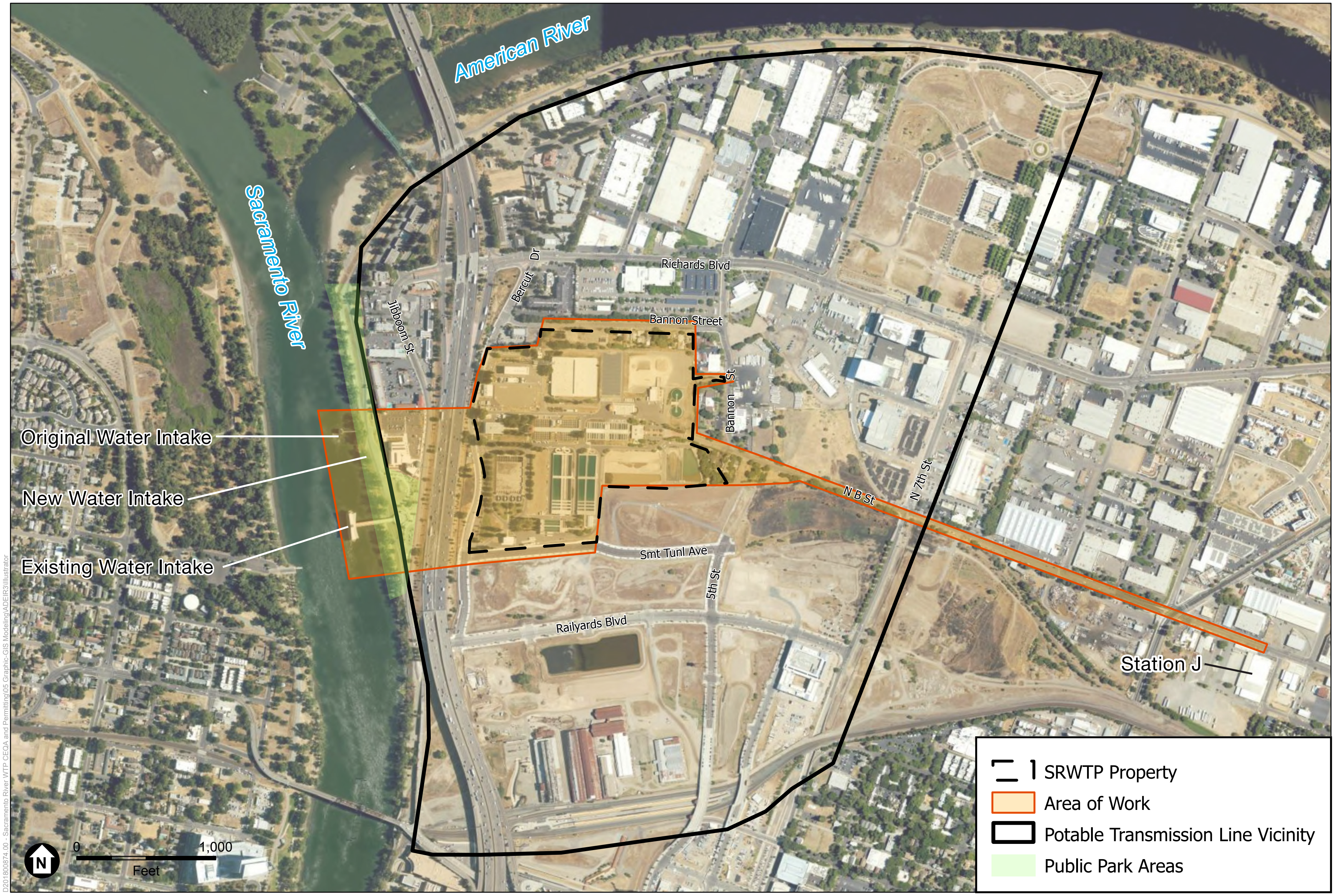
ESA

SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 2-2
E.A. Fairbairn Water Treatment Plant Project Area

ESA



SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 2-3
Sacramento River Water Treatment Plant Project Area

ESA

The initial phase would also provide resiliency within each treatment system through the addition of ozone treatment, to help address changing water quality in the Sacramento and American Rivers, and the conversion from chlorine gas to sodium hypochlorite, a safer and more reliably available chemical for disinfection.

The project buildout phase of the proposed project would be staged to meet the increasing water demands of the City's service area through 2050 by further increasing the capacity of the SRWTP to treat water diverted from the Sacramento River.

In summary, the proposed project includes the following components that are described in more detail below:

- Facility and treatment process improvements at both the FWTP and the SRWTP including replacement of aging infrastructure; integration of ozone into the treatment processes; and conversion from chlorine gas to sodium hypochlorite as the primary chemical for disinfection of the water.
- Upgrades to existing utilities that serve the FWTP and SRWTP (i.e., storm drainage systems and electrical service line connections).
- Construction of a new Sacramento River water intake and pump station, and installation of a new raw water conveyance pipeline to transfer raw water from the supply source (Sacramento River) to the SRWTP facilities.
- Improvements to the existing Sacramento River water intake and associated facilities, and installation of a second new pipeline to transport sediment deposited within the intake to SRWTP (following approximately the same alignment as the raw water conveyance pipeline described above).
- Improvement of the potable water transmission system in the vicinity of SRWTP to address critical hydraulic constrictions.

2.4.1 Fairbairn Water Treatment Plant Project Area

Treatment Plant Improvements

Currently, the FWTP is authorized to divert up to 200 MGD under its water rights. Various treatment permit requirements and the condition of existing infrastructure at present render the facility capable of operating at a treatment capacity of 100 MGD for short periods of time but currently has a reliable capacity of 80 MGD due to the existing condition of certain plant facilities. Certain regulatory conditions require the City to limit FWTP diversions to as low as 64.4 MGD (as indicated by the Hodge criteria[1]). The proposed resiliency improvements at FWTP during the initial phase would ensure a reliable surface water treatment capacity of 100 MGD, with the capability of treating 120 MGD for short periods of time. There are no project buildout activities planned for the FWTP as part of the proposed project.

[1] The "Hodge criteria" refers to minimum flow requirements established by Judge Hodge in the Environmental Defense Fund v. East Bay Municipal Utilities District case for the Lower American River. Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply* for additional information.

Table 2-1 details the FWTP improvements during the initial phase.

TABLE 2-1
FAIRBAIRN WATER TREATMENT PLANT IMPROVEMENTS

Number[1]	Proposed Improvement	Initial Phase (100 MGD Capacity)[2]
1	Flocculation-Sedimentation Basins	• Replace two aged flocculation-sedimentation basins with a single new basin (50 MGD capacity) • Extend the existing concrete effluent channel to feed to the new ozone system • Implement structural modifications (e.g., valve and overflow weir) to feed the inlet channel to improve water distribution and conveyance between basins
2	Ozone Generation and Treatment System	• Construct four enclosed partially buried process structures/basins • Install two liquid oxygen supply tanks • Install process equipment located either inside or adjacent to the new building
3	Intermediate Pump Station	• Install one new wet well with pump station (120 MGD pump capacity)
4	Filters	• Demolish eight existing aged filters and replace with four new filters • Replace the filter media in the remaining eight filters to coordinate with upstream ozone addition and match the media specifications in the four new filters. • Install a backwash supply pump station • Install a constant head box to protect filter underdrains from excess pressure
5	Hypochlorite Storage and Feed Facility	• Decommission the existing gas chlorine system and storage room, and retrofit the space to a storage area • Remove the retired lime silos and install four new chemical storage tanks with a shade structure • Construct one new chemical feed building
6	Fluoride Facility	• Decommission the existing fluoride system, and construct a new fluoride storage and feed system including a shade structure for fluoride tanks and a small building for chemical feed equipment
7 and 8	Electrical Building and Substation	• Construct one new two-story electrical building • Install a new substation for electrical service to the building • Provide electrical improvements
9 and 10	Maintenance Storage Building	• Demolish the existing maintenance shop and construct a new maintenance storage building to provide space to construct other project elements
11	Emergency Generators	• Install up to two new emergency power (diesel) generators within an enclosure

NOTES:
1. These numbers correspondence with the location of major facility improvements depicted in Figure 2-4.
2. Any dimensions, sizes, or volumes listed in this table are approximate and may change during future design phases of the project. Complete or partial demolition of existing facilities will be required for each project improvement.

Improvements proposed to be constructed and operated within the City-owned FWTP property include:

- Replacement of aging infrastructure at the end of its effective life to support treatment reliability.

- Integration of ozone treatment into the treatment process to increase its resiliency in addressing changing river water quality conditions and reducing the formation of disinfection byproducts.
- Conversion from chlorine gas to sodium hypochlorite as the primary chemical for disinfection of water to support the safety of the facilities for City staff and the public, as well as increase resiliency against issues with chemical availability.

Figure 2-4 depicts the location of major facility improvements proposed inside the FWTP project area. Supporting facilities and work including paving, landscaping, and small storage units/ facilities are not depicted for clarity. Proposed improvements would occur on previously disturbed areas within the FWTP property and public rights-of-way.

Existing Utility Upgrades

Storm Drainage

Upgrades to the existing storm drainage collection system would occur along the perimeter of FWTP, along College Town Drive from State University Avenue to Howe Avenue (refer to Figure 2-4). Approximately 3,000 feet of existing storm drain pipeline along College Town Drive is undersized for FWTP and neighboring properties (i.e., consisting of a 12-inch pipeline up to La Rivera Drive then a 15-inch pipeline to Howe Avenue where it connects to a 42-inch pipeline). To meet current standards, the existing 3,000 feet of pipeline would be replaced with a larger pipeline at least 18 inches in diameter.

Electrical Service

To support increased electrical demands and provide for increased resiliency at the FWTP, the existing electrical service lines (connecting power poles on College Town Drive to two transformers within the FWTP property) and the existing substation would be demolished and replaced with higher capacity equipment. A larger 69 kilovolt (kV) substation and two larger transformers would be constructed on the east side of the FWTP property (refer to Figure 2-4) to support improved water treatment equipment (e.g., ozone generation and treatment system and intermediate pump station).

Electrical service for the new substation would be provided by approximately 700 feet of new 69 kV overhead or underground/buried service lines. Two electrical service lines (approximately 350 feet each) would be installed by the Sacramento Municipal Utility District (SMUD) between College Town Drive and the new substation to provide resiliency with two alternate sources of electricity to FWTP. The new power poles, electrical lines, transformers, and substation would all be located within the FWTP property and public right-of-way.

To accommodate the electrical upgrades, the entry gate on the main access road (E.A. Fairbairn) on the east side of the FWTP property would be relocated approximately 80 feet south of the existing entry gate. Vegetation and trees along the west side of E.A. Fairbairn would be removed to provide adequate clearance for the new electrical lines and clear the footprint for the new substation. Storage buildings, sheds, and conflicting underground utilities on the east side of the property would also be relocated to make space for the new substation and electrical building.

SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 2-4
Major Infrastructure Improvements Proposed Inside FWTP Project Area

ESA

2.4.2 Sacramento River Water Treatment Plant Project Area

Treatment Plant Improvements

The SRWTP currently has a diversion and treatment capacity of 160 MGD. In parallel with the initial phase of treatment reliability and resiliency improvements, the treatment capacity of the SRWTP would be increased from 160 MGD to 235 MGD (an increase of 75 MGD). The project buildout phase would be staged to meet the increasing water demands of the City's service area through 2050, for an ultimate SRWTP treatment capacity of 310 MGD (a total increase of 150 MGD).

Improvements proposed to be constructed and operated within the City-owned SRWTP property include:

- Replacement of aging infrastructure at the end of its effective life to support treatment reliability.
- Integration of ozone treatment into the treatment process to increase its resiliency in addressing changing river water quality conditions and reducing the formation of disinfection byproducts.
- Conversion from chlorine gas to sodium hypochlorite as the primary chemical for disinfection of water to support the safety of the facilities for City staff and the public, as well as increase resiliency against issues with chemical availability.
- Increase in treatment capacity in a phased manner to support projected water demand within the City's service area.

Table 2-2 details the SRWTP improvements during the initial and project buildout phases.[2] **Figure 2-5** depicts the location of major facility improvements proposed inside the SRWTP project area. Supporting facilities and work including paving, landscaping, and small storage units/facilities are not depicted for clarity. Proposed improvements would occur on previously disturbed areas within the SRWTP property and public rights-of-way.

Existing Utility Upgrades

Storm Drainage

Storm drainage improvements would be needed to serve the SRWTP (refer to Figure 2-5). Within the plant boundaries, stormwater retention facilities and a pump station would be installed to attenuate flows. The existing storm drain line from the SRWTP boundary to the Sacramento River would be abandoned in place to minimize disturbance of areas outside of the SRWTP fence line (e.g., I-5, Bercut Drive), with localized locations where trenching would be necessary to fill the abandoned sections. Approximately 300 feet of up to 24-inch-diameter storm drain pipeline would be installed within SRWTP into Summit Tunnel Avenue. This pipeline would carry discharge from SRWTP's storm water system and tie into an existing 60-inch storm drain pipeline via one of two existing manholes (either at the intersection of Bercut Drive and Summit Tunnel Avenue, or within Summit Tunnel Avenue approximately 160 feet east of its intersection with Bercut Drive).

[2] The "Initial Phase" and "Project Buildout" have been designated with plant production capacities of 235 MGD and 310 MGD, respectively. These capacities represent the SRWTP treatment capacity. The number of buildout stages in between may change based on future water demands and budgets.

TABLE 2-2
SACRAMENTO RIVER WATER TREATMENT PLANT IMPROVEMENTS

Number[1]	Proposed Improvement	Initial Phase (235 MGD Capacity)[2]	Project Buildout (310 MGD Capacity)
1	Grit Separation Basin	• Construct one open-top, partially buried process structure/basin	N/A
2	Raw Water Blending System	• Construct an open-top, above-grade structure/basin • Provide process equipment located in process structure and dedicated area around structure	• Provide additional process equipment[3]
3	Chemical Flash Mix System	• Decommission the existing chemical flash mix system and install new process equipment, day tanks, and piping, located in dedicated area around above-grade piping	• Provide additional process equipment and piping.
4	Flocculation-Sedimentation Basins	• Remove the existing sedimentation basin • Construct two partially buried process structures/basins on the west side • Provide process equipment located in basins and dedicated area around basins • Modify the four existing structures/basins to accommodate other improvements	• Construct two partially buried process structures/basins on the east side
5	Ozone Generation and Treatment System	• Construct six enclosed, partially buried process structures/basins • Provide process equipment located inside new building or adjacent to building • Construct three liquid oxygen supply tanks	• Construct two process structures/basins and associated process equipment • Construct one liquid oxygen supply tank
6	Filters	• Demolish existing aged filters and filter complex • Construct eight new open-top, partially buried filtration structures/basins • Provide process equipment located inside new building or adjacent to building • Replace filter media in the 16 existing filters • Provide operational control area located above filter process equipment	• Construct eight filtration structures and associated process equipment
7	5 Million Gallon Finished Water Reservoir	• Replace the existing reservoir with new partially buried reservoir • Provide process equipment and low flow pumps located in a dedicated area adjacent to the reservoir	N/A

Number[1]	Proposed Improvement	Initial Phase (235 MGD Capacity)[2]	Project Buildout (310 MGD Capacity)
8 and 9	13 Million Gallon Finished Water Reservoir and Chlorine Contact Reservoir	• Replace existing 9.5 MG reservoir with new 13 MG enclosed, partially buried reservoir • Demolish the existing Reservoir 2 and construct one partially buried chlorine contact reservoir • Provide process equipment located inside new reservoir or dedicated storage area outside	N/A
10	High-Service Pump Station 2	• Construct multi-story building with process equipment and pumps located inside	• Provide additional pumps and process equipment
11	Electrical Building 2	• Construct multi-story building • Install electrical distribution equipment • Install high-voltage transformer/ switchgear	• Provide additional electrical equipment and transformer
12	Chemical Building - North	• Modify inside existing chemical building • Construct a shade structure with secondary containment adjacent to building • Construct seven storage tanks for lime • Construct three storage tanks for fluoride	• Construct three storage tanks for lime • Construct one storage tank for fluoride
13	Chemical Bulk Storage and Feed - North	• Construct shade structure with secondary containment adjacent to building • Construct six storage tanks for sodium hypochlorite (21,000 gallons/tank)	• Construct two process tanks for sodium hypochlorite
14	Chemical Building – South	• Demolition of existing Chemical Building - South • Construct a new single-story building • Provide process equipment (chemical feed and polymer systems) located inside new building • Provide maintenance and operator workspace	• Provide additional process equipment
15	Chemical Bulk Storage and Feed - South	• Construct a new shade structure • Construct three storage tanks for caustic soda • Construct six storage tanks for alum	• Construct one storage tank for caustic soda • Construct two storage tanks for alum
16	Filter Waste Washwater Basins	• Replace the existing three filter waste washwater basins with three new open-top, partially buried process structures/basins • Provide process equipment located inside new structures or dedicated area adjacent to basins	N/A
17	Dewatering Building 2	• Construct a new three-story building • Construct six open-top, partially buried process structures/basins • Install waste processing equipment	• Provide additional process equipment

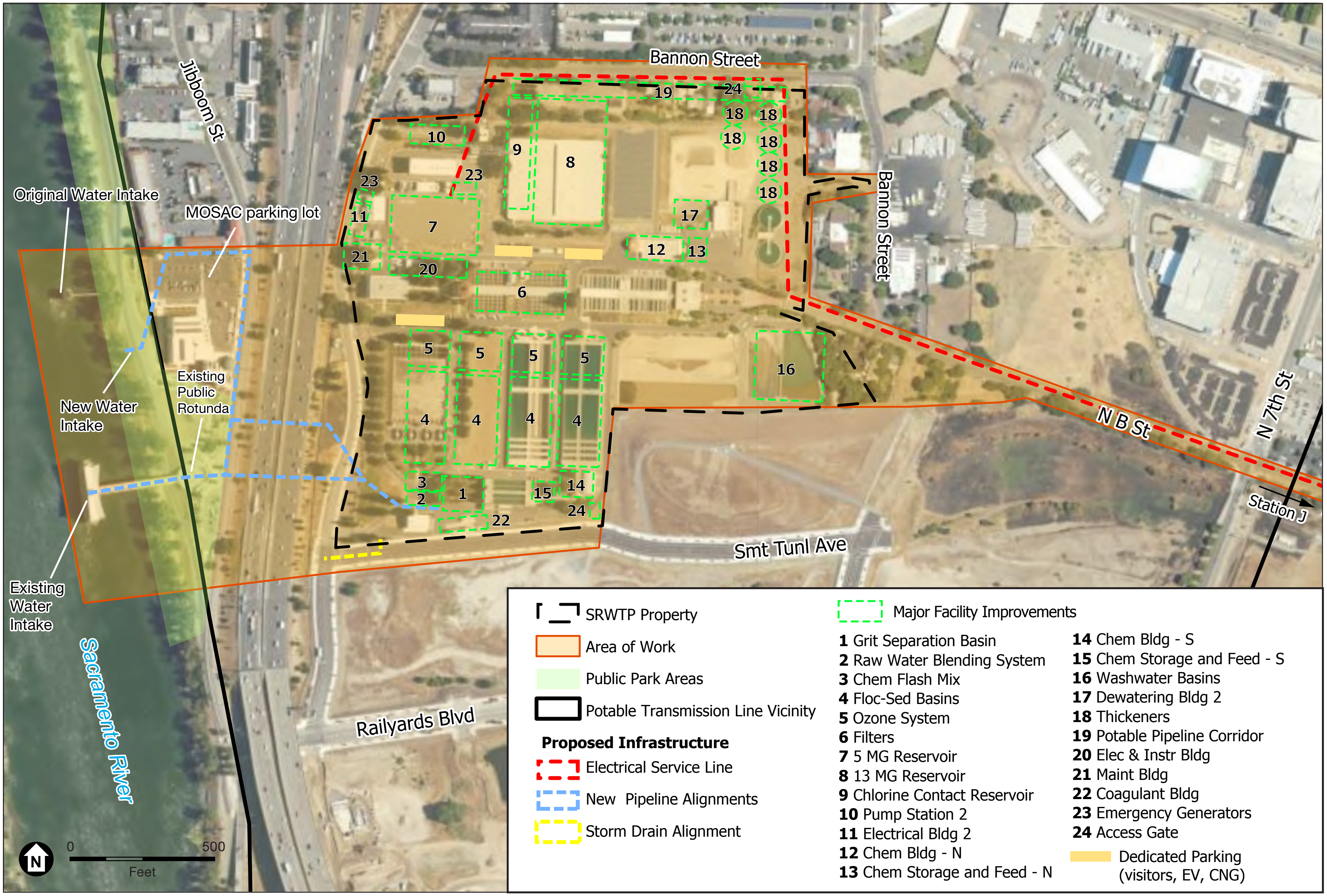
Number[1]	Proposed Improvement	Initial Phase (235 MGD Capacity)[2]	Project Buildout (310 MGD Capacity)
18	Gravity Thickeners	• Construct a two open-top, partially buried process structures/basins • Provide process equipment located inside new building or dedicated area adjacent to building	• Construct four process structures/basins and associated process equipment
19	Potable Pipeline Corridor	• Construct a new detention system and drainage pipelines • Construct new transmission mains for process systems and finished water	N/A
20	Electrical & Instrumentation Building	• Construct a multi-story building • Provide maintenance and administrative work areas and storage areas	N/A
21	Maintenance Building	• Demolish existing storage and maintenance structures and construct new multi-story building • Provide maintenance work areas and remove the existing access gate	N/A
22	Coagulant Building	• Remove the treatment equipment located inside the existing building • Remove non-historic portions of the building (e.g., exterior extensions, south and east sides)	N/A
23	Emergency Generators	• Provide three new emergency power (diesel) generators within an enclosure	N/A
24	Access Gates	• Install a new access gate from Summit Tunnel Ave to SRWTP • Install a new access gate from Bannon Street to SRWTP	N/A
N/A	Parking/Storage	• Provide a dedicated parking for City vehicles (electric and conventional) and protected parking for specialized motored equipment. • Relocate storage areas around the site that will be displaced by other project elements and construction activities.	• Relocate storage areas around the site that will be displaced by other project elements and construction activities.
N/A	Miscellaneous Yard Improvements	• Provide three surge tanks • Provide subsurface electrical duct banks, process lines and equipment vaults • Construct concrete retaining walls	• Provide one surge tank • Provide additional electrical duct banks, process lines and equipment vaults

NOTES:

1 These numbers correspondence with the location of major facility improvements depicted in Figure 2-5.

2 Any dimensions, sizes or volumes listed in this table are approximate and may change during future design phases of the project. Complete or partial demolition of existing facilities will be required for each project improvement.

3 “Process Equipment” may include any of the following: process pumps, mixers, specialty equipment (e.g., air-burst screen cleaning, ozone generator), mixers, piping, valves, and related electrical equipment.



SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 2-5
Major Infrastructure Improvements Proposed Inside SRWTP Project Area

ESA

Electrical Service

To support increased electrical demands and provide for increased resiliency at the SRWTP, approximately 8 miles of overhead and underground 115 kV and 21 kV service line connections would be replaced and/or constructed between the SRWTP and SMUD's Station J Bulk Transmission Substation (Station J) (Figure 2-5). The existing overhead and underground/buried service line within the SRWTP and along North B Street from the SRWTP to Station J would be rebuilt with either overhead or underground/buried lines. In addition, new overhead or underground/buried lines would be installed by SMUD along Bannon Street and Bercut Drive and routed into SRWTP for connection to new electrical equipment.

A portion of the electrical service line improvements proposed by the project (specifically, replacement of the underground 115 kV electrical service line buried along the south side of North B Street between North 7th Street and Station J) has been evaluated by SMUD, as the lead agency under CEQA, in the Station J Bulk Transmission Substation Project Final Environmental Impact Report ("Station J EIR", State Clearinghouse Number 2023020549) (SMUD, 2024). The Station J EIR is incorporated here by reference, including the evaluation and determination of significance of identified environmental impacts related to replacing and/or upgrading the underground electrical service line between North 7th Street and Station J, and this EIR therefore does not further evaluate that portion of the SRWTP project area.

Sacramento River Water Intakes

The proposed project involves construction and operation of a second water intake (i.e., the new water intake), a pump station, and a new pipeline for conveying raw water from the supply source (Sacramento River) to SRWTP facilities (refer to **Figure 2-6** for a cross-sectional view). It also includes improvements to the existing water intake and associated facilities, including a new pipeline to transport sediment deposited within the intake to SRWTP. The existing water intake on the Sacramento River would remain operational during and after construction of the new water intake.

Specifically, the proposed project includes:

- A new tee screen intake in the Sacramento River would be constructed and operated between the I Street Bridge and the confluence of the Sacramento and American Rivers. The four 24-foot-long and 72-inch-diameter intake screens are located offshore, immediately downstream of the original intake, affording deep water (a bed elevation of approximately 20 feet) that provides protection to the submerged screens from marine traffic and, to a lesser degree, from floating debris. The installation of this structure also improves surface water supply reliability during low river-level conditions. The new water intake would include a fish screen designed using traditional[3] and expanded criterion to provide protection of anadromous and resident fisheries (e.g., Pacific salmon, steelhead, and Delta smelt). The fish screen criteria considered incorporates guidance established by the National Marine Fisheries Service (2011) and California Department of Fish and Wildlife (2010) and would be conservatively designed using the Delta smelt criterion (e.g., approach velocity to the screens set at 0.2-foot pound per second and a minimum screen area of 1,163 square feet).

[3] Traditional criteria for intake screen design include flow rates, inlet elevations, and screen or trash rack entrance velocities.

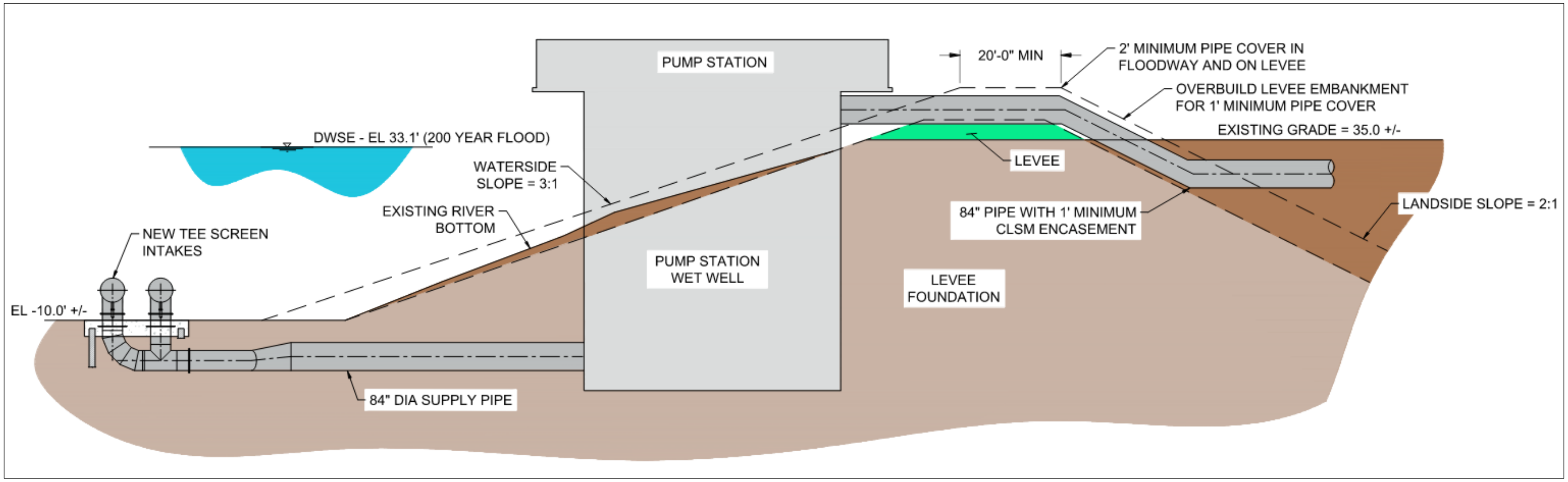


Figure 2-6
Levee Crossing Schematic for New Sacramento River Water Intake

- A new pump station (approximately 60 feet by 150 feet, slightly larger than the existing intake's pump station) for the new tee screen intake would be constructed and operated immediately to the east of the intake on the bank of the river. The new pump station would include installation of six 23,000-gallon-per-minute pumps and would be embedded within the Sacramento River side of the levee (waterside of the east bank levee) such that the conveyance capacity of the Sacramento River channel is not impacted by the addition of the pump station. Note that three of the six pumps would be installed during the initial phase, and three pumps would be installed during project buildout. The new intake and pump station would operate in parallel with the currently operating intake to provide surface water for improved water treatment plant capacity.
- A new conveyance pipeline (2,000 feet of 84-inch-diameter pipe) would be installed below ground to convey raw water from the new intake to SRWTP. The pipeline would cross over the existing east bank levee, run north of SMUD's Museum of Science and Curiosity (MOSAC) building, through Jibboom Street, under Interstate 5 (I-5), and through Bercut Drive to reach SRWTP (refer to Figure 2-5).[4] Access hatches for maintenance access would be constructed on top of the pipeline at ground elevation.
- A second pipeline (2,000 feet of 12-inch-diameter pipe) would be installed at the existing intake to transport sediment from the existing intake to SRWTP for processing and removal. The pipeline would be located along a similar alignment as the raw water conveyance pipeline from the new intake (i.e., the pipeline would spur from the existing intake to meet and follow the raw water conveyance line alignment over the existing east bank levee and under I-5 before ending at the Grit Separation Basin [refer to Figure 2-5]).
- The existing public rotunda (refer to Figure 2-5) leading to the existing water intake would be stabilized through underground concrete repairs to minimize settling. During construction, the pedestrian and bicycle access (travel path) would remain accessible to the public through a temporary path on Jibboom Street or adjacent areas. The existing travel path would be re-established once construction is completed.

Potable Water Transmission Pipelines

The proposed project would also involve improvements of the City's potable water transmission pipelines in the vicinity of SRWTP, in an area defined on the north by the American River, on the east by 7th Street, on the south by the Union Pacific Railroad, and on the west by the Sacramento River, as shown on Figure 2-3.[5] The purpose of these improvements would be to overcome hydraulic constrictions and convey the SRWTP's increased treated water supply to water users (to support the City's increased demand). Approximately 4,000 feet of 78-inch-diameter pipe and 10,000 feet of 66-inch-diameter pipe would be installed from SRWTP to water users in the City's service area. The proposed potable water transmission pipelines would be in addition to existing pipelines that distribute water from SRWTP to water users.

Additional improvements needed for mitigating distribution needs, such as pipelines and reservoirs outside of the SRWTP project area, would be addressed through subsequent environmental review once the improvements are proposed.

[4] The actual location of the proposed new water conveyance pipeline remains under consideration. Determination of the final location would involve direct discussions with MOSAC to ensure minimal impacts to operations.

[5] The final alignment for the potable water transmission pipelines has not been determined.

2.5 Construction Considerations

The following subsections describe construction considerations associated with project improvements within each project area (the FWTP project area and the SRWTP project area), including staging areas and access routes; construction activities; construction materials and equipment; construction workforce; and construction schedule and phasing. This discussion of project improvements is organized based upon the similarity of construction activities that could apply to one or more of the project components.

2.5.1 Staging Areas and Access

For all project components, construction staging of materials and equipment are anticipated to occur on previously disturbed areas within the FWTP and SRWTP project areas (refer to the "area of work" depicted for FWTP in Figures 2-2 and 2-4, and for SRWTP in Figures 2-3 and 2-5). For work within the water treatment plants, including any storm drainage and electrical service line upgrades, staging of materials and equipment would occur in miscellaneous previously disturbed open space within the property limits of FWTP and SRWTP (refer to Figures 2-4 and 2-5, respectively). For storm drainage and/or electrical service lines upgrades outside of the water treatment plant properties, staging would occur on previously disturbed areas parallel to the construction alignment within the existing roadways. Staging areas for installation of the potable water transmission pipelines in the vicinity of SRWTP would also occur within previously disturbed areas within the existing roadways.

For construction activities at the Sacramento River water intakes, a staging area for materials and equipment would be created along the shoulder of Jibboom Street and could be located within the paved MOSAC parking lot (refer to Figure 2-5). The MOSAC parking lot would remain accessible during construction. During construction of the pump station at the new intake, and of the conveyance pipelines from both the new intake and the existing intake that would cross over the levee, pedestrian and bicycle access (travel path) to a portion of the would be temporarily disrupted and detours would be provided. The temporary relocation of the travel path would likely occur on Jibboom Street on previously disturbed surfaces.

In general, existing access roads and paved areas would be used for staging and construction access. However, construction of the proposed project may also require a temporary access and/or haul road from the MOSAC parking lot to the levee. Should this occur, disturbance to the MOSAC property would be minimized and access would be maintained.

2.5.2 Construction Activities and Materials

The following subsections describe construction activities specific to each project component. For all project components, power would be provided to the construction sites by one or more on-site, portable generators (i.e., diesel, gasoline). Temporary lighting may be used during winter months and/or nighttime work and would be directed downward and shielded to ensure that no fugitive light spills out into adjacent areas. Both the generator and lighting would be moved around the construction sites as needed. Construction activities would require delivery of materials, water, and other equipment via truck trips five or six days per week, as well as waste disposal.

Treatment Plant Improvements

This section describes construction activities for improvements at FWTP and SRWTP.

Construction activities associated with treatment plant improvements at both FWTP and SRWTP would occur primarily within the City-owned property in previously disturbed areas. At FWTP, approximately 8 percent of the approximately 34-acre site would be disturbed with new structures and facilities. At SRWTP, approximately 25 percent of the approximately 50-acre site would be disturbed with new structures and facilities.

Demolition of existing structures and facilities would occur within the existing footprint of the treatment plants. Clearing and grubbing would occur in areas that are currently vegetated in order to construct future facilities and associated hardscaping for access and maintenance needs, and minor tree removal is anticipated. Clearing and grubbing methods would include the use of traditional crawlers, dozers and dump trucks. As needed, during construction, dust control measures would include the use of water trucks to spray down exposed dirt piles and trenches. Other best management practices would include the installation of silt fences and waddles, a truck washdown area, and mud removal treads for outgoing traffic from construction areas.

New facilities (e.g., grit basins, pump stations) would be located on previously disturbed ground where no structures are currently located. Structures to be replaced would occur primarily within the footprint of existing structures, with expansion of structures where site constraints or opportunities for optimization of structure size are encountered. Structures would be constructed at-grade unless there exists a need to facilitate gravity flow of water across the structure, in which case part or all of the structure would be located below grade. At the SRWTP, impact- or vibratory-pile driving may be required for piles to support new structures. Some utilities (i.e., electrical, water, sewer, and storm drainage) would be relocated on-site due to conflicts with new structures or to accommodate the constructability of other improvements within the SRWTP project area. Following construction, these areas would be returned to their existing condition and drainage would be routed to the existing stormwater drainage system. All new structures would be designed for protection from floods, as much as feasible, to allow for continued operation during times of emergency. All work would include security measures to prevent unauthorized access, whether via physical entry or via cyber-attack.

The maximum depth for excavation at FWTP is anticipated to be 25 feet below ground surface (bgs) (related to installation of the Intermediate Pump Station). The maximum depth for excavation at SRWTP is anticipated to be 60 feet bgs (related to installation of the High Service Pump Station). For excavated areas requiring dewatering efforts, work would be completed in accordance with applicable National Pollutant Discharge Elimination System (NPDES) permit requirements. Storage to contain/treat water from construction activities would be located within property limits in close proximity to excavated areas requiring dewatering. Dewatering activities may be relocated within SRWTP based on construction activities, phasing, and proximity to a discharge location (e.g., sewer, drainage, swales, etc.). Waters would be discharged into the existing stormwater collection system.

At FWTP, fencing would be added along the east property line (due to the relocated access gate). At SRWTP, fencing and boundary walls would be updated to improve security and frontage. Additional walls are proposed around the drying bed areas to help localize dust concerns. "No-climb" fencing with three-line barbed wire and/or masonry walls would be used to replace existing chain-link fencing. An access gate off Bercut Drive near the existing SRWTP maintenance building would be removed to accommodate raising the grade of the area for installation of the new maintenance building and one of the new electrical buildings. A new access gate would be installed on Summit Tunnel Avenue to allow easier access of truck deliveries to the SRWTP, and along Bannon Street to SRWTP (refer to Figure 2-5).

Borrow materials would be sourced off site. Temporary waste storage areas would be relocated on-site, away from areas in active use to protect from damage and avoid contamination (e.g., within paved areas of the FWTP and within the paved region near the sludge drying area at SRWTP). Due to existing soil conditions at SRWTP, the construction of new structure foundations would require the installation of support piles. Pile foundations are not anticipated to be necessary at FWTP.

Both FWTP and SRWTP would remain operational throughout construction, and construction activities would be sequenced in a manner that minimizes facility shutdowns and maintains the integrity of the treatment process. For example, FWTP improvements needed for the facility to treat up to 120-MGD would be completed first, prior to work at SRWTP. Plant redundancy (such as parallel treatment trains) would be used to minimize complete shutdown of the treatment plants. In some cases, pipelines or pumping systems would be temporarily shut down while replacement work is completed. Where shutdowns are infeasible (such as summer periods where system water demands are at their highest), a temporary bypass system may be installed in order to complete new piping and valves while maintaining facility operations. The duration of shutdowns and bypasses would vary for each treatment plant.

Existing Utility Upgrades

This section describes construction activities associated with upgrades to the existing storm drainage pipelines and electrical service lines at FWTP and SRWTP.

Storm drainage improvements to support upgrades at both the FWTP and SRWTP would require excavation and installation of replacement pipeline via cut-and-cover trenching in previously disturbed areas in the street right-of-way. Construction would occur within the existing street adjacent to FWTP and in disturbed areas within the SRWTP boundary and in roadways adjacent to the treatment plant boundary. Once placed, the trenches would be filled and the ground surface finished with either native material (e.g., grass, rock, dirt) or pavement (e.g., asphalt concrete).

At FWTP, construction of the new substation and transformers within the FWTP footprint would require similar construction activities (e.g., demolition, clearing) described for construction of other new facilities associated with the treatment plant improvements. Vegetation and trees along the west side of E.A. Fairbairn would be removed to provide adequate clearance for the new electrical lines and clear the footprint for the new substation. Once the new electrical substation and electrical improvements are completed and operational, the existing electrical service lines, power poles, transformers, and substation would be demolished.

At both the FWTP and SRWTP, electrical service line upgrades would be installed overhead or below ground to support increased electrical needs of the water treatment plants. If installed overhead, the existing poles would be demolished and replaced with larger poles. If installed below ground, trenches would be excavated within the existing roadway in previously disturbed areas.

Following construction of the utility upgrades, pervious areas would be landscaped. On-site retention structures would be installed to ensure any additional stormwater flows that are created due to new impervious surfaces are retained on-site before being directed to the existing stormwater drainage system.

Sacramento River Water Intakes

A variety of construction activities are associated with construction of the new tee screen intake, pump station, and conveyance pipelines for raw water (from the new intake to SRWTP) and sediment (from the existing intake to SRWTP).

New Water Intake

To prepare the construction work area, minor removal of trees and/or vegetation may be required. Construction of the new tee screen water intake would require installation of a sheet piling cofferdam in the riverbed to create a dewatered area. Access to the dewatered area would be from the levee roadway; this activity would require a temporary detour of the Sacramento River Parkway (or Greenway) pedestrian, bicycle, and maintenance traffic. After the area is dewatered, piling would be driven to support the tee screen concrete foundation, the concrete would be placed, and the piping would be laid below the riverbed elevation between the tee screens and the pump station. The piping beneath the riverbed would be protected with surface rip rap as well as rip rap along the edges of the tee screen concrete foundation. At the completion of the work, the sheet piling cofferdam would be removed.

Construction of the new pump station (riverside of the levee) would also require dewatering with a sheet piling cofferdam on the riverside of the levee. Access to the construction site and traffic detours would be shared with the new water intake construction access. Construction of the new intake pump station would require approximately 150 feet of the Sacramento River Parkway to be relocated around the construction area (approximately 20 feet east of the parkway’s current location). Soil excavation of the pump station wet well would take place first, followed by driving of steel piling to support the pump station. It is expected that excavation for the pump station wet well would require construction of a permanent, mechanically stabilized earth wall between the wet well and the levee. Once the excavation and foundation work are complete, the pump station concrete would be placed and the structure covering the pump station would be erected. Pipe and pump installation and appurtenant equipment would be installed along with the concrete and superstructure work.

Construction of the raw water conveyance pipeline from the new water intake pump station to I-5 would likely be installed with cut-and-cover trenching techniques and sheet piling shoring, or may require jack-and-bore methods. The pipeline would be buried in the upper portions of the levee, under the existing backfill, to maintain continuity of the bike and pedestrian path on top of the levee. The work could temporarily disturb the MOSAC entrance and parking area, requiring temporary traffic diversions in the area of MOSAC and Jibboom Street (refer to Figure 2-5). Minor vegetation and/or tree removal in this area may also be required.

Construction of the portion of the pipelines crossing beneath I-5 would be accomplished with either micro-tunneling or jack-and-bore methods. To accomplish this, a jacking/launching pit would be constructed on one side of I-5, and a receiving pit would be constructed on the other. The crossing would be made with a steel casing pipe of at least 96-inch-diameter; the 84-inch-diameter raw water pipeline would be contained within the casing. At the completion of the tunneling effort, the pits would be demolished and filled. Installation of the final reach of piping to the SRWTP would likely be completed with cut-and-cover trenching construction. Pile driving may occur from construction of the tee screen intake within the river to create a dewatered area, construction of the pump station on the riverside of the levee, and construction of the pipeline from the pump station to I-5.

Utilities (i.e., electrical, water, sewer, and storm drainage) adjacent to the construction work area may be relocated to accommodate construction of the raw water conveyance pipeline. Utilities would be relocated and would not disrupt normal business operations.

Existing Water Intake

Construction of a new 12-inch-diameter pipeline from the existing intake to SRWTP (to transport sediments to SRWTP for processing and removal) would be accomplished using the same construction methods used for the raw water conveyance pipeline associated with the new water intake. As described above, this new pipeline would be located along a similar alignment as the raw water conveyance pipeline. Stabilization of the existing public rotunda leading to the existing water intake would involve concrete excavation and/or auger holes for piles to support the rotunda and minimize additional settling. During construction, traffic would be temporarily rerouted around the construction work area.

Potable Water Transmission Pipelines

Construction of the potable water transmission pipelines in the vicinity of the SRWTP would primarily occur in previously disturbed areas, with the potential for minor crossings of undisturbed grassy or dirt areas. Depending on the exact location, construction of the proposed potable water transmission pipelines could require minor vegetation and/or tree removal. Work within streets adjacent to SRWTP (e.g., Bercut Drive, Bannon Street) could also be required and would include pavement excavation and repair (i.e., cut-and-cover trenching). Similar to the existing utility upgrades and conveyance pipelines, trenches would be excavated to allow placement of the pipes; once placed, the trenches would be filled and the ground surface finished with either native material (e.g., grass, rock, dirt) or pavement (e.g., asphalt or concrete). The proposed potable water transmission pipelines could also cross existing utilities which could result in their removal, temporary relocation and/or permanent relocation. Where temporary services are needed, services would be in place from a few days to a few weeks in order to maintain utility service to customers.[6] Once construction is completed, any temporarily relocated utilities would be reinstalled at their original location.

2.5.3 Construction Materials and Equipment

Table 2-3 summarizes materials anticipated to be used during construction of proposed project components.

TABLE 2-3
ANTICIPATED CONSTRUCTION MATERIALS ASSOCIATED WITH THE PROPOSED PROJECT

	Project Component				
	Treatment Plant Improvements and Existing Utility Upgrades				
Materials[1]	FWTP[2]	SRWTP (Initial Phase)[3]	SRWTP (Project Buildout)	Sacramento River Water Intakes	Potable Water Transmission Pipelines
Concrete, cubic yards	22,000	112,000	16,000	4,000	0
Cement, tons	4,000	17,000	3,000	1,000	0
Rebar, tons	3,000	14,000	2,000	200	0
Excavated materials (off-haul), cubic yards	24,000	34,000	18,000	13,000	4,000
Grubbing/stripping (soil), cubic yards	100	600	100	200	0
Grubbing/stripping (vegetation), cubic yards	100	1,600	300	500	0
Demolition, cubic yards	16,000	48,000	19,000	0	5,000
Piles, number	50	4,800	300	1,250	0

NOTES:
1 All quantities and/or volumes listed are approximate and may change during future design phases of the project.
2 FWTP includes both treatment plant improvements and existing utility upgrades.
3 SRWTP (Initial Phase) includes both treatment plant improvements and existing utility upgrades.

Table 2-4 identifies the type and maximum estimated daily number of construction equipment associated with construction of proposed project components. There could be a period when activities for constructing the treatment plant improvements and utility upgrades at SRWTP overlap with construction activities related to the Sacramento River water intakes, requiring the use of similar equipment at the same time.

6 Service at the relocated utility would only be disrupted during the tie-in and removal (approximately 4 to 16 hours).

TABLE 2-4
ANTICIPATED CONSTRUCTION EQUIPMENT ASSOCIATED WITH THE PROPOSED PROJECT

Equipment[1]	Project Component				
	Treatment Plant Improvements and Existing Utility Upgrades			Sacramento River Water Intakes	Potable Water Transmission Pipelines
	FWTP[2]	SRWTP (Initial Phase)[3]	SRWTP (Buildout)		
Aerial Lifts	1	2	1	1	0
Air Compressors	0	0	0	2	0
Boom Truck	1	2	1	0	0
Bore/Drill Rigs	0	2	1	2	0
Concrete/Industrial Saws	2	4	2	2	0
Concrete Pumps	2	4	2	2	0
Concrete Truck	6	12	6	2	0
Cranes	0	0	0	1	0
Crawler Tractors	1	2	1	3	0
Delivery Trucks (equipment) – Semi	2	4	2	2	2
Delivery Trucks (piles) – Semi	2	4	2	2	0
Delivery Trucks (rebar) – Semi	2	4	2	2	0
Dump Trucks (dirt) – Semi	2	4	2	5	2
Dumpers/Tenders	0	0	0	6	1
Excavators	1	2	1	3	1
Forklifts	1	2	1	2	0
Generator Sets	1	2	1	3	0
Graders	0	2	1	0	0
Paving Equipment	1	2	1	1	1
Pile Driver	0	1	0	1	0
Plate Compactors	1	2	1	6	1
Pumps	1	4	2	8	0
Rollers	1	2	1	0	1
Rubber Tired Backhoe	2	4	2	0	0
Rubber Tired Loader	2	4	2	3	2
Water Truck	1	2	1	2	0
Welder	1	4	2	8	0

NOTES:
1 All quantities listed are approximate and may change during future design phases of the project.
2 FWTP includes both treatment plant improvements and existing utility upgrades.
3 SRWTP (Initial Phase) includes treatment plant improvements and existing utility upgrades. The equipment quantities are conservatively estimated and assume up to two construction activities are occurring at the same time.

2.5.4 Construction Workforce and Vehicle Trips

Table 2-5 summarizes the estimated workforce required to complete proposed project activities at both the FWTP project area and the SRWTP project area, during the initial phase and during project buildout. Standard daytime shifts for construction activities would be 6:00 a.m. to 6:00 p.m. Monday through Friday. Some nighttime and/or weekend construction is anticipated; standard nighttime construction shifts would occur between 6:00 p.m. and 6:00 a.m. Portable restrooms would be brought on site for construction worker use. Workers would travel an average of approximately 30 miles per day (round trip) in the Sacramento region to their respective construction site. Worker parking would occur in designated parking areas within the treatment plant facilities or staging areas, including existing paved surfaces and previously disturbed areas.

TABLE 2-5
ANTICIPATED CONSTRUCTION WORKFORCE ASSOCIATED WITH THE PROPOSED PROJECT

Construction Workforce	Project Component: Treatment Plant Improvements and Existing Utility Upgrades: FWTP[2]	SRWTP (Initial Phase)[3]	SRWTP (Buildout)	Sacramento River Water Intakes	Potable Water Transmission Pipelines
Estimated daily average number of construction workers on-site	12	14	14	45	10
Estimated daily maximum number of construction workers on-site	37	42	42	63	15

NOTES:
1 All quantities and/or volumes listed are approximate and may change during future design phases of the project.
2 FWTP includes both treatment plant improvements and existing utility upgrades.
3 SRWTP (Initial Phase) includes both treatment plant improvements and existing utility upgrades.

Table 2-6 indicates the anticipated approximate number of daily round-trip construction truck trips for each proposed project component. These estimates are for peak construction periods for delivery of materials, water, and other equipment and for waste disposal.

TABLE 2-6
ANTICIPATED CONSTRUCTION TRUCK TRIPS ASSOCIATED WITH THE PROPOSED PROJECT

Trip Type	Project Component: Treatment Plant Improvements and Existing Utility Upgrades: FWTP[2]	SRWTP (Initial Phase)[3]	SRWTP (Buildout)	Sacramento River Water Intakes	Potable Water Transmission Pipelines
Daily truck trips for materials, waste, and vendors (round trips per day)	24	56	28	16	12

NOTES:
1 All quantities and/or volumes listed are approximate and may change during future design phases of the project.
2 FWTP includes both treatment plant improvements and existing utility upgrades.
3 SRWTP (Initial Phase) includes both treatment plant improvements and existing utility upgrades.

2.5.5 Construction Schedule and Phasing

Table 2-7 presents the construction schedule, including the approximate duration of construction for each project component. In the FWTP project area, construction associated with the treatment plant improvements and existing utility upgrades is expected to occur between 2026 and 2031. In the SRWTP project area, the initial phase of construction is expected to occur between 2027 and 2037 and buildout scheduled to occur between 2040 and 2050. Note the overall schedule to complete the work is estimated to take place over 25 years (including buildout through 2050), with construction of the treatment plant improvements and utility upgrades at SRWTP having the longest schedule (up to 8 years). For each project component, there would be a period of intensive construction, using heavy equipment, followed by several years of minimal activity to reach anticipated completion.

As mentioned, both FWTP and SRWTP would remain operational throughout construction of the proposed project improvements. Therefore, construction activities would be sequenced in a manner that minimizes facility shutdowns, maintains the integrity of the treatment process, and ensures water demands in the system will continue to be met.

TABLE 2-7
ANTICIPATED CONSTRUCTION SCHEDULE BY PROJECT COMPONENT

Project Component	Anticipated Start	Anticipated Finish of Intensive Construction	Anticipated Completion	Estimated Total Duration (years)
FWTP Project Area				
Treatment Plant Improvements and Existing Utility Upgrades	July 2026	July 2028	July 2031	5
SRWTP Project Area				
Initial Phase (235 MGD)	*January 2027*		*July 2037*	
Treatment Plant Improvements and Existing Utility Upgrades	January 2027	January 2031	January 2035	8
Sacramento River Water Intakes	January 2031	July 2035	July 2037	6
Potable Water Transmission Pipelines	July 2032	July 2035	July 2036	4
Buildout (310 MGD)	*2040*		*2050*	
Additional Improvements to Treatment Plant and New Sacramento River Water Intake Pump Station	2040	2043[1]	2050	10 (intermittent)

NOTES:
1 During project buildout, intensive construction is anticipated to occur over the first 2.5 years.

2.6 Operation and Maintenance

2.6.1 Treatment Plant Improvements

Once improvements are completed at the FWTP and SRWTP, operation and maintenance (O&M) activities would generally be similar to existing O&M activities. However, the ozone generation and treatment system improvements at both water treatment plants would require some additional maintenance. Additional emergency generators would be installed at each water treatment plant within an enclosure to support inspection activities in the event of an emergency or power outage (up to 2 at the FWTP and up to 3 at the SRWTP; refer to Tables 2-1 and 2-2, respectively).
To conduct these additional maintenance activities and for the operation of new equipment, additional full-time employees would be needed at both water treatment plants (2 at FWTP and 10 at SRWTP). In addition, there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions).

2.6.2 Existing Utility Upgrades

Once constructed, O&M of the existing utility upgrades to serve both the FWTP and SRWTP would remain the same as existing conditions. The proposed new upgraded storm drain pipelines would be operated and maintained the same as the existing storm drain pipelines. Similarly, the replacement electrical service lines would also be operated and maintained as the existing service lines are under SMUD's maintenance program.

2.6.3 Sacramento River Water Intakes

The proposed new water intake would operate in parallel with the existing water intake. Maintenance activities at the proposed new intake would include periodic cleaning of the tee screens that would be accomplished both manually and with airburst equipment, which would be located at the proposed pump station and associated compressed air piping buried alongside the conveyance pipeline. Access for removal or replacement of the pump columns, bowls, and motors at the proposed new intake would be provided with roof hatches. O&M related to sediment removal in the pumping bays of both intakes would be performed at most annually.

Maintenance of both conveyance pipelines (from the existing and proposed new intake to the SRWTP) would involve installation of manholes and cleanouts at key locations to allow for inspection and maintenance access. Cathodic protection systems (for corrosion prevention) would be installed at the points they cross the existing levee as part of the City's annual maintenance program. Maintenance of the proposed conveyance pipeline for sediment removal from the existing intake to SRWTP would be performed at most, annually.

SRWTP employees, including the additional employees discussed in Section 2.6.1, would inspect and maintain the existing water intake, new water intake, pump stations, and conveyance pipelines. As maintenance trips already occur for the existing intake, additional truck trips for maintenance of the new intake are not anticipated. No additional emergency generators are required for O&M activities at either the existing or proposed new intake. However, portable generators may be used by divers during routine maintenance.

2.6.4 Potable Water Transmission Pipelines

O&M for the proposed potable water transmission pipelines would be performed as part of ongoing City programs and would remain the same as existing conditions.

2.7 Anticipated Required Permits and Approvals

Table 2-8 summarizes the anticipated required permits and approvals for the proposed project.

TABLE 2-8
AGENCY-REQUIRED PERMITS AND APPROVALS

Agency	Type of Jurisdiction	Type of Approval
City of Sacramento Public Works	Local	Grading permits Stormwater Control Plan Stormwater Pollution Prevention Plan
Sacramento County Environmental Management Department	Local	Permits associated with water treatment plant upgrades (chemical and storage changes)
Sacramento Area Sewer District	Local	Permit associated with sewers at the water treatment plants
State Water Resources Control Board, Department of Drinking Water	State	Domestic Water Supply permit
State Water Resources Control Board	State	Statewide National Pollutant Discharge Elimination System Construction General Permit
Central Valley Regional Water Quality Control Board	State	Clean Water Act Section 401
Central Valley Regional Water Quality Control Board	State	Limited Threat Discharge and Dewatering Permit
California Department of Fish and Wildlife	State	Fish and Game Code Section 1602 Streambed Alteration Agreement
California Department of Fish and Wildlife	State	Fish and Game Code Section 2080 Incidental Take Permit
United States Army Corps of Engineers	Federal	Clean Water Act Section 404
United States Army Corps of Engineers	Federal	33 U.S. Code Section 408
United States Fish and Wildlife Service	Federal	Federal Endangered Species Act Section 7
National Marine Fisheries Service	Federal	Federal Endangered Species Act Section 7
State Historic Preservation Office (SHPO)	Federal	Section 106 National Historic Preservation Act Compliance

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CHAPTER 3

Environmental Setting, Impacts, and Mitigation Measures

3.1 Approach to the Analysis

3.1.1 Introduction and Approach to the Environmental Analysis

As discussed in Chapter 2, *Project Description*, the proposed project is designed to achieve the project objectives through multiple phases of work relating to the City's water treatment plants, raw water supply, and distribution system. In summary, implementation of the proposed project would involve construction and operation of the following components:

- Facility and treatment process improvements at both the FWTP and the SRWTP, including replacement of aging infrastructure; upgrades to existing utilities (e.g., storm drainage systems and electrical service); integration of ozone into the treatment processes; and conversion from chlorine gas to sodium hypochlorite as the primary chemical for disinfection of the water.
- Repair of the existing Sacramento River raw water intake; construction of a new water intake along with a pump station; and installation of two separate conveyance pipelines following approximately the same alignment: one for transferring raw water from the new intake to SRWTP, and a second for transporting water and sediment between the existing intake and SRWTP.
- Improvement of the potable water transmission system in the vicinity of SRWTP to address critical hydraulic constrictions.

This section discusses the resource topics that were determined to not require further analysis in Chapter 3 because they would not be impacted by construction or operation of the proposed project. It also presents the structure of the resource topics for which additional environmental analyses are provided.

See Chapter 1, *Introduction*, for more information on the use of the Draft EIR and the CEQA process.

Approach to the Analysis

The analysis in this Draft EIR provides a project-level analysis of the following: treatment plant improvements at both the FWTP and the SRWTP, existing utility upgrades at both the FWTP and SRWTP, and construction at the Sacramento River water intakes. As described in Chapter 2, *Project Description,* a portion of the electrical service line improvements proposed by the project (specifically, replacement of the underground 115 kV electrical service line buried along the south side of North B Street between North 7th Street and Station J) has been evaluated by SMUD, as the lead agency under CEQA, in the Station J Bulk Transmission Substation Project Final Environmental Impact Report ("Station J EIR", State Clearinghouse Number 2023020549) (SMUD, 2024). The Station J EIR is incorporated here by reference, including the evaluation and determination of significance of identified environmental impacts related to replacing and/or upgrading the underground electrical service line between North 7th Street and Station J, and this EIR therefore does not further evaluate that portion of the SRWTP project area.

The proposed potable water transmission pipelines proposed in the vicinity of the SRWTP are evaluated at a program-level in this Draft EIR because the specific alignments are not known at this time. As the design and locations of the potable water transmission mains are determined, potential environmental impacts associated with their construction and operation will be subject to subsequent environmental review documents.

3.1.2 Environmental Issues Not Requiring Further Analysis

Forestry Resources

No forestry resources occur in either the FWTP or SRWTP project areas. Both project areas are primarily built environments with urban uses. The existing water intake and the proposed new water intake and associated facilities are located along the Sacramento River. While habitat along the river includes riparian vegetation, there are no forestry resources. Because there are no forested lands or lands being used for forestry production in the FWTP or SRWTP project areas, **no impact** would occur and impacts to forestry resources are not discussed further in this Draft EIR.

3.1.3 Resource Topics Evaluated in the Draft EIR

This Draft EIR evaluates the physical environmental effects that have the potential to be affected by implementation of the proposed project for the following resource topics:

- Section 3.2, *Aesthetics*
- Section 3.3, *Agriculture Resources*
- Section 3.4, *Air Quality*
- Section 3.5, *Biological Resources - Aquatic*
- Section 3.6, *Biological Resources - Terrestrial*
- Section 3.7, *Cultural Resources*
- Section 3.8, *Energy*
- Section 3.9, *Geology, Soils, Paleontological Resources, and Mineral Resources*
- Section 3.10, *Greenhouse Gas Emissions*
- Section 3.11, *Hazards and Hazardous Materials*
- Section 3.12, *Hydrology, Water Quality, and Water Supply*
- Section 3.13, *Land Use and Planning*
- Section 3.14, *Noise and Vibration*

- Section 3.15, *Public Services*
- Section 3.16, *Recreation*
- Section 3.17, *Transportation*
- Section 3.18, *Tribal Cultural Resources*
- Section 3.19, *Utilities and Service Systems*
- Section 3.20, *Wildfire*

3.1.4 Resource Section Format

Each of the resource topics addressed in this chapter describes the environmental setting, regulatory setting, methods of analysis, thresholds of significance, and impact analysis. Where required, potentially feasible mitigation measures are identified to lessen or avoid significant impacts.

The environmental setting and regulatory setting descriptions provide a point of reference for assessing the environmental impacts of implementing the proposed project. Consistent with CEQA Guidelines Section 15125, the physical environmental conditions (as they existed on April 6, 2022, when the NOP was published) are described in this Draft EIR and used as the baseline by which the proposed project is measured for environmental impacts.

The environmental setting described varies by resource area. For example, the environmental setting for the noise analysis discusses acoustic fundamentals, the effects of noise on humans, and noise-sensitive land uses within the study area in proximity to proposed construction and operational activities. The regulatory setting discussion presents relevant information about federal, State, regional, and/or local laws, regulations, plans, or policies that pertain to the environmental resources addressed in each section.

Following the regulatory setting is the discussion of impacts and mitigation measures. Within this discussion, a methods of analysis description presents the analytical methods and key assumptions used in the evaluation of the proposed project. This is followed by the thresholds of significance, which identify the standards used to determine the significance of effects of the proposed project. The thresholds of significance used for this analysis were derived from Appendix G of the CEQA Guidelines. Any effects for a resource topic determined to not be impacted by the proposed project (i.e., no impact) are discussed under a subsection in each section entitled *Impacts Not Evaluated Further*.

The impacts and mitigation measures portion of each section includes impact statements (addressing construction and operation of the proposed project), prefaced by a number in **boldfaced** type. Each impact discussion is organized with the following headers to clearly describe the effects associated with construction and operation of proposed project components:

Treatment Plant Improvements: impacts are evaluated associated with proposed facility and treatment process improvements at both the FWTP and the SRWTP.

Existing Utility Upgrades: impacts are evaluated associated with proposed upgrades to existing utilities needed to serve the FWTP and the SRWTP.

Sacramento River Water Intakes: impacts are evaluated associated with repairs to the existing water intake, construction and operation of the proposed new water intake and pump station, and installation of conveyance pipelines from each intake to the SRWTP.

Potable Water Transmission Pipelines: impacts are evaluated associated with the construction and operation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's water service area.

To minimize repetition, where impacts are the same, they are combined. If they are the same for all components, they are described under an **All Project Components** header.

Impact conclusions and statements of significance are presented at the end of the discussion. An **Impact Conclusion** header is used, as needed, to summarize the analysis in support of the conclusion that applies to the proposed project components.

For identified potential significant impacts, applicable mitigation measure(s) are presented followed by a statement of significance after mitigation. Each mitigation measure identifies which proposed project component that it applies to using the following abbreviations:

- Treatment Plant Improvements - TPI (FWTP/SRWTP)
- Existing Utility Upgrades - EUU (FWTP/SRWTP)
- Sacramento River Water Intakes - SRWI (Existing/New)
- Potable Water Transmission Pipelines - TP
- All Project Components - ALL

Cumulative impacts are discussed in Chapter 4 of this Draft EIR. Chapter 5, *Other CEQA Considerations*, addresses growth-inducing impacts, significant unavoidable impacts on the environment, and significant irreversible environmental changes. Chapter 6, *Project Alternatives*, discusses a range of reasonable alternatives to the proposed project.

3.1.5 Definitions of Terms Used in the Draft EIR

This Draft EIR uses a number of terms that have specific meaning under CEQA. Among the most important of the terms used are those that refer to the significance of environmental impacts. The following terms are used to describe the environmental effects of the proposed project:

- **Thresholds of Significance:** A set of criteria used by the City of Sacramento, as the lead agency, to determine the level or threshold at which an impact would be considered significant. Thresholds (or standards) of significance used in this Draft EIR include those standards provided in Appendix G of the CEQA Guidelines. In determining the level of significance, the analysis assumes that construction and operation of proposed facilities would comply with relevant existing federal, state, and local regulations and ordinances.
- **Potentially Significant Impact:** The level of significance identified for an impact of the proposed project that may cause a substantial adverse change in the environment, depending on certain unknown conditions related to the proposed action or the affected environment. Potentially significant impacts are identified by comparing the evaluation of a project-related physical change to specified significance criteria.

- **Less-than-Significant Impact:** The level of significance identified when the physical change caused by the proposed project would not exceed the applicable significance criterion.
- **Significant and Unavoidable Impact:** The level of significance identified if the proposed project would result in a substantial adverse physical change in the environment that cannot be feasibly avoided or mitigated to a less-than-significant level.
- **Mitigation Measure:** An action that could be taken that would avoid or reduce the magnitude of a significant impact. CEQA Guidelines Section 15370 defines mitigation as any of the following:
  - Avoiding the impact altogether by not taking a certain action or parts of an action.
  - Minimizing impacts by limiting the degree of magnitude of the action and its implementation.
  - Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
  - Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
  - Compensating for the impact by replacing or providing substitute resources or environments.

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3.2 Aesthetics

3.2.1 Introduction

This section of the Draft EIR describes the existing visual environment in and around the project areas and evaluates changes to visual conditions that could result from the implementation of the proposed project.

No comments specifically addressing aesthetic or visual effects were received in response to the NOP. See Appendix A for NOP comment letters.

3.2.2 Environmental Setting

Regional Context

The City of Sacramento is characterized by a downtown urban core surrounded by suburbs and agricultural land. To the east, on clear days, the foothills of the Sierra Nevada provide a backdrop for the City's visual setting. The City is located at the confluence of the Sacramento and American Rivers. These river corridors create two of Sacramento's primary natural scenic resources. The City is characterized by flat terrain in a predominantly built-out environment. Long-range views are generally expansive, when not impeded by existing mature trees and buildings.

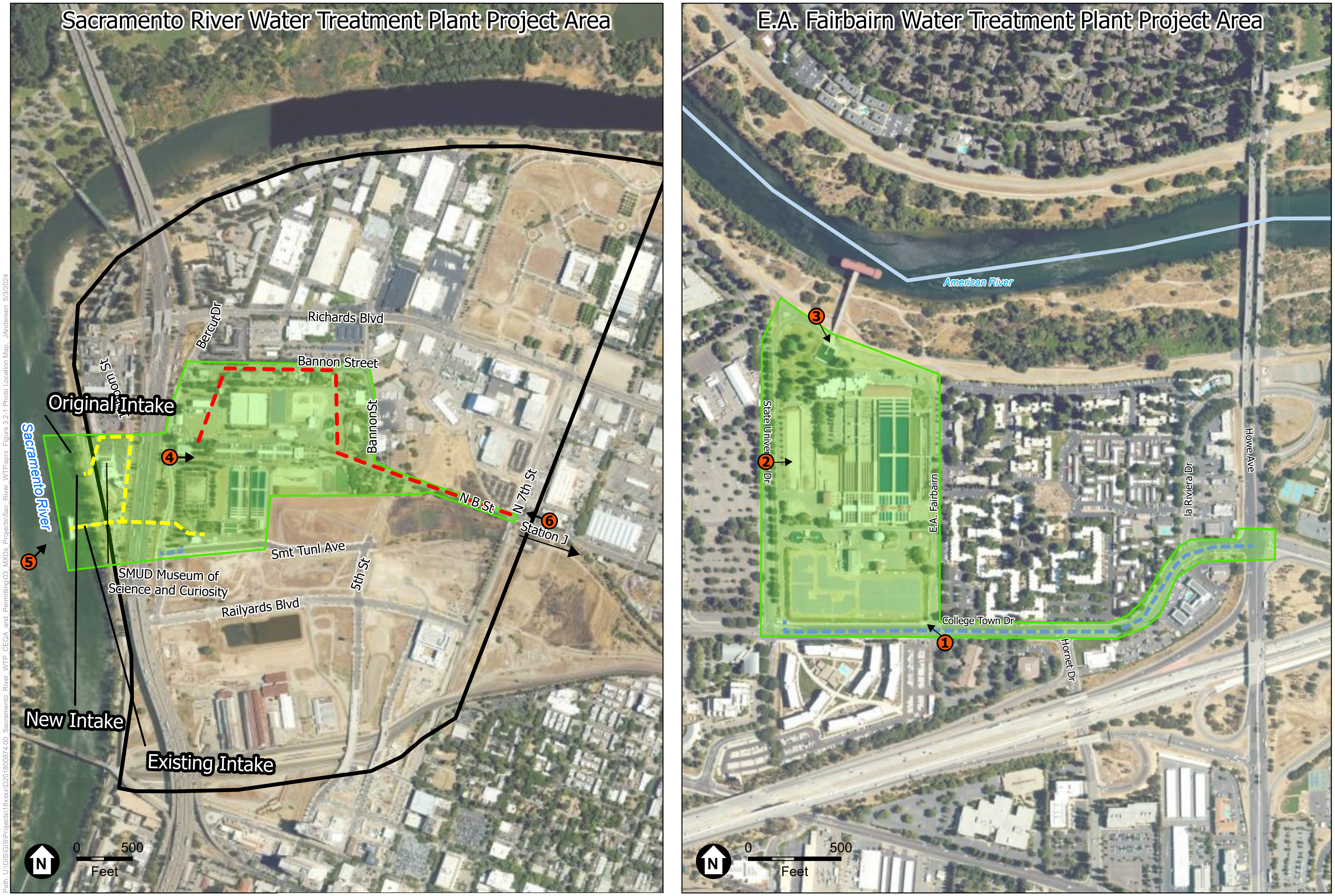
Project Areas

The project areas are comprised of existing and proposed facilities at the FWTP and the SRWTP and their respective vicinities. **Figure 3.2-1** provides an aerial view of the project areas and the locations of photographic views included in subsequent figures. **Figures 3.2-2** through **3.2-4** present representative photographic views of the project areas from publicly accessible locations.

FWTP Project Area

As described in Chapter 2, *Project Description*, the FWTP project area, including the approximately 34-acre FWTP property and associated storm drainage pipelines, is located adjacent to the south bank of the American River and near California State University, Sacramento (Sacramento State) (see Figure 2-2 in Chapter 2). The FWTP project area is bounded by State University Drive to the west, College Town Drive to the south, and Howe Avenue to the east. Adjacent land uses include the Sacramento State campus to the west and apartment complexes and student housing to the east and south. A paved pedestrian path runs along the northern edge of the FWTP property.

The FWTP is visually characterized as an urban industrial complex. On-site structures include O&M buildings, basins, tanks, reservoirs, and related water treatment infrastructure. A block of solar panels occupies the southern portion of the FWTP, on top of existing buried infrastructure. Among the paved areas and infrastructure of the FWTP are areas of landscaping and mature trees. Publicly accessible views of the interior of the FWTP are somewhat limited by flat topography, the levee, trees and vegetation, and perimeter fencing, though some taller structures, such as the approximately three-story-high cylindrical Wash Water Tank, the High Service Pump Station, the Lime Feeder building, and the Administration building, are visible from publicly accessible vantage points adjacent to the FWTP property.



SOURCE: NAIP 2022, ESA, 2024

- Potable Transmission Line Vicinity
- Treatment Plant Utilities and Intakes Area-of-Work
- Conveyance Pipeline Alignment
- Electrical Service Line
- Storm Drain Alignment
- Image Locations and Direction

ESA

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 3.2-1
Photo Locations

Viewpoint 1: View toward the FWTP from College Town Drive. View facing northwest.

Viewpoint 2: View toward the FWTP from State University Drive. View facing east.

SOURCE: ESA, 2023

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 3.2-2
Viewpoints 1 and 2

ESA

Viewpoint 3: View toward the FWTP from the American River Trail. View facing southeast.

Viewpoint 4: View toward the SRWTP from Bercut Drive. View facing east.

D201800874.00 - Sacramento River WTP CEQA and Permitting\05 Graphic-GIS Modeling\Illustrator

SOURCE: ESA, 2023

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 3.2-3
Viewpoints 3 and 4

ESA

Viewpoint 5: View of original (left) and existing (right) Sacramento River intakes. View facing east.

Viewpoint 6: View of North B Street toward the SRWTP, where the existing overhead service line would be rebuilt. View facing west.

SOURCE: ESA, 2023

Figure 3.2-4
Viewpoints 5 and 6

The overall visual quality and character of the FWTP, particularly from publicly accessible views, is that of an urban industrial complex. However, several of the original buildings within the FWTP, which were constructed in the early 1960s, possess modest International Style characteristics, which affords a visual appeal to the FWTP that distinguishes it from more utilitarian and visually unremarkable industrial sites.

The segment of College Town Drive, from State University Drive to Howe Avenue, where the proposed drainage upgrades are proposed would occur, is visually characterized as an urban street corridor flanked by low- and medium-rise industrial (i.e., the FWTP), residential (e.g., apartments and student housing), and commercial buildings, and associated landscaping and mature trees.

SRWTP Project Area

As described in Chapter 2, *Project Description*, the SRWTP project area, including the approximately 50-acre SRWTP property, is located near the confluence of the Sacramento River and American River (see Figure 2-3 in Chapter 2). The SRWTP project area is bounded on the north by the American River, on the east by 7th Street, on the south by the Union Pacific Railroad, and on the west by the Sacramento River.

The SRWTP property is visually characterized as an urban industrial complex. Water treatment plant structures include O&M buildings, basins, tanks, reservoirs, and related water treatment infrastructure. A block of solar panels is located in the north-central area of the SRWTP, atop existing buried infrastructure. Among the paved areas and infrastructure of the SRWTP are areas of landscaping and mature trees. Publicly accessible views of the SRWTP are substantially limited by elevated flat topography (as compared to elevations of adjacent streets), trees and vegetation, and perimeter fencing. The overall visual quality and character of the SRWTP, particularly from limited publicly accessible views, is that of an urban industrial complex. However, several of the original buildings at the SRWTP, which were constructed in the 1920s, possess distinctive Neoclassical Revival characteristics, which affords a visual appeal to the SRWTP that distinguishes it from more utilitarian and visually unremarkable industrial sites. The visual character surrounding the SRWTP property is characterized by a combination of developed and undeveloped parcels within a predominantly commercial and industrial setting.

The SRWTP project area also includes the existing Sacramento River water intake and the site of the proposed new water intake, which are located on the east bank of the Sacramento River. This area is visually characterized by developed commercial businesses (e.g., hotels) and public recreational facilities adjacent to the confluence of the American and Sacramento rivers, including the existing intake structures that extend into the Sacramento River and SMUD’s MOSAC housed within a former historic electrical power station building.

Light and Glare

Nighttime lighting is necessary to provide and maintain safe, secure, and attractive environments; however, these lights have the potential to produce spillover light and glare, and if designed incorrectly, could be considered unattractive. Although nighttime light is a common feature of urban areas, spillover light can adversely affect light-sensitive uses, such as residential units at nighttime. Sacramento is largely built out, and a large amount of artificial light and glare from urban uses in the city already exists.

Glare results when a light source, directly in the field of vision, is brighter than the eye can comfortably accept. Squinting or turning away from a light source is an indication of glare. The presence of a bright light in an otherwise dark setting may be distracting or annoying (*discomfort glare*) or may diminish the ability to see other objects in the darkened environment (*disability glare*). Reflective glare, such as the reflected view of the sun from a window or mirrored surface, can be distracting during the day.

Existing sources of nighttime light in the FWTP project area are mostly surrounding residential uses. Lighting, including stadium lights, on the Sacramento State campus and headlights from motor vehicles traveling on U.S. Highway 50 (US-50) also contribute to existing ambient levels of nighttime lighting in the FWTP project area. Nighttime security lighting at the FWTP provides a comparatively minimal contribution to existing ambient levels of nighttime lighting in the vicinity.

Existing sources of nighttime light in the SRWTP project area are mostly commercial, office, and industrial uses. Headlights from motor vehicles traveling on I-5 and local streets, including Richards Boulevard, contribute to existing ambient levels of nighttime lighting in the SRWTP project area. Nighttime security lighting at the SRWTP provides a comparatively minimal contribution to existing ambient levels of nighttime lighting in the vicinity.

Sources of reflective daytime glare in the FWTP and SRWTP project areas are minimal, as most of the buildings and structures are clad primarily in non-reflective surfaces. However, automobiles traveling along US-50, I-5, and local roadways contribute to nighttime sources of light and glare in the FWTP and SRWTP project areas.

3.2.3 Regulatory Setting

Federal

Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act (16 U.S. Code 1271-1287) established a method for providing Federal protection for certain free-flowing rivers, preserving them and their immediate environments for the use and enjoyment of present and future generations. Eligible rivers can be designated as Wild River Areas, Scenic River Areas, or Recreational River Areas. Recreational River Areas are those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past. The Wild and Scenic Rivers Act, under Section 10, includes management direction for designated rivers, with primary emphasis given to protecting their aesthetic, scenic, historic, archaeologic, and scientific features.

The American River from the Nimbus Dam to the confluence with the Sacramento River, which includes the river segment directly north of the FWTP project area, is designated as a Recreational River Area. The Sacramento River as it passes by the SRWTP project area is not designated under the Wild and Scenic Rivers Act.

State

California Scenic Highway Program

California's Scenic Highway Program was created by the Legislature in 1963 to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The state laws governing the Scenic Highway Program are found in the Streets and Highways Code, Section 260 et seq. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated. These highways are identified in Section 263 of the Streets and Highways Code.

According to the California Department of Transportation (Caltrans) list of designated scenic highways under the California Scenic Highway Program, there are no highway segments within the City of Sacramento that are designated scenic. State Route 160 (SR-160) from the Contra Costa County line to the south limit of the City of Sacramento is the only officially designated state scenic highway near the city (Caltrans, 2023). Neither the FWTP project area nor the SRWTP project area are visible from this portion of SR-160.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted on February 27, 2024. General Plan goals and policies that are applicable to the evaluation of proposed project effects on aesthetic resources are provided in **Table 3.2-1**.

TABLE 3.2-1
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – AESTHETICS

Element	Goals and Policies
Land Use and Placemaking	Goal LUP-1: Goal LUP-4: Policies LUP-4.6, 4.7; Goal LUP-6: Policy LUP-6.9; Goal LUP-7: Policy LUP-7.5; Goal LUP-8: Policies LUP-8.2, 8.10
Environmental Resources and Constraints	Goal ERC-2: Policy ERC-2.3; Goal ERC-3: Policy ERC-3.10

SOURCE: City of Sacramento, 2024

River District Specific Plan

As described above, the SRWTP project area is mainly located within the River District Specific Plan area. The River District Specific Plan (City of Sacramento, 2011) establishes planning and design standards for approximately 748 acres of land within the River District Specific Plan area, with a focus on transitioning from industrial to residential mixed uses, services, and community facilities. The Land Use chapter of the River District Specific Plan describes the land use designations and allowable development densities for the River District Specific Plan area, which correspond to and implement the "development concepts" for each of the River District's subareas. The River District Specific Plan establishes goals and policies for orderly upgrading, replacement, and expansion of public utility infrastructure, including water, sanitary sewer, and storm drainage systems.

City of Sacramento Planning and Development Code (Title 17)

The City of Sacramento Planning and Development Code (Sacramento City Code Title 17) is intended to implement the city's General Plan through the adoption and administration of zoning laws, ordinances, rules, and regulations. To achieve this outcome, the Planning and Development Code regulates all of the following:

- The use of land, buildings, or other structures.
- 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.
- The physical characteristics of buildings, structures, and site development, including the location, height, and size of buildings and structures; yards, courts, and other open spaces; lot coverage; land use intensity through regulation of residential density and floor area ratios; and architectural and site design.

Site Plan and Design Review

As a condition of project approval, the proposed project is required to obtain a site plan and design review permit pursuant to the requirements set forth in Article 1 of Chapter 17.808 of the Planning and Development Code. The purpose of the site plan and design review permit is to ensure that the physical aspects of development projects are consistent with the General Plan and applicable specific plan and with all applicable design guidelines; to ensure the development is of high quality and is compatible with and complimentary to surrounding development; to ensure streets and other public access ways and facilities, parking facilities, and utility and other infrastructure, both on-site and off-site, are adequate and available to support the development and conform to City development standards; to promote energy efficiency and water conservation; and to avoid or minimize to the extent feasible adverse environmental effects of development.

Sacramento River Parkway Plan

The City of Sacramento adopted the Sacramento River Parkway Plan on October 21, 1997. The Sacramento River Parkway Plan is a policy guide for habitat preservation and restoration and recreational development for lands adjacent to the Sacramento River. The plan identifies current conditions, develops a vision for the future, and identifies programs and actions for achieving the vision. The plan includes the following goals for the Sacramento River Parkway:

- To recognize the multiple use aspect of the Sacramento River Parkway for recreation, habitat preservation, and flood control;
- To preserve, protect, and enhance the natural and cultural resources of the Parkway;
- To provide appropriate access and facilities for the enjoyment of the Parkway by present and future generations;
- To create a continuous, lineal on-river parkway with a bicycle and pedestrian trail along the Sacramento River from the city limits at Interstate 80 (I-80) and Garden Highway in South Natomas to the City limits at Freeport; until such time that all of the Parkway lands are under public ownership, the goal is to provide a continuous lineal parkway on and off-river by using an interim bypass trail; and

- To establish development policies and implementation measures for the development of the Sacramento River Parkway.

American River Parkway Plan

The County of Sacramento adopted the American River Parkway Plan on September 10, 2008, and the City of Sacramento approved Resolution 2008-731 on November 6, 2008, which recommended adoption of the Plan by the California State Legislature (acting under the Urban American River Parkway Preservation Act). The purpose of the plan is to provide a guide to land use decisions affecting the Parkway; specifically addressing its preservation, use, development, and administration. The plan also acts as the management plan for the Federal and State Wild and Scenic Rivers Act. The plan includes the following goals for the American River Parkway:

- To provide appropriate access and facilities so that present and future generations can enjoy the amenities and resources of the Parkway which enhance the enjoyment of leisure activities;
- To preserve, protect, interpret and improve the natural, archaeological, historical and recreational resources of the Parkway, including an adequate flow of high-quality water, anadromous and resident fishes, migratory and resident wildlife, and diverse natural vegetation;
- To mitigate adverse effects of activities and facilities adjacent to the Parkway; and
- To provide public safety and protection within and adjacent to the Parkway.

3.2.4 Impacts and Mitigation Measures

Method of the Analysis

The analysis of potential impacts related to aesthetics involved qualitatively comparing the existing built and natural environment to the future built and natural environment and evaluating the visual changes that would result from implementation of the proposed project. Potential impacts were evaluated within the context of existing conditions based on analyses of photographs, site reconnaissance, and project data. Key view corridors were examined, and existing views within, to and from the FWTP and SRWTP project areas were compared to those that would be expected to occur in the future with project implementation. In addition, anticipated visual changes were evaluated in the context of adopted City policies and regulations. See Section 3.1, *Approach to the Analysis*, for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
- In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from

publicly accessible vantage point). In an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.

- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Impacts Not Further Evaluated

Have a substantial adverse effect on a scenic vista.

Visually sensitive public locations include viewpoints where a change to the visibility of an important scenic resource, or a visual change to the resource itself, would affect the general public. These locations include public plazas, trails, parks, parkways, or designated, publicly available and important scenic corridors. No designated scenic vistas or scenic corridors are present within the project areas. Consequently, the proposed project would not have an impact on a scenic vista, and this topic is not addressed further in this section of the EIR.

Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

As presented above in subsection 3.2.3, *Regulatory Setting*, there are no highway segments within the City of Sacramento that are designated scenic. SR-160 from the Contra Costa County line to the south limit of the City of Sacramento is the only officially designated state scenic highway near the city (Caltrans, 2023). Neither the FWTP project area nor the SRWTP project area are visible from this portion of SR-160. Consequently, the proposed project would have no impact on scenic resources within a state scenic highway, and this topic is not addressed further in this section of the EIR.

Impacts and Mitigation Measures

Table 3.2-2 summarizes the impact conclusions presented in this section.

TABLE 3.2-2
SUMMARY OF IMPACT CONCLUSIONS – AESTHETICS

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.2-1: Implementation of the proposed project could substantially degrade the existing visual character or quality of public views of the site and its surroundings or conflict with applicable zoning and other regulations governing scenic quality.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.2-2: Implementation of the proposed project could create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.2-1: Implementation of the proposed project could substantially degrade the existing visual character or quality of public views of the site and its surroundings or conflict with applicable zoning and other regulations governing scenic quality.

As described in Chapter 2, *Project Description*, implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. The effects of the proposed project related to visual character and quality and consistency or conflicts with applicable zoning and other regulations governing scenic quality are discussed below.

Treatment Plant Improvements

As presented above in subsection 3.2.2, *Environmental Setting*, the FWTP and SRWTP are urban industrial complexes. Publicly accessible views of the FWTP and SRWTP are limited by flat topography, trees and vegetation, and perimeter fencing. Treatment plant structures include O&M buildings, basins, tanks, reservoirs, and related water treatment infrastructure. While each treatment plant includes some originally constructed buildings that convey architectural qualities that distinguish them from more utilitarian and visually unremarkable industrial sites, neither the FWTP nor the SRWTP comprise distinctive or notable visual or scenic resources.

The proposed project includes facility and treatment improvements at both the FWTP and the SRWTP including replacement of aging infrastructure. Construction activities would result in the presence and movement of equipment, vehicles, and personnel for varying periods of time in various locations at both water treatment plants. These activities could result in temporary, short-term loss of visual quality and cohesion within the project areas for sensitive viewers (e.g., recreationists and residents), but these transient and temporary effects would not result in permanent or substantial effects to the existing visual character or quality.

Following completion of construction, proposed water treatment plant improvements would be consistent with existing uses within the FWTP and SRWTP properties and would therefore not result in a substantial change in visual character compared to existing conditions at either water treatment plant.

As discussed in subsection 3.2.3, *Regulatory Setting*, the proposed project is required to obtain a site plan and design review permit as a condition of approval pursuant to the requirements set forth in Chapter 17.808 of the Planning and Development Code. The purpose of the site plan and design review permit, among other objectives, is to ensure that the physical aspects of development projects are consistent with all applicable plans, policies, and design guidelines to ensure the development is of high quality and is visually compatible with and complementary to the project site and surrounding development. Required issuance of a site plan and design review permit would further ensure that proposed water treatment plant improvements would not substantially degrade the existing visual character or quality of public views of the FWTP or SRWTP and their surroundings or conflict with applicable zoning and other regulations governing scenic quality.

Existing Utility Upgrades

The proposed project includes upgrades to existing storm drainage utilities at both water treatment plants. At the FWTP, storm drainage upgrades would occur along the perimeter of the FWTP, along College Town Drive from State University Drive to Howe Avenue. The existing pipeline would be replaced with a larger pipeline (at least 18-inch) and all construction would occur within the street right-of-way. At the SRWTP, storm drainage infrastructure would be upgraded within the SRWTP property, and the existing storm drain line from the SRWTP to the Sacramento River would be abandoned in place, with localized locations where trenching would be necessary to fill the abandoned sections. Approximately 300 feet of up to 24 inch-diameter storm drain pipeline would be installed within the SRWTP into Summit Tunnel Avenue. Storm drainage upgrades serving both water treatment plants would be installed underground and would not result in visual change related to existing conditions.

The proposed project also includes upgrades to existing electrical service utilities at both water treatment plants. At FWTP, increased electrical demands would be accommodated with the installation of new electrical service infrastructure within the water treatment plant property, including a new substation and two transformers, and new electrical lines and power poles installed between College Town Drive and the new substation. At SRWTP, the existing overhead service lines within the SRWTP and along the north side of North B Street from the SRWTP to North 7th Street would be rebuilt with either overhead or underground/buried lines. The new overhead or underground/buried lines would be installed along Bannon Street and Bercut Drive and routed into SRWTP for connection to new electrical gear. For both FWTP and SRWTP, if the electrical service lines are installed overhead, the existing poles would be demolished and replaced with larger poles. If the electrical service lines are installed below ground, trenches would be excavated within the existing public right-of-way in previously disturbed areas. The electrical infrastructure and new electrical service lines installed as part of the proposed project would not result in an adverse change to visual character because they would be consistent with the existing urban-industrial visual character at and around both water treatment plants.

Sacramento River Water Intakes

The proposed project includes improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP. The original intake, located immediately upriver from the proposed new water intake, would remain intact with implementation of the proposed project. Conveyance pipelines would also be installed from each intake to the SRWTP.
As presented in subsection 3.2.2, *Environmental Setting*, these components are located in the SRWTP project area that is visually characterized by park, recreational, and public facilities adjacent to the confluence of the American and Sacramento rivers, including SMUD's MOSAC, located within a former historic electrical power station building. As noted above, construction activities could result in temporary, short-term loss of visual quality and cohesion for sensitive viewers (e.g., recreationists and residents), but these transient and temporary effects would not result in permanent or substantial effects to the existing visual character or quality of the area.

The existing intake would appear visually consistent with exiting conditions after the improvements are completed. Similarly, the existing roadways and other disturbed surfaces under which the conveyance pipelines would be installed would appear visually consistent with their current state, after construction is complete. Additionally, the new water intake would consist of facilities and equipment in the river and along the riverbank that would be designed to integrate with the surrounding area and facilities. Consequently, the construction and operation of proposed components related to the Sacramento River water intakes would not substantially degrade the existing visual character or quality of public views of the site and its surroundings or conflict with applicable zoning and other regulations governing scenic quality.

Potable Water Transmission Pipelines

The proposed project would also involve phased installation of potable water transmission pipelines from the SRWTP to distribute treated water from the SRWTP to the City's service area. The potable water transmission pipelines would be installed as needed to meet future demands and to overcome hydraulic constrictions within the area defined on the north by the American River, on the east by 7th Street, on the south by the Union Pacific Railroad, and on the west by the Sacramento River. The transmission pipelines would be installed within existing rights-of-way, underground, and would not be expected to substantially degrade the existing visual character or quality of public views or conflict with applicable zoning and other regulations governing scenic quality. As noted above, construction activities could result in temporary, short-term loss of visual quality and cohesion for sensitive viewers (e.g., recreationists and residents), but these transient and temporary effects would not result in permanent or substantial effects to the existing visual character or quality.

Impact Conclusion

As discussed above, the proposed water treatment plant improvements would be constructed within the FWTP and SRWTP properties and would be consistent with current uses. Required issuance of a site plan and design review permit would further ensure that proposed water treatment plant improvements would not substantially degrade the existing visual character or quality of public views of the FWTP or SRWTP and their surroundings or conflict with applicable zoning and other regulations governing scenic quality. Proposed upgrades to existing utilities, including the new overhead and underground electric service lines and storm drainage upgrades, would not result in adverse visual change related to existing conditions. The proposed new water intake and supporting facilities would be designed to integrate with the surrounding area and facilities. The proposed potable water transmission pipelines from the SRWTP would be installed within existing rights-of-way, underground, and would not be expected to substantially degrade the existing visual character or quality. Construction activities would result in the presence and movement of equipment, vehicles, and personnel for varying periods of time in various locations within the project areas. These activities could result in temporary, short-term loss of visual quality and cohesion within the project areas for sensitive viewers (e.g., recreationists and residents), but these transient and temporary effects would not result in permanent or substantial effects to the existing visual character or quality. For the reasons discussed above, implementation of the proposed project would not substantially degrade the existing visual character of the project areas or the quality of public views or conflict with applicable zoning and other regulations governing scenic quality. Therefore, impacts related to existing visual character or quality would be **less than significant** for all project components.

Mitigation Measure

Mitigation Measures (ALL): None required.

Impact 3.2-2: Implementation of the proposed project could create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

All Project Components

As discussed in subsection 3.2.2, *Environmental Setting*, Sacramento is largely built out, and a large amount of artificial light and glare from urban uses in the City already exist.

Existing sources of nighttime light in the FWTP project area are mostly surrounding residential uses, lighting on the Sacramento State campus, and headlights from motor vehicles traveling on US-50. Nighttime security lighting at the FWTP provides a comparatively minimal contribution to existing ambient levels of nighttime lighting in the vicinity.

Existing sources of nighttime light in the SRWTP project area are mostly commercial, office, and industrial uses and headlights from motor vehicles traveling on I-5 and local streets, including Richards Boulevard. Nighttime security lighting at the SRWTP provides a comparatively minimal contribution to existing ambient levels of nighttime lighting in the vicinity.

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. As described in Chapter 2, *Project Description*, temporary construction lighting could be used during winter months and/or nighttime work for project construction activities and would be directed downward and shielded to ensure that no fugitive light spills out into adjacent areas.

With regard to O&M, the proposed utility upgrades, and potable water transmission pipelines would not include any new sources of light or glare above existing conditions. Nor would the proposed new conveyance pipelines which would connect the existing and new Sacramento River intakes to the SRWTP.

Proposed treatment plant improvements at the FWTP and SRWTP and the proposed new Sacramento River water intake would include security and facility lighting that could increase ambient levels of nighttime lighting above existing conditions. However, any new lighting would be subject to applicable City regulations and policies implemented to minimize adverse light and glare.

As previously discussed, the proposed project is required to obtain a site plan and design review permit as a condition of approval pursuant to the requirements set forth in Chapter 17.808 of the Planning and Development Code. The scope of site plan and design review extends to all aspects of the physical characteristics of development, including lighting and building materials that may cause glare impacts. In addition, the 2040 General Plan includes Policy LUP-8.10 (Responsiveness to Context), which requires appropriate building and site design that considers and reflects the existing character of neighborhoods and corridors. Required adherence to City regulations and policies would ensure that impacts related to the creation of new sources of substantial light or glare which could adversely affect daytime or nighttime views would be **less than significant** for all project components.

Mitigation Measure

Mitigation Measures (ALL): None required.

3.3 Agriculture Resources

3.3.1 Introduction

This section of the Draft EIR addresses agricultural resource impacts associated with implementation of the proposed project.

No comments specifically addressing agricultural resources were received in response to the NOP. See Appendix A for NOP comment letters.

3.3.2 Environmental Setting

Agricultural lands surrounding the city of Sacramento support tomatoes, pears, sugar beets, and alfalfa (to the south and west) and rice, grains, fruits, and other field crops (to the north). Agricultural lands to the east are less suitable for crop production and support livestock grazing. Agriculture and agriculture-supporting industry, including fruit and vegetable processing and shipping, comprise a significant portion of the region's income and employment, with rice, tomatoes, wine grapes, prunes, peaches, almonds, and walnuts ranking among the more lucrative crops (City of Sacramento, 2023). The city itself is mostly urbanized, with limited amounts of active commercial agricultural lands remaining that support large-scale operations. The remaining agricultural lands and commercial agricultural activity are located within the southern and northern areas of the city (City of Sacramento, 2023).

As described in Chapter 2, *Project Description*, the FWTP project area, including the approximately 34-acre FWTP property and associated storm drainage pipelines, is located adjacent to the south bank of the American River and near Sacramento State University (see Figure 2-2 in Chapter 2). The FWTP project area is bounded by State University Drive to the west, College Town Drive to the south, and Howe Avenue to the east. Adjacent land uses include the Sacramento State campus to the west and apartment complexes and student housing to the east and south. A paved pedestrian path runs along the northern edge of the FWTP property.

The SRWTP project area, including the approximately 50-acre SRWTP property, is located near the confluence of the Sacramento River and American River (see Figure 2-3 in Chapter 2). The SRWTP project area is bounded on the north by the American River, on the east by 7th Street, on the south by the Union Pacific Railroad, and on the west by the Sacramento River. The SRWTP project area also includes the existing Sacramento River water intake and the site of the proposed new water intake, which are located on the east bank of the Sacramento River.

There are no farmlands designated in the FWTP or SRWTP project areas. Land uses in the project areas are not used for agricultural production and are zoned as Parks and Recreation, Public/ Quasi-Public, and Residential Mixed Use in the adopted General Plan (City of Sacramento, 2024).

Important Farmland

The California Department of Conservation (DOC), Office of Land Conservation, maintains a statewide inventory of farmlands, which are mapped for public use under the Farmland Mapping and Monitoring Program (FMMP). As part of the FMMP, the DOC produces Important Farmland maps that identify and rate the suitability of agricultural lands in California on a county-by-county basis, based on soil quality and irrigation status. Maps are updated every two years based on land inventory and soil survey data prepared by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), with current land use information gathered from aerial photographs, a computer mapping system, public review, and field reconnaissance.

FMMP designations do not affect local land use decisions; rather, they are identification tools that can be used for policy purposes by local governments. FMMP farmlands are classified into the following:

- **Prime Farmland –** Land that has the best combination of physical and chemical characteristics for crop production. It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops when treated and managed.
- **Farmland of Statewide Importance** – Land other than Prime Farmland that has a good combination of physical and chemical characteristics for crop production.
- **Unique Farmland –** Land that does not meet the criteria for Prime Farmland or Farmland of Statewide Importance but has been used for the production of specific crops with high economic value.
- **Farmland of Local Importance –** Land that currently is either producing crops or has the capability of production but does not meet the criteria of the categories above.
- **Grazing Land –** Land on which the vegetation is suited to the grazing of livestock.
- **Urban and Built-up Land –** Land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.
- **Other Land** – Land not included in any other mapping category.

For the purposes of environmental review under CEQA, the categories of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland constitute "agricultural land" (Public Resources Code Section 21060.1). These categories are collectively referred to as "Important Farmland" in this analysis. Generally, any conversion of land from one of these categories to a lesser quality category or a non-agricultural use would be considered an adverse impact. According to the FMMP, the FWTP and SRWTP project areas are classified as Urban and Built-Up Land and Other Land; therefore, there are no designated Important Farmlands (DOC, 2022a). Important Farmlands in the vicinity of the SRWTP project area includes Farmland of Local Importance on the north bank of the American River, approximate one mile upstream of the existing and proposed new Sacramento River water intakes, as well as a mix of Prime Farmland and Farmland of Local Importance approximately three miles downstream along the west bank of the Sacramento River (opposite side of the river from the Sacramento River water intakes).

Williamson Act Lands

The California Land Conservation Act of 1965, commonly known as the Williamson Act (Government Code Section 51200 et seq.), enables local governments to establish "agricultural preserves" consisting of lands devoted to agricultural uses and other compatible uses. Upon establishment of such preserves, the locality may offer to owners of included agricultural land the opportunity to enter into annually renewable contracts that restrict the land to agricultural use for at least 10 years (i.e., the contract continues to run for 10 years following the first date upon which the contract is not renewed). In return, the landowner receives property tax benefits. Participating local governments are required to establish their own rules and regulations regarding implementation of the Williamson Act within their jurisdiction, including enrollment guidelines, acreage minimums, enforcement procedures, allowable uses, and compatible uses. There are no Williamson Act lands present in the proposed project areas (DOC, 2022b).

3.3.3 Regulatory Setting

Federal

Farmland Protection Policy Act

The U.S. Department of Agriculture administers the Farmland Protection Policy Act of 1981 (7 CFR Chapter VI Part 658). The act discourages federal activities that would convert farmland to non-agricultural purposes and assures to the extent possible that federal programs are administered to be compatible with State, local government, and private programs and policies to protect farmland. For purposes of the act, farmland includes land defined as prime, unique, or farmlands of statewide or local importance as well as forest land, pastureland, or cropland; it does not include water or urban built-up land. Projects are subject to Farmland Protection Policy Act requirements if they could irreversibly convert farmland (directly or indirectly) to non-agricultural use and are completed by a federal agency or with assistance from a federal agency. The NRCS is the Federal agency responsible for ensuring compliance with these laws and policies.

Federal agency representatives of projects that have the potential to convert farmland to non-farm use coordinate with their local office of the NRCS or U.S. Department of Agriculture Service Center. The NRCS uses a land evaluation and site assessment (LESA) system to establish a farmland conversion impact rating score on proposed sites of federally funded and assisted projects. The resulting score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level.

State

California Farmland Conservancy Program

DOC's California Farmland Conservancy Program was established in 1996 to encourage the permanent conservation of productive agricultural lands in collaboration with local entities. In creating this program, the California Legislature recognized the important contribution made by farmland to the state's food supply and the additional benefits of farmland: conserving wildlife habitat, protecting wetlands, and preserving scenic open space.

The California Farmland Conservancy Program supports local efforts to conserve farmland by providing grant funds for the purchase of agricultural conservation easements. These easements are deed restrictions intended to ensure that a given piece of agricultural land can never be used for purposes that would interfere with farming, leaving farmers free to make all ongoing agricultural management decisions on their land.

California Farmland Mapping and Monitoring Program

In 1980, the DOC started a system of mapping and monitoring important farmland in California based on soil and climatic characteristics, the Farmland Mapping and Monitoring Program. CEQA lead agencies are required to evaluate agricultural resources in environmental assessments based at least in part on the Farmland Mapping and Monitoring Program. The State's system was designed to document the amount of agricultural land in California that was being converted to non-agricultural land or transferred into Williamson Act contracts.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted on February 27, 2024. General Plan goals and policies that are applicable to the evaluation of proposed project effects on agriculture resources are provided in **Table 3.3-1**.

TABLE 3.3-1
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – AGRICULTURE RESOURCES

Element	Goals and Policies
Land Use and Placemaking	Policies LUP-1.11, 1.12
Environmental Justice Element	Policies EJ-2.7, 2.10

SOURCE: City of Sacramento, 2024

3.3.4 Impacts and Mitigation Measures

Method of the Analysis

The analysis of agriculture resources in this section is based on a review of available literature and maps from State agencies. The analysis focuses on whether there are existing agricultural uses in and/or adjacent to the proposed project areas and whether implementation of the proposed project would result in physical impacts on agriculture resources. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
- Conflict with existing zoning for agricultural use, or a Williamson Act contract.
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use.

Impacts Not Further Evaluated

Convert Important Farmland to non-agricultural use or conflict with existing zoning for agricultural use, or a Williamson Act contract.

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. As described in subsection 3.3.2, *Environmental Setting*, there is no Important Farmland or land enrolled in Williamson Act contracts located in the FWTP or SRWTP project areas, and the project areas are not designated for agricultural production based on the City's 2040 General Plan land use map or associated zoning ordinances (see Section 3.13, *Land Use and Planning*, for additional details related to zoning and land use designation requirements). Therefore, implementation of the proposed project would not result in the conversion of Important Farmland to non-agricultural use or conflict with existing zoning for agricultural use or a Williamson Act contract and **no impact** would occur. These issues will not be further evaluated in the EIR.

Impacts and Mitigation Measures

Table 3.3-2 summarizes the impact conclusions presented in this section.

TABLE 3.3-2
SUMMARY OF IMPACT CONCLUSIONS – AGRICULTURE RESOURCES

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.3-1: Implementation of the proposed project could result in changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.3-1: Implementation of the proposed project could result in changes in the existing environment which, due to their location or nature, could result in the conversion of Important Farmland to non-agricultural use.

All Project Components

As described in subsection 3.3.2, *Environmental Setting*, neither the FWTP or SRWTP project areas contain designated Important Farmland, nor do they include any agricultural uses. The treatment plant improvements, existing utility upgrades, conveyance pipelines, and potable water transmission pipelines would occur in developed areas, mainly within paved or previously disturbed surfaces. The existing water intake and the proposed new water intake and pump station are located in, and on the east bank of, the Sacramento River, where habitat includes aquatic resources and riparian vegetation; however, there are no lands zoned or used for agriculture or designated as Farmland within the project areas or directly downstream. As noted above under *Important Farmland* in subsection 3.3.2, *Environmental Setting*, in the vicinity of the SRWTP project area include Farmland of Local Importance on the north bank of the American River, approximately one mile upstream of the existing and proposed new Sacramento River water intakes, as well as a mix of Prime Farmland and Farmland of Local Importance approximately three miles downstream along the west bank of the Sacramento River (opposite side of the river from the Sacramento River water intakes). Given the nature and location of project components and the lack of Farmland or other agricultural resources within or nearby the project areas, the physical changes from construction and operational needs of the proposed project would not cause any direct impacts to, or conversion of, agricultural lands.

The general objective of the proposed project is to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand. Implementation of the proposed project would provide an additional source of water that could support development that could result in the conversion of farmland to non-agricultural use. For discussion of how the proposed project would support planned population growth within the City's urban limits in accordance with the City's 2040 General Plan, and how the environmental effects of such growth, including on agricultural resources, were evaluated in the Master EIR for the 2040 General Plan, please refer to Chapter 5, *Other CEQA Considerations*.

Because the proposed project would not result in the conversion of Farmlands to non-agricultural uses, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

3.4 Air Quality

3.4.1 Introduction

This section of the Draft EIR addresses the potential air quality impacts associated with implementation of the proposed project.

Comments addressing air quality were received in response to the NOP. Comments requested that the EIR fully analyze project consistency with the River District Specific Plan circulation and land use measures. See Appendix A for NOP comment letters.

See Section 3.11, *Hazards and Hazardous Materials*, for further discussion of asbestos and Section 3.10, *Greenhouse Gas Emissions*, for evaluation of greenhouse gas emissions associated with construction and operation of the proposed project.

3.4.2 Environmental Setting

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions (for example, wind speed, wind direction, and air temperature) in combination with local surface topography (for example, geographic features such as mountains and valleys), determine how air pollutant emissions affect local air quality.

The project area is located within Sacramento County, California, which is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD). SMAQMD is the primary local agency with respect to air quality for all of Sacramento County. Sacramento County is within the Sacramento Valley Air Basin (SVAB), which also includes all of Butte, Colusa, Glenn, Shasta, Sutter, Tehama, Yolo, and Yuba Counties, the western portion of Placer County, and the eastern portion of Solano County.

Climate and Meteorology

The climate of the SVAB is Mediterranean in character, with mild, rainy winter weather from November through March and warm to hot, dry weather from May through September. Sacramento Valley temperatures range from 20 to 115 degrees Fahrenheit and the average annual rainfall is 20 inches. The topographic features giving shape to the SVAB are the Coast Range to the west, the Sierra Nevada to the east, and the Cascade Range to the north. These mountain ranges channel winds through the SVAB but also inhibit the dispersion of pollutant emissions.

The predominant annual and summer wind pattern in the Sacramento Valley is the full sea breeze, commonly referred to as Delta breezes. These cool winds originate from the Pacific Ocean and flow through a sea-level gap in the Coast Range called the Carquinez Straits. In the winter (December to February), northerly winds predominate. Wind directions in the Sacramento Valley are influenced by the predominant wind flow pattern associated with each season. However, about half the days from July through September, a phenomenon called the “Schultz Eddy” occurs. This event is a large isotropic vertical-axis eddy on the north side of the Carquinez Straits that prevents the Delta breezes from transporting pollutants north and out of the Sacramento

Valley and causes the wind pattern to circle back south, resulting in air pollutants remaining within the Sacramento Valley. This phenomenon's effect exacerbates the pollution levels in the area and increases the likelihood of state or federal standards (CEC, 2018) being violated.

The vertical and horizontal movement of air is an important atmospheric component involved in the dispersion and subsequent dilution of air pollutants. Without movement, air pollutants can collect and concentrate in a single area, increasing the associated health hazards. For instance, in the winter, the SVAB typically experiences calm atmospheric conditions that result in stagnant air and increased air pollution. As a result, persistent inversions occur frequently in the SVAB, especially during autumn, and restrict the vertical dispersion of pollutants released near ground level.

Air Pollutants of Concern

Air pollutants of concern within the SVAB include criteria air pollutants and toxic air contaminants (TACs).

Criteria Air Pollutants

Criteria air pollutants are a group of six common air pollutants for which the United States Environmental Protection Agency (EPA) has set ambient air quality standards. Criteria air pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) in size fractions of 10 microns or less in diameter (PM_{10}) and 2.5 microns or less in diameter ($PM_{2.5}$), and lead. Most criteria pollutants are directly emitted. Ozone, however, is a secondary pollutant that is formed in the atmosphere by chemical reactions between nitrogen oxides (NOx) and reactive organic gases (ROGs). In addition to the criteria air pollutants identified by the United States EPA, the California Air Resources Board (CARB) includes an additional four criteria air pollutants (visibility reducing particulates, sulfates, hydrogen sulfide, and vinyl chloride).

Criteria air pollutants have been recognized to cause notable health problems and consequential damage to the environment either directly or in reaction with other pollutants, due to their presence in elevated concentrations in the atmosphere. Such pollutants have been identified and regulated as part of the overall endeavor to prevent further deterioration and facilitate improvement in air quality. These pollutants are regulated by the United States EPA and are subject to emissions control requirements adopted by federal, state and local regulatory agencies. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) for each of the criteria air pollutants and their effects on health are summarized in the *Regulatory Setting* section below. It must be noted that the ambient air quality standards—both federal and state—are expressed as airborne concentrations of various pollutants. Compliance with the standards is on a regional basis. In the SVAB, compliance is demonstrated by ongoing measurements of pollutant concentrations at nine air quality monitoring stations operated by the SMAQMD in Sacramento County. An exceedance of an ambient air quality standard at any one of the stations counts as a regional exceedance.

NAAQS and CAAQS have been set at levels considered safe to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly with a margin of safety; and to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. As explained by the CARB, “An air quality standard defines the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without any harmful effects on people or the environment” (CARB, 2023a). That is, if a region is in compliance with the ambient air quality standards, its regional air quality can be considered protective of public health. The NAAQS are statutorily required to be set by the United States EPA at levels that are “requisite to protect the public health,” 42 USC Section 7409(b)(1).[1] As such, the closer a region is to attaining a particular NAAQS, the lower the human health impact is from that pollutant.

Criteria air pollutants of concern in the SVAB include O_3, PM_{10}, and $PM_{2.5}$, as concentrations of these pollutants are above state and/or national ambient air quality standards. Sulfur dioxide, lead, visibility reducing particulates, sulfates, hydrogen sulfide, and vinyl chloride concentrations are well below state and/or national ambient air quality standards and are not air pollutants of concern in the SVAB. **Table 3.4-1** lists the health effects associated with criteria air pollutants of concern.

Ozone

As discussed above, O_3 is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving the O_3 precursors ROG, also referred to as volatile organic compounds (VOCs) by some regulating agencies, and NO_X. The main sources of ROG in the SVAB are the evaporation of solvents, paints, and fuels; the main sources of NO_X are combustion processes (including motor vehicle engines). O_3 is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with O_3 production through a photochemical reaction process.

Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicle engines; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure of humans to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue, impaired central nervous system function, and angina (chest pain) in persons with serious heart disease. Very high concentrations of CO can be fatal.

Particulate Matter

PM is frequently classified by particle size, where PM_{10} consists of PM that is 10 microns or less in diameter and $PM_{2.5}$ consists of the subset of PM_{10} that is 2.5 microns or less in diameter (a micron is one-millionth of a meter). PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Some sources of particulate matter, such as wood burning in fireplaces, demolition, and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. Particulates also can damage materials and reduce visibility.

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1 See: https://www.law.cornell.edu/uscode/text/42/7409.

TABLE 3.4-1
HEALTH AND ENVIRONMENTAL EFFECTS OF CRITERIA AIR POLLUTANTS OF CONCERN

Pollutant	Adverse Effects
Ozone	• People most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers. In addition, people with certain genetic characteristics, and people with reduced intake of certain nutrients, such as vitamins C and E, are at greater risk from ozone exposure. • Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and airway inflammation. It also can reduce lung function and harm lung tissue. Ozone can worsen bronchitis, emphysema, and asthma, leading to increased medical care. • Ozone affects sensitive vegetation and ecosystems, including forests, parks, wildlife refuges and wilderness areas. In particular, ozone harms sensitive vegetation during the growing season.
Carbon Monoxide	• Breathing air with a high concentration of CO reduces the amount of oxygen that can be transported in the blood stream to critical organs like the heart and brain. • At very high levels, which are possible indoors or in other enclosed environments, CO can cause dizziness, confusion, unconsciousness and death. • Very high levels of CO are not likely to occur outdoors. However, when CO levels are elevated outdoors, they can be of particular concern for people with some types of heart disease. These people already have a reduced ability for getting oxygenated blood to their hearts in situations where the heart needs more oxygen than usual. They are especially vulnerable to the effects of CO when exercising or under increased stress. In these situations, short-term exposure to elevated CO may result in reduced oxygen to the heart accompanied by chest pain also known as angina.
Particulate Matter	• Particulate matter contains microscopic solids or liquid droplets that are so small that they can be inhaled and cause serious health problems. Such health effects include aggravating asthma and bronchitis, causing visits to the hospital for respiratory and cardiovascular symptoms, and contributing to heart attacks and deaths. Particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into your lungs, and some may even enter the bloodstream. • Fine particles ($PM_{2.5}$) are the main cause of reduced visibility (haze) in parts of the United States, including many national parks and wilderness areas.
Nitrogen Dioxide	• Breathing air with a high concentration of NO_2 can irritate airways in the human respiratory system. Such exposures over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms. Longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly are generally at greater risk for the health effects of NO_2. • NO_2, along with other oxides of nitrogen (NO_X), reacts with other chemicals in the air to form both particulate matter and ozone. Both of these are also harmful when inhaled due to effects on the respiratory system.

SOURCES: CARB, 2017; USEPA, 2022a; USEPA, 2022b; USEPA, 2022c; USEPA, 2022d.

Large dust particles (diameter greater than 10 microns) settle out rapidly and are easily filtered by human breathing passages. This large dust is of more concern as a soiling nuisance rather than a health hazard. The remaining fine particulate matter, PM_{10} and $PM_{2.5}$, are a health concern particularly at levels above the federal and state ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) has greater effects on health because these particles are small enough to be able to penetrate to the deepest parts of the lungs.

A large body of scientific evidence indicates that both long-term and short-term exposure to $PM_{2.5}$ can cause a wide range of health effects (e.g., aggravating asthma and bronchitis, causing visits to the hospital for respiratory and cardiovascular symptoms, and contributing to heart attacks and deaths). According to CARB, both PM_{10} and $PM_{2.5}$ can be inhaled, with some depositing throughout the airways. PM_{10} is more likely to deposit on the surfaces of the larger airways of the upper region of the lung while $PM_{2.5}$ is more likely to travel into and deposit on the surface of the deeper parts of the lung, which can induce tissue damage, and lung inflammation (CARB, 2017). Short-term (up to 24 hours duration) exposure to PM_{10} has been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits. The effects of long-term (months or years) exposure to PM_{10} are less clear, although studies suggest a link between long-term PM_{10} exposure and respiratory mortality and the International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer at certain exposures (IARC, 2015). Short-term exposure to $PM_{2.5}$ has been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days and long-term exposure to $PM_{2.5}$ has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children. According to CARB, populations most likely to experience adverse health effects with exposure to PM_{10} and $PM_{2.5}$ include older adults with chronic heart or lung disease, children, and asthmatics. Children and infants are susceptible to harm from inhaling pollutants such as PM_{10} and $PM_{2.5}$ compared to healthy adults because they inhale more air per pound of body weight than adults, spend more time outdoors, and have developing immune systems (CARB, 2017).

Nitrogen Dioxide

NO_2 is a reddish-brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels.

According to the United States EPA, NO_2 can potentially irritate airways in the human respiratory system (USEPA, 2016). Short-term exposures can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms and longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. According to CARB, controlled human exposure studies show that NO_2 exposure can intensify responses to allergens in allergic asthmatics. In addition, a number of epidemiological studies have demonstrated associations between NO_2 exposure and premature death, cardiopulmonary effects, decreased lung function growth in children, respiratory symptoms, emergency room visits for asthma, and intensified allergic responses. Infants and children are particularly at risk from exposure to NO_2 because they have disproportionately higher exposure to NO_2 than adults due to their greater breathing rate for their body weight and their typically greater outdoor exposure duration while in adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease. CARB states that much of the information on distribution in air, human exposure and dose, and health effects is specifically for NO_2 and there is only limited information for nitric oxide and NO_X, as well as large uncertainty in relating health effects to nitric oxide or NO_X exposure (CARB, 2019a).

Other Criteria Air Pollutants

Other criteria air pollutants include SO_2 and lead, which are not air pollutants of concern in the SVAB. SO_2 is a combustion product of sulfur or sulfur-containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of particulate matter, atmospheric sulfate, and atmospheric sulfuric acid formation that could precipitate downwind as acid rain. The maximum SO_2 concentrations recorded in the project vicinity are well below federal and state standards.

Leaded gasoline (phased out in the United States beginning in 1973), lead-based paint (on older houses and cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which puts children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California.

Toxic Air Contaminants

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances and may be emitted from a variety of common sources including gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations. TACs of concern include diesel particulate matter (DPM) and asbestos.

Diesel Particulate Matter

The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways and rail lines with diesel locomotive operations.

CARB identified DPM as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans. It is estimated that about 70 percent of total known cancer risk related to air toxics in California is attributable to DPM. More than 90 percent of DPM is less than 1 μm in diameter and thus is a subset of $PM_{2.5}$; therefore, DPM also contributes to the same non-cancer health effects as $PM_{2.5}$ exposure. These include aggravating asthma and bronchitis, causing visits to the hospital for respiratory and cardiovascular symptoms, and contributing to heart attacks and deaths. DPM may also facilitate development of new allergies; a clinical study of human subjects has shown that diesel exhaust particles, in combination with potential allergens, may be able to produce new allergies that didn’t previously exist (CARB, 2019b).

Regulation of diesel engines and fuels has decreased DPM levels by 68 percent since 1990. Furthermore, CARB estimates that emissions of DPM in 2035 will be less than half those in 2010, even with increasing vehicle miles traveled (CARB, 2016). Nonetheless, based on 2012 estimates of statewide exposure, DPM is estimated to increase statewide cancer risk by 520 cancers per million residents exposed over a lifetime.

Asbestos

Asbestos is a fibrous mineral and used as a processed component of building materials. Because asbestos has been proven to cause serious adverse health effects, including asbestosis and lung cancer, it is strictly regulated based on its natural widespread occurrence and its use as a building material. Exposure to asbestos fibers may result in health issues such as lung cancer, mesothelioma (a rare cancer of the thin membranes lining the lungs, chest and abdominal cavity), and asbestosis (a non-cancerous lung disease that causes scarring of the lungs) (CARB, 2024). When building materials containing asbestos are disturbed, asbestos fibers may be released. Asbestos is also naturally occurring in ultramafic rock (a rock type commonly found in California), but its occurrence at the project site has a low probability (DOC, 2000). See Section 3.11, *Hazards and Hazardous Materials* for further discussion of asbestos.

Existing Ambient Air Quality

The FWTP and SRWTP project areas are shown on Figures 2-2 and 2-3, respectively, in Chapter 2, *Project Description*. The FWTP project area, including the approximately 34-acre FWTP site, is approximately 5 miles east from the SRWTP project area that includes the 50-acre SRWTP site. Nearby ambient air quality monitoring stations that are assumed to be representative of the ambient air for the project areas are located in the Del Paso Manor neighborhood and at 1309 T Street. The Del Paso Manor neighborhood monitor measures and records concentrations of CO and is located approximately 4.3 miles northeast of the FWTP. The T Street monitor measures and records concentrations of O_3, PM_{10}, and $PM_{2.5}$, and is located approximately 1.8 miles southeast of the SRWTP. **Table 3.4-2** presents a 3-year summary of air pollutant concentration data collected at these monitoring stations for CO, O_3, PM_{10}, and $PM_{2.5}$, as well as the number of days the applicable standards were exceeded during the given year.

As shown in Table 3.4-2, O_3 levels in the vicinity of proposed project facilities have resulted in several violations of ambient air quality standards between 2020 and 2022. Concentrations of O_3 in the project vicinity exceeded the 1-hour state standard twice and exceeded the 8-hour national standards seven times during the past 3 years.

Ambient air quality monitoring data for PM_{10} in the project areas indicate that the 24-hour standard was exceeded four times in 2020. Regarding $PM_{2.5}$, the monitoring station recorded concentrations that exceeded the 24-hour national standard 17 times in 2020 and 4 times in 2021.

There have been no recorded exceedances of the state and national 1-hour and 8-hour CO standards during the 3-year study period.

TABLE 3.4-2
SUMMARY OF AIR QUALITY MONITORING DATA (2020–2022)

Pollutant	National/ State Standard	2020	2021	2022
Ozone – Sacramento-T Street Station				
Maximum 1-hour concentration, ppm	0.09[a]	**0.112**	0.091	**0.106**
Number of days above State 1-Hour standard		1	0	1
Maximum 8-hour concentration, ppm	0.070/0.070	**0.076**	**0.080**	**0.079**
Number of days above National 8-Hour standard		3	1	3
Number of days above State 8-Hour standard		*	*	*
Respirable Particulate Matter (PM_{10}) – T Street Station				
Annual average concentration, μg/m^3	20a	**31.2**	**23.5**	**21.0**
Maximum 24-Hour concentration (national/state), μg/m^3	150/50	**298.7/292.8**	**132.6**/142.6	60.2/61.3
Estimated number of days above National 24-Hour standard[c]		**4**	0	0
Estimated number of days above State 24-Hour standard[c]		**59**	**13.3**	**6.1**
Fine Particulate Matter ($PM_{2.5}$) – T Street Station				
Annual average concentration, μg/m^3	12.0/12.0	**13.1**	9.3	8.5
Maximum 24-Hour concentration, μg/m^3	35[b]	**111.0**	**89.1**	33.1
Estimated number of days above National 24-Hour standard[c]		17.1	4.0	0
Carbon Monoxide (CO) – Del Paso Manor Station				
Maximum 8-Hour concentration, ppm	9/9.0	2.1	1.1	*
Number of days above National or State 8-hour standard		0	0	0
Maximum 1-Hour concentration, ppm	35/20	2.2	1.3	*
Number of days above National or State 1-hour standard		0	0	0

NOTES: ppm = parts per million; μg/m^3 = micrograms per cubic meter; * = insufficient data.

Bold values are in excess of applicable standard.

a State standard, not to be exceeded.
b National standard, not to be exceeded.
c Particulate matter sampling schedule of 1 out of every 6 days, for a total of approximately 60 samples per year. Estimated days exceeded mathematically estimates of how many days concentrations would have been greater than the level of the standard had each day been monitored.

SOURCES: CARB, 2023b; USEPA, 2023.

Odors

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor and recognition only occurs with an alteration in intensity. The occurrence and severity of odor impacts depend on the nature, frequency, and the intensity of the source; wind speed and direction; and the sensitivity of receptors. Examples of common land use types that typically generate significant odor impacts include, but are not limited to wastewater treatment plants, sanitary landfills, composting/green waste facilities, rendering plants, and food packaging plants (SMAQMD, 2016). While the operation of wastewater treatment plants are considered to be a source of odors, water treatment plants like the FWTP and SRWTP are not typically a common source of operational odors.

Sensitive Receptors

Air quality does not affect individuals or groups within the population in the same way, and some groups are more sensitive to adverse health effects caused by exposure to air pollutants than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, those with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases.

Land uses such as schools, children’s day care centers, hospitals, and nursing and convalescent homes are considered to be the most sensitive to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Parks and playgrounds are considered moderately sensitive to poor air quality because persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality; however, exposure times are generally far shorter in parks and playgrounds than in residential locations and schools, which typically reduces the overall health risk associated with exposure to pollutants. Residential areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions. Workers are not considered sensitive receptors because all employers are required to follow regulations set forth by the Occupation Safety and Health Administration (OSHA) to ensure the health and well-being of their employees.

FWTP Project Area

The nearest sensitive land uses to the FWTP include College Town Apartments, located approximately 70 feet east of the FWTP property boundary, and the Sacramento State Hornet Commons apartments, located approximately 60 feet south of the FWTP property boundary, across College Town Drive.

SRWTP Project Area

The nearest existing sensitive receptors to the SRWTP are residences located over 1,500 feet to the north of the construction area. While not an existing use, the future Kaiser Permanente Medical Center, to be constructed south of the SRWTP property across Summit Tunnel Avenue, is estimated to be complete and operational by 2030. The routes and footprints of the proposed water transmission pipelines to distribute treated water from the SRWTP to the City’s service area are not known at this time, and therefore the nearest sensitive receptors are unable to be located until more information is provided.

3.4.3 Regulatory Setting

Federal

Criteria Air Pollutants

The United States EPA is required by the federal Clean Air Act (CAA) to identify and establish NAAQS to protect public health and the environment. The federal CAA identifies two types of NAAQS: primary and secondary. Primary standards provide public health protection, including protecting the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The United States EPA has set NAAQS for six principal pollutants, called criteria air pollutants. These criteria air pollutants include O_3, NO_2, SO_2, CO, PM, and lead. The original indicator for PM was total suspended particulates; currently the standards are in terms of PM_{10} and $PM_{2.5}$. **Table 3.4-3** presents the current NAAQS (and state ambient air quality standards) and provides a brief discussion of the related health effects and principal sources for each pollutant.

TABLE 3.4-3
STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	State Standard	National Standard
Ozone	1 hour	0.09 ppm	---
	8 hour	0.070 ppm	0.070 ppm
Carbon Monoxide	1 hour	20 ppm	35 ppm
	8 hour1	9.0 ppm	9 ppm
Nitrogen Dioxide	1 hour	0.18 ppm	100 ppb
	Annual Avg.	0.030 ppm	0.053 ppm
Sulfur Dioxide	1 hour	0.25 ppm	75 ppb
	3 hour	---	0.5 ppm [2]
	24 hour	0.04 ppm	0.14 ppm
	Annual Avg.	---	0.030 ppm
Respirable Particulate Matter (PM_{10})	24 hour	50 $\mu g/m^3$	150 $\mu g/m^3$
	Annual Avg.	20 $\mu g/m^3$	---
Fine Particulate Matter ($PM_{2.5}$)	24 hour	---	35 $\mu g/m^3$
	Annual Avg.	12 $\mu g/m^3$	12.0 $\mu g/m^3$
Lead	Monthly Ave.	1.5 $\mu g/m^3$	---
	Quarterly	---	1.5 $\mu g/m^3$
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard
Sulfates	24 hour	25 $\mu g/m^3$	No National Standard
Visibility Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard
Vinyl chloride	24 hour	0.01 ppm	No National Standard

NOTES: ppb = parts per billion; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

1. A more stringent 8-hour carbon monoxide state standard exists around Lake Tahoe (6 ppm).
2. Secondary national standard.

SOURCE: CARB, 2023a

The United States EPA classifies air basins (or portions thereof) as “attainment” or “nonattainment” for each criteria air pollutant, based on whether or not the NAAQS had been achieved. The classification is determined by comparing actual monitoring data with the standards. “Unclassified” is defined by the federal CAA as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant. Furthermore, an area may be designated attainment with a maintenance plan (also known as a maintenance area), which means that an area was previously nonattainment for a criteria air pollutant but has since been redesignated as attainment. These areas have demonstrated through modeling that they have sufficient controls in place to meet and maintain the NAAQS.

The Sacramento region’s attainment status for the criteria air pollutants are summarized in **Table 3.4-4** (state designations are also provided). The Sacramento region is considered a federal nonattainment area for O_3 and $PM_{2.5}$ and as an attainment-maintenance area for the federal CO and PM_{10} standards.

TABLE 3.4-4
SACRAMENTO COUNTY ATTAINMENT STATUS

Pollutant and Averaging Time	Designation/Classification	
	State Standards	Federal Standards
Ozone (1-hour)	Nonattainment	No Federal Standard
Ozone (8-hour)	Nonattainment/Serious	Nonattainment/Severe
Carbon Monoxide	Attainment	Attainment/Maintenance
Nitrogen Dioxide	Attainment	Unclassified/Attainment
Sulfur Dioxide	Attainment	Unclassified
Respirable Particulate Matter (PM_{10})	Nonattainment	Attainment/Maintenance*
Fine Particulate Matter ($PM_{2.5}$)	Attainment	Nonattainment/Moderate
Lead	Attainment	Attainment
Visibility Reducing Particles	Unclassified	No Federal Standard
Sulfates	Attainment	No Federal Standard
Hydrogen Sulfide	Unclassified	No Federal Standard
Vinyl Chloride	Unclassified	No Federal Standard

NOTES:

CARB makes area designations for ten criteria pollutants (O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, lead, visibility reducing particles, sulfates, and hydrogen sulfide. CARB does not designate areas according to the vinyl chloride standard.

* Effective October 28, 2013, the United States EPA formally re-designated Sacramento County as attainment for the federal PM_{10} standard.

SOURCES: CARB, 2022

The federal CAA requires each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The SIP is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The United States EPA has responsibility to review all state SIPs to determine if they conform to the mandates of the federal CAA and will achieve air quality goals when implemented.

Hazardous Air Pollutants

Federal laws use the term "Hazardous Air Pollutants" (HAPs) to refer to the same types of compounds that are referred to as TACs under State law. Currently, 187 substances are regulated as HAPs. The federal CAA requires the United States EPA to identify National Emission Standards for Hazardous Air Pollutants (NESHAPs) to protect public health and welfare.

State

Criteria Air Pollutants

At the state level, the CARB oversees California air quality policies and regulations. The California Legislature has adopted its own air quality standards (California Ambient Air Quality Standards, or CAAQS) as shown in Table 3.4-3 (CARB, 2023a). Most of the California ambient standards tend to be at least as protective as NAAQS and are often more stringent.

In 1988, California passed the California Clean Air Act (CCAA) (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or nonattainment, but based on state ambient air quality standards rather than the federal standards. The CCAA requires each air district in which state air quality standards are exceeded to prepare a plan that documents reasonable progress towards attainment. If an air basin (or portion thereof) exceeds the CAAQS for a particular criteria air pollutant, it is considered to be nonattainment of that criteria air pollutant until the area can demonstrate compliance. As indicated in Table 3.4-4, Sacramento County is classified as nonattainment and serious nonattainment for the 8-hour and 1-hour state ozone standards, respectively, and is nonattainment for the 24-hour and annual state PM_{10} standard.

Toxic Air Contaminants

The State Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807. A total of 243 substances have been designated TACs under California law; they include the 187 (federal) HAPs adopted in accordance with AB 2728. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify, quantify, and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions.

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Further regulations of diesel emissions by the CARB include the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Offroad Diesel Vehicle Regulation, and the New Offroad Compression Ignition Diesel Engines and Equipment Program. All of these regulations and programs have timetables by which manufacturers must comply, and existing operators must upgrade their diesel-powered equipment.

In 2004, CARB adopted a measure to limit the idling of diesel-fueled commercial motor vehicles. Heavy-duty diesel vehicles with a Gross Vehicle Weight Rating of 10,000 pounds or heavier are prohibited from idling for more than 5 minutes within California's borders. Exceptions to the rule apply for certain circumstances.

Local

Sacramento Metropolitan Air Quality Management District

The SMAQMD is the regional agency responsible for air quality regulation within Sacramento County. The SMAQMD regulates air quality through its planning and review activities and has permit authority over most types of stationary emission sources and can require operators of stationary sources to obtain permits, can impose emission limits, set fuel or material specifications, and establish operational limits to reduce air emissions. The SMAQMD regulates new or modified stationary sources of TACs.

All areas designated as nonattainment are required to prepare plans showing how the area would meet the air quality standards by its attainment dates. The following are the most recent air quality plans applicable to the area of the proposed projects:

- Sacramento Regional 2008 8-Hour Ozone Attainment and Reasonable Further Progress Plan (SMAQMD, 2017)[2]
- SMAQMD's Triennial Report and Air Quality Plan Revision (SMAQMD, 2015)
- PM_{10} Implementation/Maintenance Plan and Redesignation Request for Sacramento County (SMAQMD, 2010)
- $PM_{2.5}$ Implementation/Maintenance Plan and Redesignation Request (SMAQMD, 2013)
- 2004 Revision to the California State Implementation Plan for CO (SMAQMD, 2004)

The construction phases of the project would be subject to the applicable SMAQMD regulations with regards to construction and stationary equipment, particulate matter generation, architectural coatings, and paving materials. Equipment used during construction would be subject to the applicable requirements of the SMAQMD, including Regulation 2 (Permits), Rule 201 (General Permit Requirements); and Regulation 4 (Prohibitory Rules), Rule 401 (Ringelmann Chart/ Opacity), Rule 402 (Nuisance), Rule 403 (Fugitive Dust), Rule 404 (Particulate Matter), Rule 405 (Dust and Condensed Fumes), Rule 420 (Sulfur Content of Fuels), Rule 442 (Architectural Coatings), Rule 453 (Cutback and Emulsified Asphalt Paving Materials).

Furthermore, the demolition or renovation of any existing buildings and structures would be subject to Regulation 9, Rule 902 (Asbestos). Rule 902 is intended to limit asbestos emissions from demolition or renovation of structures and the associated disturbance of regulated asbestos-containing material generated or handled during these activities. This rule addresses the National Emissions Standards for Asbestos and adds requirements for mitigation.

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2 The Sacramento Regional 2015 NAAQS 8-Hour Ozone Attainment & Reasonable Further Progress Plan was published August 22, 2023. Public hearings will be held in September through October 2023 to consider adoption of the plan. The Sacramento Federal Nonattainment Area air districts will host public hearings to consider this Plan. After the air districts adopt the Plan, it will be submitted to CARB for final adoption. The Plan will be subsequently submitted to United States EPA for final reviews and approval. For more information, see: https://www.airquality.org/air-quality-health/air-quality-plans/2015-o3-naaqs-sip.

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies that are applicable to the evaluation of air quality effects of the proposed project are provided in **Table 3.4-5**.

TABLE 3.4-5
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – AIR QUALITY

Element	Goals and Policies
Environmental Resources	Goal ERC-4: Policies ERC-4.5, ERC-4.7

SOURCES: City of Sacramento 2024

3.4.4 Impacts and Mitigation Measures

Method of the Analysis

The following analysis is based on guidance from the SMAQMD provided in its Guide to Air Quality Assessment in Sacramento County. The air district's guidelines identify different approaches to analyzing plans versus projects. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Project-related air quality impacts fall into two categories: short-term impacts due to construction, and long-term impacts due to project operation. As presented in Table 2-7 in Chapter 2, *Project Description*, construction activities in the FWTP project area (improvements at the FWTP and existing utility upgrades) would occur over a total period of approximately 5 years (July 2026 through July 2031). Construction activities in the SRWTP project area (improvements at the SRWTP, existing utility upgrades, Sacramento River water intakes, and potable water transmission pipelines) would occur in two phases. The initial phase would occur over a total period of approximately 10 years (January 2027 through July 2037), and the buildout phase would occur over approximately 10 years (2040 through 2050). For each project component, there would be a period of intensive construction, using heavy equipment, followed by several years of minimal activity to reach anticipated completion. For a conservative estimate of emissions, the most intensive construction years were modeled, and these periods are also presented in Table 2-7. Construction at the FWTP and the SRWTP would be sequenced in a manner that would minimize facility shutdowns, maintain the integrity of the treatment process, and ensure water demands in the system will continue to be met. Therefore, the level of activity and equipment use would not be continuous for the duration of construction at each site. During construction of each project component, activities would generate criteria air pollutants primarily from the combustion of fuel in construction equipment and vehicle trips associated with worker commute, material delivery and hauling. Once each component is operational, emissions would result primarily from motor vehicle trips generated by worker trips to and from the various component sites.

Construction Impacts

The emissions generated from construction activities include:

- Exhaust emissions from fuel combustion for mobile heavy-duty diesel and gasoline-powered equipment (including construction equipment, haul trucks, and employee vehicles).
- PM from soil disturbance and site preparation and grading activity (also known as fugitive dust).

Construction emissions were estimated using methodology consistent with the California Emissions Estimator Model (CalEEMod) version 2022.1.1.20 and Emissions Factor model (EMFAC) 2021. Project-specific inputs for each component included site area, demolition area, fill and off haul volumes, and starting year and duration of construction. In addition, equipment types, quantities, and total annual hours anticipated to be used were provided, along with the number of workers, vendors, and haul trips (see Tables 2-3 through 2-6 in Chapter 2). An average of 9 hours per day of equipment use was applied based on the anticipated project construction schedules. Total annual hours of use for equipment associated with new water intake was approximated based on duration of construction and level of activity required for that component.

Operation and Maintenance Impacts

Once improvements are completed, operation and maintenance (O&M) activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). O&M activities for all other project components would be completed under existing maintenance programs. As there would be minimal activity in the operational lifetime of each project component, air pollutant emissions resulting from operations of the project components have not been quantified.

Health Risk Assessment

The proposed project would result in a short-term increase of TAC emissions over the 10 years of construction of the various project components. The main TAC of concern for the proposed project is diesel exhaust, a complex mixture of chemicals and particulate matter identified by the CARB as a TAC with potential cancer and chronic non-cancer effects. As DPM is the TAC emitted in the largest quantity, it is used as a surrogate for other TACs within diesel exhaust. The operation of off-road construction equipment (e.g., excavators, loaders, cranes, graders) and on-road diesel-fueled heavy-duty vehicles would emit DPM.

Due to the low levels of emissions from construction equipment and operational activities, the short durations of equipment used during construction, and the distance from project components to sensitive receptors, the potential health risk increases are discussed qualitatively to assess the impacts of DPM emissions generated by construction equipment and vehicles associated with the proposed project on existing sensitive receptors located in the vicinity of the various construction areas.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Conflict with or obstruct implementation of an applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The SMAQMD has established mass emissions thresholds for O_3 precursors (NO_X and ROG), PM_{10}, and $PM_{2.5}$ because the Sacramento region does not meet the state and federal ozone and state particulate matter (PM_{10} and $PM_{2.5}$) ambient air quality standards. Emissions of O_3 precursors or PM from an individual project could further contribute to an existing exceedance of the ozone standards. Construction activities are not likely to generate substantial quantities of CO because most construction equipment is diesel-powered and therefore has much lower CO emissions than gasoline vehicles (CO emissions are predominantly a result of gasoline fuel combustion).

Specifically, the project would have a potentially significant adverse impact on air quality if emissions would result in:

- Short-term (construction) emissions of NO_X above 85 maximum pounds per day (ppd);
- Short-term (construction) emissions of PM10 above zero ppd without implementation of all best management practices (BMPs) and above 80 maximum ppd or 14.6 tons per year (tpy) after implementation of all BMPs;
- Short-term (construction) emissions of PM2.5 above zero ppd without implementation of all BMPs and above 82 maximum ppd or 15.0 tpy after implementation of all BMPs;
- Long-term (operational) emissions of NO_X or ROG above 65 maximum ppd;
- Long-term (operational) emissions of PM10 above zero ppd without implementation of all BMPs and above 80 maximum ppd or 14.6 tpy after implementation of all BMPs; or
- Long-term (operational) emissions of PM2.5 above zero ppd without implementation of all BMPs and above 82 ppd or 15.0 tpy after implementation of all BMPs.

Impacts and Mitigation Measures

Table 3.4-6 summarizes the impact conclusions presented in this section.

TABLE 3.4-6
SUMMARY OF IMPACT CONCLUSIONS – AIR QUALITY

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.4-1: Construction of the proposed project could conflict with or obstruct implementation of an applicable air quality plan.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.4-2: Operation and maintenance of the proposed project conflict with or obstruct implementation of an applicable air quality plan.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.4-3: Construction of the proposed project could **r**esult in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.4-4: Operation and maintenance of the proposed project could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.4-5: Construction of the proposed project could expose sensitive receptors to substantial pollutant concentrations.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.4-6: Operation and maintenance of the proposed project could expose sensitive receptors to substantial pollutant concentrations.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.4-7: Construction of the proposed project could result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.4-8: Operation and maintenance of the proposed project could result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant
LSM: Less than Significant with Mitigation

Impact 3.4-1: Construction of the proposed project could conflict with or obstruct implementation of an applicable air quality plan.

All Project Components

Construction of proposed project components would require site preparation, use of equipment, and other associated activities that would result in temporary emissions that are regulated by applicable air quality plans. The Sacramento Regional 2008 8-Hour Ozone Attainment and Reasonable Further Progress Plan (SMAQMD, 2017) addresses attainment of the federal 8-hour ozone standard, while the Triennial Report and Air Quality Plan Revision (SMAQMD, 2015) address attainment of the California 1-hour and 8-hour ozone standards. These are the latest plans issued by the SMAQMD, and they incorporate land use assumptions and travel demand modeling from the Sacramento Area Council of Governments.

According to the SMAQMD, land use development projects that exceed emissions of 85 ppd of NO_X or 65 ppd of ROG during construction would have the potential to obstruct the success of the regional ozone attainment plans and would therefore be considered significant and require mitigation. The proposed project would be required to comply with all SMAQMD rules and regulations for construction, which would be included in construction plans and ensured as a condition of approval. The applicable rules and regulations would include, but would not be limited to, the following:

- Rule 403 related to Fugitive Dust
- Rule 404 related to Particulate Matter
- Rule 442 related to Architectural Coatings
- Rule 453 related to Cutback and Emulsified Asphalt Paving Materials
- Rule 460 related to Adhesives and Sealants

Activities associated with construction of proposed project components would involve earth-disturbing activities (e.g., soil excavation, trenching, clearing and grubbing of vegetated areas). Construction activities associated with treatment plant improvements and existing utility upgrades at both treatment plants would also include demolition of existing structures. These activities would result in temporary fugitive dust emissions. To apply the PM_{10} and $PM_{2.5}$ thresholds presented in Thresholds of Significance, projects must implement all feasible SMAQMD Best Available Control Technologies and BMPs related to dust control. In the case of construction activities, projects are required to implement the SMAQMD's identified Basic Construction Emissions Control Practices, which are considered by the SMAQMD to be the applicable construction BMPs. The control of fugitive dust during construction is required by SMAQMD Rule 403 and enforced by SMAQMD staff which would minimize fugitive dust emissions to less-than-significant levels.

Emissions from construction activities associated with each project component were estimated for each year of intensive construction activity (refer to Impact 3.4-3, Table 3.4-7 to Table 3.4-12). The total emissions generated from construction activities of the proposed project would exceed the SMAQMD threshold for NOx emissions in construction years 2027 and 2028, which are generated primarily by the construction activities at the SRWTP. PM_{10} and $PM_{2.5}$ were modeled assuming incorporation of SMAQD BMPs during construction to help reduce fugitive dust emissions. However, if those BMPs are not implemented, emissions could exceed the thresholds. Consequently, construction activities would be considered to generate emissions that could conflict with or obstruct implementation of the SMAQMD's air quality plans and this impact would be **potentially significant**.

Mitigation Measures

> **Mitigation Measure 3.4-1(a) (TPI-SRWTP, EUU–SRWTP):** Prior to the initiation of construction at SRWTP, including existing utility upgrades, contractor shall ensure that all heavy-duty off-road diesel-powered equipment (including owned, leased, and subcontractor equipment) shall be CARB Tier 4 Final or cleaner. These requirements shall also be included on improvement plans and submitted for review and approval by SMAQMD.

Mitigation Measure 3.4-1(b) (ALL): The following Basic Construction Emissions Control Practices, required by SMAQMD Rule 403 and enforced by SMAQMD staff, shall be implemented to minimize fugitive dust emissions during construction activities:

i. Water all exposed surfaces two times daily. Exposed surfaces include, but are not limited to soil piles, graded areas, unpaved parking areas, staging areas, and access roads;

ii. Cover or maintain at least 2 feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways should be covered;

iii. Use wet power vacuum street sweepers to remove any visible track-out mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited;

iv. Limit vehicle speeds on unpaved roads to 15 miles per hour;

v. All roadways, driveways, sidewalks, parking lots to be paved should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used;

vi. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes [California Code of Regulations, Title 13, Sections 2449(d)(3) and 2485]. Provide clear signage that posts this requirement for workers at the entrances to the site;[3]

vii. Provide current certificate(s) of compliance for CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation [California Code of Regulations, Title 13, Sections 2449 and 2449.1];[4] and

viii. Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.

Significance After Mitigation: Implementation of Mitigation Measure 3.4-1(a) would reduce SRWTP construction emissions of NOx to be below SMAQMD thresholds for construction in 2027 and 2028. Implementation of Mitigation Measure 3.4-1(b) would reduce PM_{10} and $PM_{2.5}$ emissions by ensuring compliance with the requirements of SMAQMD Rule 403. Therefore, with implementation of Mitigation Measure 3.4-1(a) and (b), the proposed project would not conflict with or obstruct the implementation of the SMAQMD's air quality and this impact would be **less than significant with mitigation**.

Impact 3.4-2: Operation and maintenance of the proposed project could conflict with or obstruct implementation of an applicable air quality plan.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the

3 This BMP for idling specifically applies to diesel-powered equipment. Non-diesel vehicles are not required to limit idling time.

4 This BMP specifically applies to diesel-powered equipment.

water treatment plants and new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). In addition, there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions).

Emissions would primarily be generated from employee vehicle trips to and from the treatment plants for intermittent O&M activities. These trips would occur infrequently and would have negligible emissions and would not conflict or obstruct the implementation of an applicable air quality plan. At the Sacramento River water intakes, SRWTP employees, including the additional employees discussed above, would inspect and maintain the existing water intake, new water intake, pump stations, and conveyance pipelines. As maintenance trips already occur for the existing intake, additional truck trips for maintenance of the new intake are not anticipated. Existing SRWTP employees who perform daily inspections and maintenance at the existing water intake would also inspect and maintain the new water intake, pump stations and conveyance pipelines. Therefore, no additional full-time employees or truck trips would be required. No additional emergency generators are required for O&M activities at either the existing or proposed new intake.

O&M activities for all other project components would be completed under existing maintenance programs. The proposed new upgraded storm drain pipelines would be operated and maintained the same as the existing storm drain pipelines. Similarly, the replacement electrical service lines would also be operated and maintained as the existing service lines are under Sacramento Municipal Utilities District's (SMUD's) maintenance program. O&M for the proposed potable water transmission pipelines would be performed as part of ongoing City programs and would remain the same as existing conditions.

Because of the limited increase in activities associated with O&M, such activities would result in negligible increases in emissions and would not be anticipated to result in a conflict with or obstruct the implementation of an applicable air quality plan and this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.4-3: Construction of the proposed project could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.

All Project Components

Emissions from construction activities associated with each project component were estimated for each year of intensive construction activity (see Chapter 2, *Project Description,* Table 2-7). Construction of FWTP improvements and existing utility upgrades would occur over an approximately 2-year period between July 2026 through July 2028. Initial phase construction of SRWTP improvements and existing utility upgrades would occur over an approximately 4-year period (January 2027 through January 2031). Initial phase construction at the Sacramento River water intakes would occur over an approximately 4.5-year period (January 2031 through July

2035). Initial phase construction activities associated with the installation of the potable water transmission mains would occur over an approximately 3-year period (July 2032 through July 2035). The buildout phase for additional improvements at the SRWTP and new water intake pump station would occur intermittently over an approximately 10-year period (2040 through 2050) with intensive construction anticipated to occur over the first 2.5 years.

Results of the construction emissions modeling for each separate component are presented in **Tables 3.4-7** through **3.4-12** for informational purposes. Total unmitigated and mitigated emissions are summarized in **Table 3.4-13** and **Table 3.4-14** respectively and compared to the SMAQMD thresholds of significance. SMAQMD does not have a significance threshold for ROG emissions from construction, and therefore ROG emissions are shown for informational purposes only. These emissions incorporate the reduction in PM_{10} and $PM_{2.5}$ from the quantifiable measures required by SMAQMD BMPs during construction to help reduce fugitive dust emissions. As shown in the table, emissions for all years of construction activities at the FWTP, Sacramento River water intake, and the potable water transmission pipeline would be under applicable SMAQMD thresholds. However, construction emissions from the SRWTP improvements and associated existing utility upgrades at SRWTP would exceed the NOx SMAQMD threshold in the years 2027 and 2028 and the impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.4-2(a) (TPI-SRWTP, EUU– SRWTP): Implement Mitigation Measure 3.4-1(a).

Mitigation Measure 3.4-2(b) (ALL): Implement Mitigation Measure 3.4-1(b).

TABLE 3.4-7
FWTP PLANT IMPROVEMENTS AND UTILITY UPGRADES EMISSIONS BY YEAR

Year	ROG (ppd)	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2026	1.69	15.41	3.47	0.89	0.48	0.11
2027	3.23	22.75	4.05	1.18	0.52	0.15
2028	1.57	10.40	3.65	0.81	0.47	0.10

SOURCE: ESA, 2024 (see Appendix B)

TABLE 3.4-8
SRWTP PLANT IMPROVEMENTS AND UTILITY UPGRADES UNMITIGATED EMISSIONS BY YEAR

Year	ROG (ppd)	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2027	13.34	91.05	8.77	3.73	1.14	0.49
2028	13.10	85.25	8.60	3.56	1.12	0.46
2029	13.00	81.25	8.42	3.43	1.09	0.45
2030	12.80	77.80	8.33	3.35	1.08	0.44
2031	1.12	6.57	5.85	1.05	0.76	0.14

SOURCE: ESA, 2023 (see Appendix B)

TABLE 3.4-9
SRWTP PLANT IMPROVEMENTS AND UTILITY UPGRADES MITIGATED EMISSIONS BY YEAR

Year	ROG (ppd)	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2027	4.23	51.72	6.43	1.65	0.84	0.21
2028	4.21	51.19	6.43	1.64	0.84	0.21
2029	4.22	51.08	6.43	1.64	0.84	0.21
2030	4.22	50.77	6.43	1.64	0.84	0.21
2031	0.37	4.45	5.68	0.90	0.76	0.14

SOURCE: ESA, 2024 (see Appendix B)

TABLE 3.4-10
SRWTP BUILDOUT CONSTRUCTION EMISSIONS BY YEAR

Year	ROG (ppd)	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2040	2.95	15.34	2.96	0.86	0.38	0.11
2041	2.94	15.06	2.94	0.84	0.38	0.11
2042	1.21	6.13	2.63	0.55	0.34	0.07

SOURCE: ESA, 2024 (see Appendix B)

TABLE 3.4-11
SACRAMENTO RIVER WATER INTAKE CONSTRUCTION EMISSIONS BY YEAR

Year	ROG (ppd)	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2031	1.68	12.19	0.99	0.47	0.13	0.06
2032	1.65	11.77	0.98	0.46	0.13	0.06
2033	1.62	11.30	0.96	0.44	0.12	0.06
2034	1.61	11.03	0.95	0.43	0.12	0.06
2035	0.79	5.34	0.75	0.25	0.10	0.03

SOURCE: ESA, 2024 (see Appendix B)

TABLE 3.4-12
POTABLE WATER TRANSMISSION PIPELINE CONSTRUCTION EMISSIONS BY YEAR

Year	ROG (ppd)	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2032	0.05	0.32	0.29	0.05	0.41	0.35
2033	0.07	0.47	0.29	0.06	0.40	0.34
2034	0.07	0.44	0.29	0.05	0.21	0.16
2035	0.03	0.21	0.29	0.05	0.04	0.01

SOURCE: ESA, 2024 (see Appendix B)

TABLE 3.4-13
PROPOSED PROJECT CONSTRUCTION UNMITIGATED EMISSIONS BY YEAR

Year	ROG (ppd)	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2026	1.69	15.14	3.74	0.89	0.49	0.12
2027	16.58	**113.80**	12.82	4.91	1.67	0.64
2028	14.67	**95.66**	12.25	4.37	1.59	0.57
2029	13.00	81.25	8.42	3.43	1.09	0.45
2030	12.80	77.80	8.33	3.35	1.08	1.12
2031	2.80	18.76	1.23	0.68	0.16	0.09
2032	2.04	14.20	1.34	0.57	0.17	0.07
2033	2.17	14.90	1.35	0.59	0.18	0.08
2034	2.15	14.44	1.33	0.57	0.17	0.07
2035	1.00	6.69	1.07	0.33	0.14	0.04
2040	2.95	15.34	2.96	0.86	0.38	0.11
2041	2.94	15.06	2.94	0.84	0.38	0.11
2042	1.21	6.13	2.63	0.55	0.34	0.07
SMAQMD Thresholds	N/A	85	80	82	14.6	15.0
Significant?	N/A	**Yes**	No	No	No	No

SOURCE: ESA, 2024 (see Appendix B)

TABLE 3.4-14
PROPOSED PROJECT CONSTRUCTION MITIGATED EMISSIONS BY YEAR

Year	ROG (ppd)	NO_X (ppd)	PM_{10} (ppd)	$PM_{2.5}$ (ppd)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
2026	1.69	15.14	3.74	0.89	0.49	0.12
2027	7.47	74.47	10.48	2.83	1.36	0.37
2028	5.79	61.59	10.08	2.45	1.31	0.32
2029	4.22	51.08	6.43	1.64	0.84	0.21
2030	4.22	50.77	6.43	1.64	0.84	0.90
2031	2.05	16.64	1.06	0.54	0.14	0.07
2032	2.04	14.20	1.34	0.57	0.17	0.07
2033	2.17	14.90	1.35	0.59	0.18	0.08
2034	2.15	14.44	1.33	0.57	0.17	0.07
2035	1.00	6.69	1.07	0.33	0.14	0.04
2040	2.95	15.34	2.96	0.86	0.38	0.11
2041	2.94	15.06	2.94	0.84	0.38	0.11
2042	1.21	6.13	2.63	0.55	0.34	0.07
SMAQMD Thresholds	N/A	85	80	82	14.6	15.0
Significant?	N/A	No	No	No	No	No

SOURCE: ESA, 2024 (see Appendix B)

Significance After Mitigation: Implementation of Mitigation Measure 3.4-1(a) would reduce SRWTP construction emissions of NOx to be below SMAQMD thresholds for construction in 2027 and 2028. Implementation of Mitigation Measure 3.4-1(b) would ensure compliance with the requirements of SMAQMD Rule 403 to reduce fugitive dust emissions. Therefore, with implementation of Mitigation Measures 3.4-1(a) and (b), construction activities would not exceed SMAQMD thresholds and the impact from construction of the proposed project would be **less than significant with mitigation**.

Impact 3.4-4: Operation and maintenance of the proposed project could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.

All Project Components

As described in Impact 3.4-2, once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and new intake would result in additional full-time employees. In addition, there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions). Emissions would primarily be generated from employee vehicle trips to and from the treatment plants for intermittent O&M activities. These trips would occur infrequently and would have negligible emissions and would not conflict or obstruct the implementation of an applicable air quality plan. At the Sacramento River water intakes, SRWTP employees, including the additional employees discussed above, would inspect and maintain the existing water intake, new water intake, pump stations, and conveyance pipelines. As maintenance trips already occur for the existing intake, additional truck trips for maintenance of the new intake are not anticipated. Existing SRWTP employees who perform daily inspections and maintenance at the existing water intake would also inspect and maintain the new water intake, pump stations and conveyance pipelines. Therefore, no additional full-time employees or truck trips would be required. No additional emergency generators are required for O&M activities at either the existing or proposed new intake.

O&M activities for all other project components would be completed under existing maintenance programs. The proposed new upgraded storm drain pipelines would be operated and maintained the same as the existing storm drain pipelines. Similarly, the replacement electrical service lines would also be operated and maintained as the existing service lines are under SMUD’s maintenance program. O&M for the proposed potable water transmission pipelines would be performed as part of ongoing City programs and would remain the same as existing conditions.

Because of the limited increase in activities associated with O&M, such activities would not be anticipated to result in a considerable increase in criteria pollutants that would exceed SMAQMD’s thresholds for operational emissions and this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.4-5: Construction of the proposed project could expose sensitive receptors to substantial pollutant concentrations.

The dose to which receptors are exposed is the primary factor affecting health risk from TACs. Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. According to the California Office of Environmental Health Hazard Assessment (part of the California Environmental Protection Agency), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on 9-year, 30-year, and/or 70-year exposure periods when assessing TACs (such as DPM) that have only cancer or chronic non-cancer health effects. However, such health risk assessments should be limited to the duration of the emissions-producing activities associated with the project, unless the activities occur for less than 6 months. Activities that would last more than 2 months but less than 6 months should be evaluated as if they would last for 6 months. The Office of Environmental Health Hazard Assessment does not recommend assessing cancer risk for projects lasting less than 2 months at the maximum exposed individual resident (OEHHA, 2015).

Land uses sensitive to air pollutants are those where sensitive population groups are located including residences, schools, hospitals, convalescent homes, and other facilities where people spend significant amounts of time.

Treatment Plant Improvements and Existing Utility Upgrades

FWTP

The nearest sensitive receptors to the FWTP are residences located approximately 60 feet south of the FWTP property boundary, across College Town Drive. During construction activities, the use of heavy-duty, diesel-fueled construction equipment would generate TAC emissions in the form of DPM. However, construction activity would be temporary, with the most intensive construction occurring in periods over a 3-year span, and emissions would be minimal as shown in Table 3.4-7. Only 8 percent of the approximately 34-acre FWTP property would be disturbed throughout the duration of construction. The active disturbed area for each phase of construction would rotate around the site rather than remain in the same location for the 3-year period of work. Therefore, no one receptor would be exposed to DPM emissions for the full construction duration. Due to the intermittent duration of construction activity and low levels of emissions, health risk that would result from construction related DPM emissions would be minimal.

SRWTP

The nearest existing sensitive receptors to the SRWTP are residences located over 1,500 feet to the north of the construction area. During construction activities, the use of heavy-duty, diesel-fueled construction equipment would generate TAC emissions in the form of DPM. However, construction activity would be temporary, and emissions would be minimal, as shown in Tables 3.4-8 and 3.4-9. The active disturbed area for each phase of construction would rotate around the site rather than remain in the same location for the 4.5-year period of work. Therefore, no one receptor would be exposed to DPM emissions for the full construction duration. Due to the intermittent duration of construction activity and low levels of emissions, health risk that would result from construction related DPM emissions would be minimal.

As discussed under subsection 3.4.2, *Environmental Setting*, while not an existing use, the future Kaiser Permanente Medical Center, located south of the SRWTP property across Summit Tunnel Avenue, is estimated to be complete and operational by 2030. Construction would still be on-going in the SRWTP project area, including at the water treatment plant and Sacramento River water intakes, after the hospital is operational. Hospitals and healthcare facilities are equipped with advanced filtration systems not just to reduce particulate pollution but also to reduce virus transmission. Hospitals rely on a combination of specialized heating, ventilation, and air conditioning (HVAC) systems and high-efficiency particulate air (HEPA) filters to regulate airflow, and to prevent the spread of viruses and bacteria. Any air entering the hospital is first passed through a series of filters before it is allowed to circulate. These filters reduce the levels of potentially harmful particulates in the air, such as viruses, dust, pollen, and pollution from the outdoor environment (Cairn Technology Ltd., 2022). A short-term indoor exposure of several days or even several weeks is extremely unlikely to cause health risks that would exceed SMAQMD's thresholds. The short duration of inpatient stay combined with the presence of HEPA filters and inoperable windows would result in less-than-significant health risk impacts from DPM and $PM_{2.5}$, whose impacts are primarily chronic and estimated based on exposure durations of 1 year for $PM_{2.5}$ concentration and 30 years for cancer risk.

Sacramento River Water Intakes

During construction of the new water intake, pump station and raw water pipeline, the use of heavy-duty, diesel-fueled construction equipment would generate TAC emissions in the form of DPM. However, construction activity would be temporary, and emissions would be minimal as shown in Table 3.4-10. Due to the temporary nature of the construction, low levels of emissions, and lack of sensitive receptors in the vicinity of the new water intake, pump station and raw water pipeline site, health risk that would result from construction related DPM emissions would be minimal.

Potable Water Transmission Pipelines

Construction of up to 14,000 linear feet of potable water transmission pipelines in the vicinity of the SRWTP would involve many of the same earth-disturbing activities (e.g., soil excavation, trenching, dewatering) and equipment types as for the FWTP and SRWTP improvements. Construction would likely occur in previously distributed areas, and depending on the location of the pipeline, minor vegetation and/or tree removal may be required.

The routes and footprints of the transmission pipelines are not known at this time. However, the type of construction activities for installing them would be similar to other ground disturbing activities associated with other project components and would be subject to compliance with existing regulations and the incorporation of BMPs. Therefore, construction would not expose sensitive receptors to substantial pollutant concentrations.

Impact Conclusion

Due to the temporary nature of the construction, low levels of emissions, and lack of sensitive receptors in the vicinity of the new water intake, pump station and raw water pipeline site, health risk that would result from construction related DPM emissions would be minimal, and impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.4-6: Operation and maintenance of the proposed project could expose sensitive receptors to substantial pollutant concentrations.

All Project Components

As described in Impact 3.4-2, once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and new intake would result in additional full-time employees. In addition, there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions). Emissions would primarily be generated from employee vehicle trips to and from the treatment plants for intermittent O&M activities. These trips would occur infrequently and would have negligible emissions and would not conflict or obstruct the implementation of an applicable air quality plan. At the Sacramento River water intakes, SRWTP employees, including the additional employees discussed above, would inspect and maintain the existing water intake, new water intake, pump stations, and conveyance pipelines. As maintenance trips already occur for the existing intake, additional truck trips for maintenance of the new intake are not anticipated. Existing SRWTP employees who perform daily inspections and maintenance at the existing water intake would also inspect and maintain the new water intake, pump stations and conveyance pipelines. Therefore, no additional full-time employees or truck trips would be required. No additional emergency generators are required for O&M activities at either the existing or proposed new intake. O&M activities for all other project components would be completed under existing maintenance programs.

Because of the limited increase and intermittent nature of O&M activities, such activities would not be anticipated to result in a considerable increase in emissions. Therefore, O&M activities are not anticipated to expose sensitive receptors to substantial pollutant concentrations and health risk impacts to sensitive receptors in the vicinity of proposed project components would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.4-7: Construction of the proposed project could result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

All Project Components

Construction activities associated with the proposed project could result in sources of odorous emissions. During construction, development of the various infrastructure and improvements would include the use of diesel-powered vehicles and equipment that could temporarily generate localized odors. However, construction activities would occur in several different locations within the project area over the duration of construction, therefore odorous emissions would not be continuous in one location for the entire duration of construction. Use of equipment would be temporary and would cease at the conclusion of construction.

Therefore, construction of the proposed project would not result in odorous emissions that would adversely affect a substantial amount of people, and the impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.4-8: Operation and maintenance of the proposed project could result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

All Project Components

As described in Impact 3.4-2, once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and operation of new equipment at the water treatment plants and new intake would occur. No additional emergency generators are required for O&M activities at either the existing or proposed new intake. Unlike wastewater treatment operations, water treatment facilities are not typically associated with odor emissions. During operation, odors could emanate from vehicle exhaust, intermittent use of the backup generators during emergencies and maintenance testing, temporarily generating localized odors. However, these emissions would occur infrequently and for short durations and would not adversely affect a substantial number of people. O&M activities for all other project components would be completed under existing maintenance programs. Because O&M of proposed project components are not expected to result in emissions that would lead to the production of odors that could adversely affect a substantial number of people, impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

3.5 Biological Resources – Aquatic

3.5.1 Introduction

This section of the Draft EIR addresses the potential aquatic biological resource impacts associated with implementation of the proposed project. The potential impacts of implementation of the proposed project on terrestrial biological resources is discussed in Section 3.6, *Biological Resources – Terrestrial*.

Comments addressing aquatic biological resources were received in response to the NOP. The California Department of Fish and Wildlife (CDFW) provided comments on the NOP requesting that the EIR include an assessment and map of habitat types and species along with an inventory and an assessment of rare, threatened, endangered, and other sensitive species that could be affected by the proposed project. The comment letter also requested the inclusion of appropriate and adequate avoidance, minimization, and/or mitigation measures. CDFW's comment letter identified Delta smelt (*Hypomesus transpacificus*), longfin smelt (*Spirinchus thaleichthys*), Sacramento River winter-run and spring-run Chinook salmon (*Oncorhynchus tshawytscha*), Sacramento splittail (*Pogonichthys macrolepidotus*), and green sturgeon (*Acipenser medirostris*) as special-status aquatic species with potential to occur. CDFW's comments are addressed in this section. See Appendix A for NOP comment letters.

A review of pertinent literature and database queries were conducted for the project site and surrounding area. The sources of reference data reviewed for this evaluation include the following:

- City of Sacramento 2040 General Plan (City of Sacramento, 2024).
- CDFW California Natural Diversity Database (CNDDB) List of Regionally Occurring Special-Status Species (CDFW, 2023) (**Appendix C**).
- U.S. Fish and Wildlife Service (USFWS) List of Federally Threatened and Endangered Species that May Occur in the Project Location (USFWS, 2023) (Appendix C).

3.5.2 Environmental Setting

This subsection provides an overview of the existing conditions in the proposed project areas (described in Chapter 2, *Project Description)*, where the proposed project has the potential to affect fisheries resources, including special-status fish species. Because of the differences in fish communities and habitat types, the information is broken into two different environments: (1) the Lower American River; and (2) the Lower Sacramento River and Sacramento-San Joaquin Delta (Delta). A general description of these water bodies, along with fisheries resources in each of these environments, is presented below. Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply*, for more detailed descriptions of surface water bodies in the proposed project areas, including operations of the Central Valley Project (CVP) and State Water Project (SWP).

Lower American River

Folsom Reservoir separates the upper American River from the lower American River. Folsom Reservoir is the largest reservoir on the American River, with a maximum storage capacity of approximately 967 thousand acre-feet (TAF). As a part of the CVP, Folsom Dam and Reservoir are operated for flood control and to meet CVP water delivery obligations. In addition to operating the dam and reservoir for flood control and water supply, the U.S. Bureau of Reclamation (Reclamation) releases water from Folsom Reservoir to the lower American River to meet minimum instream flow requirements below Nimbus Dam. Additional flow releases are made in consideration of flow fluctuation and bank stability recommendations and to manage water temperatures to meet the needs of salmonids. Folsom Reservoir is also operated by Reclamation to help meet Delta salinity and flow objectives established to improve fisheries conditions and to support CVP south-of-Delta exports. Lake Natoma is located seven miles downstream of Folsom Dam and forms behind Nimbus Dam. This forebay is operated by Reclamation as part of the CVP as a re-regulating reservoir that accommodates the flow fluctuations caused by operating the Folsom Power Plant to meet downstream CVP obligations.

In addition to the numerous regulatory requirements that affect CVP operations, Reclamation has adopted the Lower American River Modified Flow Management Standard, which was proposed by the Sacramento Water Forum as outlined in the *Modified Flow Management Standard Proposed Water-Right Terms and Conditions* (November 2017) (ARWA, 2017). The Lower American River Flow Management Standard includes ramping rate and flow fluctuation criteria to minimize drastic changes in flows for the benefit of specific in-river fish life cycles. The Lower American River Modified Flow Management Standard includes minimum release requirements and adjustments, temperature management, and oversight by the American River Group as well as monitoring and adaptive management.

The Lower American River Modified Flow Management Standard includes the Annual Water Temperature Management Plan which identifies the most beneficial water temperature regime possible from May 15 through November 1, constrained by cold-water pool availability in Folsom Reservoir and the Modified Flow Management Standard flow and storage provisions (AWRA, 2017). The American River Temperature and Flow Strategy involves the use of multiple target water temperature schedules for the lower American River at Watt Avenue. The "schedule" approach was developed with the purpose of balancing the seasonal use of Folsom Reservoir's cold-water availability, which varies from year-to-year. The prioritization order of the target temperature schedules reflects the desire to protect juvenile steelhead over-summer rearing, while considering the needs of fall-run Chinook salmon spawning, given the constraints of cold-water pool availability in Folsom Reservoir. The temperature plan attempts to limit stressful temperatures (above 65°F) for juvenile steelhead and spawning fall-run Chinook salmon and also avoid water temperatures at or above 72°F that can be lethal for salmonids over an extended period.

Sacramento River and Delta

The Sacramento River is the largest river system in California. It originates near the slopes of Mount Shasta in northern California and flows southward to Suisun Bay in the Delta in central California. The lower Sacramento River is defined as the reach south of the Sacramento and Yolo Bypass, near the American River confluence downstream through to the City of Freeport. The lower Sacramento River is highly channelized and leveed, and bordered by agricultural lands. Aquatic habitat in the lower Sacramento River is characterized by slow-water glides and pools, and has reduced water clarity and habitat diversity, compared to the upper Sacramento River. The Sacramento River is a major migration corridor that supports numerous anadromous fish species including green sturgeon, Chinook salmon, and steelhead trout.

The Delta lies at the confluence of the Sacramento and San Joaquin Rivers and is one of the largest estuaries in the United States. The Delta boundary extends north along the Sacramento River terminating just south of the American River, south along the San Joaquin River terminating just north of the Stanislaus River, east to the City of Stockton, and west to Suisun Bay. Runoff from Central Valley streams accounts for approximately 95 percent of Delta inflows.

Water quality in the Delta region is governed, in part, by Delta hydrodynamics, which are highly complex. The principal factors affecting Delta hydrodynamic conditions are: (1) river inflows from the San Joaquin and Sacramento River systems; (2) daily tidal inflows and outflows through San Francisco Bay; and (3) pumping from the south Delta through the Harvey O. Banks Pumping Plant (Banks Pumping Plant), C.W. "Bill" Jones Pumping Plant (Jones Pumping Plant), and other smaller diversions throughout the Delta. Delta hydrodynamic conditions are measured primarily using the parameters of Sacramento and San Joaquin River flows, Delta outflow, Delta inflow, flows in Old and Middle rivers, and Delta exports. The transition area between saline waters and fresh water, frequently referred to as the *low-salinity zone*, is typically located within Suisun Bay.

As described in Section 3.12, *Hydrology, Water Quality, and Water Supply,* changes in the location of the low-salinity zone in the western Delta are commonly measured by the position of *X2*, which is the distance upstream (in kilometers) from the Golden Gate Bridge where tidally averaged salinity is equal to 2 parts per thousand. The position of X2 is controlled by parameters such as daily tidal flows, Delta inflow, and Delta exports. Aquatic organisms have different salinity tolerances and preferences; therefore, changes in the position of the low-salinity zone and X2 are commonly used to characterize likely changes in species distribution.

Special-Status Species

Special-status species are regulated under the federal Endangered Species Act (FESA) and California Endangered Species Act (CESA) or other regulations or are species that are considered sufficiently rare by the scientific community to qualify for such listing. These species are classified in the following categories:

- Species listed or proposed for listing as threatened or endangered under the FESA (50 CFR 17.12 [listed plants], 50 CFR 17.11 [listed animals], and various notices in the Federal Register [FR] [proposed species]).

- Species that are candidates for possible future listing as threatened or endangered under the FESA (61 FR 40, February 28, 1996).
- Species listed or proposed for listing by the State of California as threatened or endangered under the CESA (California Code of Regulations, Title 14, Section 670.5).
- Animal species of special concern to CDFW.
- Animals fully protected under the California Fish and Game Code (Section 3511 [birds], Section 4700 [mammals], and Section 5050 [reptiles and amphibians]).
- Species that meet the definitions of rare and endangered under CEQA; a plant or animal species may be treated as “rare or endangered” even if not on one of the official lists (CEQA Guidelines, Section 15380).

A list of special-status fish species that have the potential to occur in the project areas was compiled based on data contained in the CNDDB (CDFW, 2023); the USFWS List of Threatened and Endangered Species that May Occur in your Proposed Project Location or May Be Affected by Your Proposed Project prepared for each water treatment plant (USFWS, 2023); and the National ESA Critical Habitat Mapper (NMFS, 2023). **Table 3.5-1** provides a list of special-status fish species, their general habitat requirements, and an assessment of their potential to occur in the vicinity of the project sites.

The “Potential to Occur” categories are defined as follows:

- **None:** A species is determined to have no potential to occur if (1) its specific habitat requirements are not present; **AND/OR** (2) it is outside the range or presumed to be extirpated from the area or region; **AND/OR** (3) a survey has been conducted according to agency protocol and the species was not found.
- **Low**: A species is determined to have a low potential to occur if (1) its known current distribution or range is outside of but near the study area; **AND/OR** (2) only limited or marginally suitable habitat is present.
- **Moderate**: A species is determined to have a moderate potential to occur if (1) habitat is present in the study area or immediately adjacent areas; **AND** (2) the study area is in the known range of the species, even if the species was not observed during general biological surveys.
- **High:** A species is determined to have a high potential to occur or be present if (1) habitat is present in the study area or immediately adjacent areas; **AND** (2) the study area is in the known range of the species; **AND/OR** (3) there are recent and reliable records of the species on or near the site.

Conclusions regarding habitat suitability and species occurrence are based on the analysis of existing literature and databases described previously and known habitats occurring within the project areas and regionally. Two special-status species have high potential to occur and 7 special-status species have moderate potential to occur in the project areas. Six species have low or no potential to occur in the project areas. Only species classified as having a moderate or high potential for occurrence were considered in the impact analysis.

TABLE 3.5-1
SPECIAL-STATUS SPECIES WITH THE POTENTIAL TO BE AFFECTED BY CONSTRUCTION ACTIVITIES AND CHANGES IN WATER SUPPLY

Scientific Name	Common Name	Listing Status: Federal/State/Other	Habitat Description	Potential for Occurrence within the Project Areas
Fish				
Acipenser medirotris pop. 1	Green sturgeon – southern DPS	FT/SSC/--	Spawning occurs primarily in cool (11-15 C) sections of mainstem rivers in deep pools (8-9 meters) with substrate containing small to medium-sized sand, gravel, cobble, or boulder.	**Moderate.** Green sturgeon could occur in the project area year-round. Unknown if spawning occurs in the American River, but adults could occur as strays.
Acipenser transmontanus	White sturgeon	--/SC/--	Spawning occurs primarily in cool (11-15 C) sections of mainstem rivers in deep pools (8-9 meters) with substrate containing small to medium-sized sand, gravel, cobble, or boulder. Primarily reside in the San Francisco Estuary.	**Moderate.** Adult white sturgeon could occur in the project area during upstream migration to spawning areas on the Sacramento River. Juveniles could occur while rearing and during their outmigration to the Delta.
Spirinchus thaleichthys	Longfin smelt	FP/ST/--	Euryhaline, nektonic & anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15–30 parts per thousand but can be found in completely freshwater to almost pure seawater.	**Moderate.** While historically longfin smelt have been found as far north as Colusa, CA, the species has been experiencing rapid decline. Today, longfin smelt are known to spawn in the lower Sacramento River near or downstream of Rio Vista.
Hypomesus transpacificus	Delta smelt	FT/SE/--	Occurs in open surface waters in the Sacramento/San Joaquin Delta. Occurs 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.	**Moderate.** While historically delta smelt have been found as far north as the Feather River, the species has been experiencing rapid decline. Recently their distribution is restricted to Suisun Bay and the north, east, and west Delta. May occur seasonally during spawning in winter and spring.
Oncorhynchus mykiss irideus pop. 11	Steelhead – Central Valley DPS	FT/--/--	This DPS 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.	**High.** Primarily present during in-migration (adults) and out-migration (juveniles) periods. Spawning occurs on the American River. Juvenile rainbow trout (both resident and anadromous) can be present in the American River year-round.
Oncorhynchus tshawytscha pop. 7	Chinook salmon – Sacramento River winter-run ESU	FE/SE/--	Anadromous species using riverine, estuarine, and saltwater habitat. Adult migration potentially occurs from January through May. Juvenile outmigration occurs from November through mid-March.	**Moderate.** Primarily present during in-migration (adults) and out-migration (juveniles) periods. Spawning occurs in the upper reaches of the Sacramento River; however, adults may occur as strays on the American River.
Oncorhynchus tshawytscha pop. 11	Chinook salmon – Central Valley spring-run ESU	FT/ST/--	Anadromous species using riverine, estuarine, and saltwater habitat. Adult migration potentially occurs from March through May. Juvenile outmigration occurs from November through April.	**Moderate.** Primarily present during in-migration (adults) and out-migration (juveniles) periods. Spawning occurs in tributaries of the upper Sacramento River; however, adults may occur as strays on the American River.

Scientific Name	Common Name	Listing Status: Federal/State/Other	Habitat Description	Potential for Occurrence within the Project Areas
Oncorhynchus tshawytscha pop. 13	Chinook salmon – Central Valley fall-/ late fall-run ESU	SC/SSC/--	Anadromous species using riverine, estuarine, and saltwater habitat. Adult migration potentially occurs from June through December. Juvenile outmigration occurs from March through July.	**High.** Primarily present during in-migration (adults) and out-migration (juveniles) periods. Spawning occurs on the American River.
Lampetra tridentata	Pacific lamprey	SC/SSC/--	Adults need clean, gravelly riffles in permanent streams to spawn successfully. Ammocoetes live in silty backwaters and eddies with muddy or sandy substrate into which they burrow.	**Low.** Can occur in lower American, lower Sacramento, and San Joaquin rivers, including the Delta.
Lampetra ayresii	River lamprey	--/SSC/--	Adults need clean, gravelly riffles in permanent streams to spawn successfully. Ammocoetes live in silty backwaters and eddies with muddy or sandy substrate into which they burrow.	**Low.** Can occur in lower American, lower Sacramento, and San Joaquin rivers, including the Delta.
Pogonichthys macrolepidotus	Sacramento splittail	--/SSC/--	Splittail spawn in shallow water over flooded vegetated habitat with a detectable water flow. Splittail larvae and juveniles remain in riparian or annual vegetation along shallow edges on floodplains.	**Moderate.** Historically, Sacramento splittail were found as far north as Redding, CA and are occasionally observed in the American River. However, they are now largely confined to the Delta, Suisun Bay, Suisun Marsh, and the Napa and Petaluma rivers.
Lavinia symmetricus spp.	Sacramento hitch	--/SSC/--	Sacramento hitch inhabit warm lowland waters including clear streams, turbid sloughs, lakes, and reservoirs.	**Low.** In the Sacramento River, hitch appear to be spread across much of their native range including the Delta.
Archoplites interruptus	Sacramento perch	--/SSC/--	Historically found in the sloughs, slow moving rivers, and lakes of the Central Valley. Prefer warm water. Aquatic vegetation is essential for young.	**None.** Extirpated from native range.
Mylopharodon conocephalus	Hardhead	--/SSC/--	Hardhead are often found at low to mid elevations in relatively undisturbed habitats of larger streams with high water quality (clear, cool).	**Low.** In the Sacramento River, they are common and may be present in the Delta.
Lavinia exilicauda exilicauda	Central California roach	--/SSC/--	Occurs in small, warm tributaries to larger streams that flow through open foothill woodlands of oak and foothill pine. Located in the foothills in much of the same region that contains the pikeminnow-hardhead-sucker assemblage.	**Low.** Occurs upstream of large reservoirs or in tributary streams.

KEY: DPS = distinct population segment; ESU = evolutionarily significant unit

Federal: (NMFS, USFWS)
- FE = Listed as Endangered by the Federal Government
- FT = Listed as Threatened by the Federal Government
- FP = Proposed for listing by the Federal Government
- SC = Species of Concern

State: (CDFW)
- SE = Listed as Endangered by the State of California
- ST = Listed as Threatened by the State of California
- SC = Candidate for listing by the State of California
- SSC = California Species of Special Concern

SOURCES: CDFW, 2023; NMFS, 2023; and USFWS, 2023.

Special-Status Fish

Green Sturgeon

In North America, the southern distinct population segment (DPS) of green sturgeon is found from Ensenada, Mexico to Southeast Alaska. Green sturgeon was classified as a Class 1 Species of Special Concern by CDFW in 1995 (Moyle et al., 1995). Class 1 Species of Special Concern are those that conform to the state definitions of threatened or endangered and could qualify for addition to the official list. On April 7, 2006, National Marine Fisheries Service (NMFS) determined that the southern DPS of green sturgeon was threatened under the Federal ESA (NMFS, 2006b). On October 9, 2009, NMFS designated critical habitat for the green sturgeon southern DPS throughout most of its occupied range (NMFS, 2009), including the Sacramento and American rivers.

Green sturgeon are widely distributed in the Delta and estuary areas. Historical and recent information confirms that green sturgeon occur in the Sacramento River and a few of its tributary (Feather, Yuba, and Bear) rivers. Historic and present records indicate that spawning of green sturgeon is limited exclusively to the Sacramento River watershed (NMFS, 2018). Adults typically migrate upstream into rivers between late February and late July. Spawning occurs from March to July, with peak spawning from mid-April to mid-June. Green sturgeon are believed to spawn every 3 to 5 years, although recent evidence indicates that spawning may be as frequent as every two years (NMFS, 2005c). Adult green sturgeon broadcast their eggs in deep, fast water over large cobble substrate, where the eggs settle into the interstitial spaces (Moyle, 2002). Larvae hatch from eggs between 6to 8 days after spawning if temperature conditions are optimal. Larvae and young-of-the-year (YOY) use riverine areas to forage and rear until they gain the ability to tolerate higher salinity concentrations.

Juvenile green sturgeon are known to live in freshwater for up to three years using riverine, subtidal, and intertidal habitats in the lower Sacramento River and Delta (Radtke, 1966; Klimley et al., 2015). Post-spawn fish behavior varies between holding for several months in the Sacramento River then out-migrating in the fall or winter or moving out of the river quickly during the spring or summer months (Heublein et al., 2009). Post-spawn outmigration through the Delta Estuary is also variable with some adults traveling to the Pacific Ocean in 2 to 10 days and others remaining in the estuary for months. Juvenile and adult green sturgeon can be present within the proposed project area year-round. It is unknown if green sturgeon spawn in the American River, however, adults may occur as strays.

White Sturgeon

As with green sturgeon, white sturgeon are found from Ensenada, Mexico to Southeast Alaska. The San Francisco Estuary population of white sturgeon – the only reproducing population of white sturgeon in California – was previously classified as a Species of Special Concern by CDFW. On July 12, 2024, CDFW approved white sturgeon as a candidate species for listing as threatened under CESA. Candidate species for listing under CESA are granted full protections during the review process. Presently, there is no federal listing for white sturgeon.

White sturgeon primarily inhabit estuaries of large river systems, migrating to fresh water to spawn. Spawning success has been hindered by the construction of dams, such as Shasta Dam on the Sacramento River and Oroville Dam on the Feather River. Spawning in the California Central Valley is now limited to the Sacramento River between Knights Landing and Colusa (Moyle, 2002; Moyle et al., 2015) with observations of periodic spawning occurring in the Feather and San Joaquin rivers (Beamesderfer et al., 2004; Jackson et al., 2015). Prior to spawning, white sturgeon move into the lower reaches of rivers during the winter and migrate upstream to spawning areas between December and early June (Moyle et al., 2015). Like green sturgeon, white sturgeon broadcast their eggs in deep, fast water over large cobble substrate, where the eggs settle into the interstitial spaces (Moyle, 2002). Larvae hatch from eggs between 4-12 days after spawning if temperature conditions are optimal (Wang, 1986). Larvae and YOY use riverine areas to forage and rear until they gain the ability to tolerate higher salinity concentrations (McCabe and Tracy, 1994). Recruitment success of juvenile white sturgeon is correlated with high spring flows and Delta outflow. High spring flows during juvenile rearing (i.e., between April and July) assist in moving larval sturgeon downstream into suitable rearing habitat quicker than years with low spring flows (Stevens and Miller, 1970).

White sturgeon typically inhabit deep water over soft bottom substrates, feeding on or near the bottom (Moyle, 2002). White sturgeon remain in the San Francisco Estuary throughout most of their life (Klimley et al., 2015), but more evidence is showing that white sturgeon may move into marine environments as well (Sellheim et al., 2022; Scott and Crossman, 1973). Adult and juvenile white sturgeon primarily occur in the San Francisco Estuary but can be present in the Project area during upstream migration as adults and downstream migration as rearing juveniles.

Longfin Smelt

The longfin smelt is a relatively small (i.e., 90 to 110 millimeter standard length at maturity), semelparous, pelagic fish that occurs in estuaries of the Pacific North American Coast, from Prince William Sound, Alaska to San Francisco Bay, California with landlocked populations found in Lake Washington, Washington and Harrison Lake, British Columbia (Baxter, 1999; Moyle, 2002). In California, the longfin smelt inhabits the San Francisco Estuary, Humboldt Bay, and Eel, Klamath, and Smith rivers (Baxter, 1999). Spawning may occur from November through June, with the peak of spawning activity likely occurring from February through April (Moyle, 2002). Longfin smelt have adhesive eggs and are presumed to spawn over sandy or gravel substrates, rocks, and aquatic plants (Wang, 1986; Emmett et al., 1991; Robinson and Greenfield, 2011). Most adults die after spawning; however, a few, mainly 1-year-old females, live another year and probably spawn a second time (USFWS, 2001).

Egg development lasts approximately one month (CDFG, 2009), after which the young hatch and exist as yolk-sac larvae for 1 to 2 weeks (Robinson and Greenfield, 2011). Yolk-sac larvae float near the water surface, moving with the prevailing current. The larvae metamorphose into juveniles approximately 1 to 2 months after hatching, varying with water temperature (Emmett et al., 1991). Larvae tend to inhabit the upper third of the water column, while juveniles and adults occur in the lower two-thirds. However, juveniles and adults may make daily vertical migrations to the upper water column at night, tracking the diurnal movements of their prey (Moyle, 2002).

Larvae have low salinity tolerance, and Kimmerer et al. (2009) documented that larvae and young juveniles were most numerous in water with a salinity of two parts per thousand (ppt), decreasing in abundance as salinity approached 15 ppt. Juveniles migrate to higher-salinity water as they mature. For much of the species' life cycle, individuals are found in more brackish water with salinities up to 30 ppt, and longfin smelt have been recorded beyond the Golden Gate Bridge, in marine waters where salinity approaches 35 ppt. The species is not tolerant of warmer water (exceeding 20°C to 22°C) and, during summer, longfin smelt generally move to deeper water (including marine areas), possibly to avoid warmer water in shallower areas.

Once one of the most abundant species observed in San Francisco Estuary surveys (Moyle, 2002), the Estuary longfin smelt population has seen dramatic declines over several years (Rosenfield and Baxter, 2007; Sommer et al., 2007; MacNally et al., 2010) resulting in its March 2009 inclusion in the list of threatened pelagic fish species under CESA (CDFG, 2009). Longfin smelt are proposed endangered under FESA. Wetlands in the upper Estuary and southern San Francisco Bay may be critical spawning habitats for longfin smelt (Grimaldo et al., 2017).

Delta Smelt

Delta smelt are federally listed as threatened and listed as endangered by the State of California. The Delta smelt is a semi-anadromous fish with an annual life cycle. A portion of adults move from Suisun Bay or river channels in the lower Delta to freshwater upstream and spawn in February to May (Moyle et al., 1992; Moyle, 2002; Bennett, 2005). However, recent distributional studies indicate that movement patterns of smelt are highly variable, depending on outflow, exports, channel configurations, and other factors (Moyle et al., 2016). An increasingly higher percentage of smelt caught in various surveys are found in freshwater areas, year around, such as the Sacramento Deepwater Ship Channel and the Toe Drain of the Yolo Bypass (Merz et al., 2011; Sommer et al., 2011; Sommer and Mejia, 2013). A recent series of laboratory tests indicated that Delta smelt prefer to spawn on pebble and sand substrates (Lindberg et al., 2019), this suggests that freshwater Delta habitats with pebble and sand substrates could potentially be important spawning habitats for Delta smelt.

Historically, the Delta smelt was the most abundant pelagic fish species in the San Francisco Estuary (Moyle, 2002), but by the early 1980s, abundance had declined dramatically (Sommer et al., 2007). There is no "smoking gun" or single cause of the Delta smelt decline. Instead, multiple factors have created habitat that is significantly less able to support smelt in large numbers (Moyle et al., 2016). The ultimate cause of decline in Delta smelt is competition with people for water and habitat (Moyle et al., 2016). Some of the proximate drivers of decline in Delta smelt abundance include entrainment, altered hydrology, reduced food availability, predation, contaminants, habitat change, drought, and climate change (Moyle et al., 2016).

Since 2002, Delta smelt and other pelagic fish species in the San Francisco Estuary have experienced a further rapid decline in abundance (MacNally et al., 2010). Many recent studies have related the decline in Delta smelt abundance to various environmental covariates, including water clarity and salinity (Feyrer et al., 2007), water exports, water temperatures, and zooplankton abundance (MacNally et al., 2010), and water clarity and water exports (Thomson et al., 2010).

Central Valley Steelhead

Central Valley steelhead was federally listed as threatened on March 19, 1998 (NMFS, 1998b). The threatened status of Central Valley steelhead was reaffirmed in NMFS's final listing determination on January 5, 2006 (NMFS, 2006a). Critical habitat for Central Valley steelhead was designated by NMFS on September 2, 2005 (NMFS, 2005b) and includes the Sacramento and American rivers.

Steelhead have highly variable and complex life history patterns but are broadly categorized into winter and summer reproductive ecotypes. Winter-run steelhead are the most widespread reproductive ecotype and the only type currently present in Central Valley streams (McEwan, 2001). Winter steelhead become sexually mature in the ocean and enter fresh water from August through April, typically spawning from December through April (NMFS, 2014). Individual steelhead may spawn more than once, returning to the ocean between each spawning migration.

Juvenile steelhead typically rear 1 to 2 years in fresh water before migrating to the ocean as smolts. Juvenile migration to the ocean generally occurs from December through August, with peak outmigration from January to May (McEwan, 2001). However, some juveniles may stay and mature in fresh water without migrating to the ocean (i.e., resident rainbow trout). Resident rainbow trout can shift back to anadromy if conditions are appropriate. Juvenile steelhead tend to use bank habitat more frequently than the main channel, because bank habitat provides increased protection, shade, and food.

Central Valley steelhead occur in the proposed project area in both the Sacramento and American rivers, either as adults migrating upstream to their spawning habitat, or as juveniles rearing and migrating toward the ocean. Central Valley steelhead are known to spawn in the American River. Juvenile rainbow trout (both resident and anadromous) can occur in the American River year-round.

Sacramento River winter-run Chinook Salmon ESU

The Sacramento River winter-run Chinook salmon evolutionarily significant unit (ESU) was listed as threatened under FESA on August 4, 1989 (NMFS, 1989). NMFS subsequently upgraded the federal listing to endangered on January 4, 1994 (NMFS, 1994). NMFS designated critical habitat for Sacramento River winter-run Chinook salmon on June 16, 1993 (NMFS, 1993) and includes the Sacramento River.

Winter-run Chinook salmon spend 1 to 3 years in the ocean. Adult winter-run Chinook salmon leave the ocean and migrate through the Delta into the Sacramento River from December through July with peak migration in March. Adults spawn from mid-April through August (Moyle, 2002). Egg incubation continues through October. Downstream movement of juvenile winter-run Chinook salmon begins in August, soon after fry emerge.

Historically, winter-run Chinook salmon occupied and spawned in the upper reaches of the Sacramento River including Little Sacramento, McCloud, and Pit rivers and Battle Creek (Moyle et al., 1989; Lindley et al., 2007). After construction of the Shasta and Keswick dams, those habitats became unavailable due to the impassable dams and hydroelectric operations. Currently, winter-run Chinook salmon is known to occur only in the mainstem of the Sacramento River, with spawning occurring between Keswick Dam near Redding and Red Bluff Diversion Dam (Lindley et al., 2007; NMFS, 2016). The Sacramento River is the main migration route through the Delta. However, juveniles occasionally may stray into the central Delta and lower San Joaquin River system during outmigration because of entrainment into diversion channels.

Winter-run Chinook salmon adults have the potential to occur in the proposed project area during their upstream migration to spawn in the Sacramento River near Redding. Adults may occur in the American River as strays. Juveniles have the potential to occur in the proposed project area during their downstream migration through the Sacramento River.

Central Valley spring-run Chinook Salmon ESU

The Central Valley spring-run Chinook salmon ESU was federally listed as threatened on September 16, 1999 (NMFS, 1999). Their threatened status was reaffirmed in NMFS's final listing determination issued on June 28, 2005 (NMFS, 2005a). Critical habitat for Central Valley spring-run Chinook salmon was designated by NMFS on September 2, 2005 (NMFS, 2005b) and includes the Sacramento and American rivers.

Historically, spring-run Chinook salmon occupied the upstream reaches of all major river systems in the Central Valley where no natural barriers existed. By the 1950s, however, populations in the San Joaquin River had been extirpated (Yoshiyama et al., 1998). Loss of access and holding areas due to the construction of dams was a major contributing factor. Similarly, abundance of spring-run in the Sacramento River has been in decline, with only remnant runs occurring in Butte, Mill, and Deer creeks of the upper Sacramento River (Williams et al., 2016).

Adult spring-run Chinook salmon begin their upstream migration in March, with peak upstream migration occurring from May through June, and ending in September. Spring-run Chinook salmon are sexually immature during upstream migration, and adults hold in deep, cold pools near spawning habitat until spawning commences in late summer and fall. Spring-run Chinook salmon spawn in the upper reaches of the mainstem Sacramento River and tributary streams (USFWS, 2001). Spawning typically begins in late August and may continue through October. Juveniles emerge in November and December in most locations but may emerge later when water temperature is cooler. Newly emerged fry remain in shallow, low-velocity edgewater (CDFG, 1998).

A small portion of an annual year-class of juvenile spring-run Chinook salmon may emigrate as post-emergent fry (less than 1.8 inches long) and reside in the Delta undergoing smoltification. However, most are believed to rear in the upper river and tributaries during winter and spring, emigrating as juveniles (more than 1.8 inches long). Rearing takes place in their natal streams, the mainstem of the Sacramento River, inundated floodplains (including the Sutter and Yolo bypasses), and the Delta. Downstream migration of yearlings typically coincides with the onset of the winter storm season, and migration may continue through March (CDFG, 1998).

Spring-run Chinook salmon adults have the potential to occur in the proposed project area during their upstream migration to spawn in tributaries of the Sacramento River. Adults may occur in the American River as strays. Juveniles have the potential to occur in the proposed project area during their downstream migration from tributaries and through the Sacramento River.

Central Valley fall-/late fall-run Chinook Salmon ESU

Central Valley fall-/late fall–run Chinook salmon ESU are currently the most abundant and widespread salmon runs in California (Mills et al., 1997). This species is not listed under the FESA. On March 9, 1998, NMFS issued a proposed rule to list fall-run Chinook salmon as threatened (NMFS, 1998a). However, on September 16, 1999, NMFS determined that the species did not warrant listing (NMFS, 1999). On April 15, 2004, NMFS classified Central Valley fall-/late fall–run Chinook salmon as a species of concern (NMFS, 2004). However, Essential Fish Habitat (EFH) is designated for this species. EFH is defined as those waters and substrate necessary for spawning, breeding, feeding, or growth to maturity. EFH includes currently and historically accessible habitat. This species is also designated as a California Species of Concern by CDFW.

Adult fall-run Chinook salmon migrate into the Sacramento River and its tributaries from June through December in mature condition and spawn from late September through December, soon after arriving at their spawning grounds (Yoshiyama et al., 1998). The spawning peak occurs in October and November. Emergence occurs from December through March, and juveniles migrate downstream to the ocean soon after emerging, rearing in fresh water for only a few months. Smolt outmigration typically occurs from March through July (Yoshiyama et al., 1998).

Late fall–run Chinook salmon migrate upstream before they are sexually mature and hold near spawning grounds for 1 to 3 months before spawning. Upstream migration takes place from October through April and spawning occurs from late January through April, with peak spawning in February and March (Yoshiyama et al., 1998). Fry emerge from April through June. Juvenile late fall–run Chinook salmon rear in their natal streams during the summer, and they remain in some streams throughout the year. Smolt outmigration can occur from November through May (Yoshiyama et al., 1998).

Fall-/late fall-run Chinook salmon adults have the potential to occur in the proposed project area during their upstream migration to spawn in tributaries of the Sacramento River, including spawning in the American River. Juveniles have the potential to occur in the proposed project area during their downstream migration from the Sacramento and American rivers.

Sacramento Splittail

Sacramento splittail are not listed under the CESA or FESA but are considered a California Species of Special Concern. Sacramento splittail are a relatively large, long-lived cyprinid, endemic to the sloughs, lakes, and rivers of the Central Valley (Moyle, 2002) and most typically is found in tidally influenced freshwater and estuarine habitats (e.g., the Delta and Suisun Bay) with salinities as high as 10 to 18 ppt (Moyle et al., 2004). Nonbreeding splittail can survive wide fluctuations in temperature and low dissolved oxygen levels (less than 1 milligram of oxygen per liter), allowing them to live in slow-moving sections of rivers and sloughs (Moyle et al., 2004). Adults begin a gradual upstream migration toward spawning areas sometime between late November and late January. The migration is associated with flow events from February through April that inundate floodplains and riparian areas used for spawning and rearing (Moyle et al., 2004). Spawning is associated with conditions such as changing water levels, lower water temperatures, and increasing length of day (Moyle et al., 2004). In the Sacramento River basin, the most important spawning areas appear to be the Yolo and Sutter Bypasses, which are extensively flooded during wet years. In the San Joaquin drainage, spawning apparently takes place in wet years where the San Joaquin River is joined by the Tuolumne and Merced rivers (Moyle et al., 2004). There are two genetically distinct populations of Sacramento splittail in the greater Estuary; a Napa and Petaluma rivers population and a Central Valley population (Baerwald et al., 2007). It is thought that current data is biased toward the Central Valley population, which consists of individuals from the Cosumnes, Sacramento, and San Joaquin rivers and their tributaries. Threats to Sacramento splittail include habitat loss and degradation, loss of access to seasonally inundated floodplains, introduction of nonnative species, entrainment in the CVP and SWP water export facilities, and harvest by recreational anglers.

Critical Habitat

Critical habitat is defined in Section 3(5)A of the FESA as a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Five designated critical habitats are present in the project area and are described below.

North American Green Sturgeon Critical Habitat

Designated critical habitat for the southern DPS of green sturgeon includes the Sacramento River, the Delta, and Suisun, San Pablo, and all of San Francisco Bay below the higher high water (NMFS, 2009).

Delta Smelt Critical Habitat

Designated critical habitat for Delta smelt includes all water and all submerged lands below ordinary high water and the entire water column bounded by and contained in Suisun Bay, including all contiguous water bodies contained within the statutory definition of the Delta, including the Sacramento and San Joaquin rivers (USFWS, 1994). Critical habitat for Delta smelt is designated in the following California counties: Alameda, Contra Costa, Sacramento, San Joaquin, Solano, and Yolo.

Sacramento River winter-run Chinook Salmon Critical Habitat

Designated critical habitat for winter-run Chinook salmon includes the Sacramento River from Keswick Dam, Shasta County (River mile 302) to Chipps Island (River mile 0) at the westward margin of the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge (NMFS, 1993).

Central Valley spring-run Chinook Salmon Critical Habitat

Designated critical habitat for spring-run Chinook salmon includes all river reaches accessible in the Sacramento River and its tributaries in California, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge (NMFS, 2005b).

Central Valley Steelhead Critical Habitat

Designated critical habitat for Central Valley steelhead includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-waterline or bank-full elevation in the Sacramento and San Joaquin rivers, their tributaries, and the Delta (NMFS, 2005b).

3.5.3 Regulatory Setting

Federal

Federal Endangered Species Act

The FESA (USC title 16, sections 1531–1544 [16 USC 1531–1544]) prohibits unauthorized take of fish, wildlife, and plants that are listed as threatened or endangered and their designated critical habitat. *Candidate species* are those for which there is sufficient information on their biological status and threats to proposed listing, but for which the development of a proposed listing regulation is precluded by other higher priority listing activities but are usually evaluated as special-status species during the environmental review process. FESA specifies procedures for addressing effects or consequences of proposed actions on federally listed species.

Procedures for addressing impacts to federally listed species follow two principal pathways. The first pathway is a Section 10(a) incidental take permit, which applies to situations where a non-federal government entity must resolve potential adverse impacts to species protected under the FESA. The second pathway involves Section 7 consultation, which applies to projects directly undertaken by a federal agency or private projects requiring a federal permit or approval such as a Section 404 permit under the Clean Water Act (CWA) or receiving federal funding.

Biological Opinions on the Coordinated Long-Term Operation of the Central Valley Project and State Water Project

On August 2, 2016, Reclamation, the lead federal agency, and the California Department of Water Resources (DWR), the applicant, jointly requested the reinitiation of FESA consultation on the coordinated long-term operation of the CVP and SWP. The USFWS accepted the re-initiation request on August 3, 2016, and NMFS accepted the re-initiation request on August 2, 2019. On January 31, 2019, Reclamation transmitted their Biological Assessment to USFWS and NMFS. Both USFWS and NMFS finalized their biological opinions on the coordinated long-term operation of the CVP/SWP on October 21, 2019.

In February 2019, state agencies announced that they would for the first time pursue a separate state Incidental Take Permit (ITP) to ensure the SWP’s compliance with the CESA. In November 2019, DWR issued a draft document prepared under CEQA that identified potential operational changes to protect species and manage the SWP based on real-time conditions in the Delta ecosystem, including additional flows dedicated to the environment. After a public comment period, DWR developed an application for an ITP and submitted the application to CDFW in December 2019. DWR certified its final environmental document on March 27 and CDFW issued the ITP on March 31, 2020.

In fall 2021, Reclamation and DWR collaborated with the USFWS, NMFS, and CDFW to develop revised operating rules for the CVP and SWP (the proposed action) and evaluate how the anticipated modifications may cause effects to ESA-listed species and/or designated critical habitat not analyzed in the 2019 biological opinions. The updated rules align operations for the Sacramento-San Joaquin River Delta and present a drought-resilient framework for operating Delta facilities and Shasta Reservoir that will provide more certainty for water users and fish and wildlife. The plan also includes a new winter-run action plan to improve viability over the next 10 years, an adaptive management approach to incorporate new science, and a federal strategy to evaluate impacts of new water infrastructure (Reclamation, 2024a). Reclamation and DWR analyzed impacts of the proposed action and alternatives under National Environmental Policy Act (NEPA) and CEQA, respectively. The fish and wildlife agencies also analyzed this proposed action consistent with the FESA and CESA (Reclamation, 2024a). On December 20, 2024, Reclamation signed the Record of Decision signaling approval of the revised operating rules (Reclamation, 2024b).

Water Temperature Objectives in the Lower American River

Water temperature objectives for the lower American River have been developed according to the February 18, 2020, Record of Decision on the Long-Term Operation of the CVP and SWP. The record of decision implements Alternative 1 (the Preferred Alternative) as described in the associated environmental impact statement. Alternative 1 was the Proposed Action consulted upon and analyzed in the biological opinions issued by USFWS and NMFS in October 2019.

Under the primary water temperature objective, Reclamation operates the Folsom/Nimbus Dam complex and the water temperature control shutters at Folsom Dam to maintain a daily average water temperature of 65°F or lower at the Watt Avenue Bridge from May 15 through October 31. Subsequent objectives provide measures minimizing temperature effects if the primary objective cannot be achieved. The water temperature objectives are achieved according to an annual temperature plan, which is prepared in accordance with the water temperature objectives and is designed to minimize water temperature effects on Central Valley steelhead and provide for Chinook salmon spawning in the fall.

Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply,* for additional description of the Lower American River minimum flow and temperature requirements.

Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (16 USC 1801 et seq.), NMFS, fishery management councils, and federal agencies are required to cooperatively protect EFH for commercially important fish species such as Pacific coast groundfish, Pacific salmon, highly migratory species, and coastal pelagic fish and squid. As defined by the U.S. Congress, EFH includes "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."[1]

1 16 USC 1802 – Definitions (10)

Central Valley Project Improvement Act

The Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575) includes Title 34, the Central Valley Project Improvement Act (CVPIA). The CVPIA amended the CVP's authorization to include fish and wildlife protection, restoration, and mitigation as project purposes of the CVP having equal priority with irrigation and domestic uses of CVP water, and it elevated fish and wildlife enhancement to a level having equal purpose with power generation. Among the changes mandated by the CVPIA was the dedication of 800 TAF of CVP yield annually to fish, wildlife, and habitat restoration.

The U.S. Department of the Interior's May 9, 2003, decision on the implementation of Section 3406(b)(2) of the CVPIA explains how Section 3406(b)(2) water will be dedicated and managed. Dedication of CVPIA 3406(b)(2) water occurs when Reclamation takes a fish and wildlife habitat restoration action based on the recommendations of USFWS (and in consultation with NMFS and CDFW), pursuant to Section 3406(b)(2). Water exports at the CVP pumping facilities have been reduced using "(b)(2) water" to decrease the risk of fish entrainment at the salvage facilities and to augment river flows.

Clean Water Act

The CWA establishes the basic structure for regulating discharges of pollutants to waters of the U.S. The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply,* for a detailed description of the Clean Water Act.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code Sections 13000 et seq.), passed in 1969, articulates the federal CWA. The State Water Board and regional water boards are the state agencies with primary responsibility for the coordination and control of water quality. Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply,* for a detailed description of the Porter-Cologne Water Quality Control Act.

California Endangered Species Act

The CESA was enacted in 1984. Under CESA, the California Fish and Game Commission has the responsibility for maintaining a list of threatened and endangered species. Pursuant to the requirements of the CESA, an agency reviewing a project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project site and determine whether the project would have a potentially significant impact on such species. In addition, CDFW encourages informal consultation on any project which may impact a candidate species. The CESA prohibits the take of California listed animals and plants in most cases, but the CDFW may issue incidental take permits under special conditions.

Pursuant to the requirements of the CESA, an agency reviewing a project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project study area and determine whether the project will have a potentially significant impact on such species. Project-related impacts to species on the CESA endangered or threatened list would be considered significant. “Take” of protected species incidental to otherwise lawful management activities may be authorized under Fish and Game Code Section 206.591. Authorization from CDFW would be in the form of an Incidental Take Permit under Section 2801.

California Fish and Game Code

Lake and Streambed Alteration Agreement (CA Fish and Game Code Section 1602)

Fish and Game Code Section 1602 requires any person, government agency, or public utility proposing any activity that will divert or obstruct the natural flow or change the bed, channel or bank of any river, stream, or lake, or proposing to use any material from a streambed, to first notify CDFW of such proposed activity.

Fully Protected Species (CA Fish and Game Code Section 3511, 4700, 5050)

Certain species are considered *fully protected*, meaning that the code explicitly prohibits all take of individuals of these species except for take permitted for scientific research. Section 5050 lists fully protected amphibians and reptiles, Section 5515 lists fully protected fish, Section 3511 lists fully protected birds, and Section 4700 lists fully protected mammals. Except as provided in Sections 2081.7 or 2835, fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the species for the protection of livestock.

Take Prohibition (CA Fish and Game Code Section 86, 2080)

Fish and Game Code Section 86 defines ‘take’ and Section 2080 prohibits ‘taking’ of a species listed as threatened or endangered under CESA (CA Fish and Game Code Section 2080) or otherwise fully protected, as defined in CA Fish and Game Code Section 3511, 4700, and 5050.

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines section 15380(d) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specific criteria.

The CEQA also specifies the protection of other locally or regionally significant resources, including natural communities or habitats. Although natural communities do not presently have legal protection, the CEQA requires an assessment of such communities and potential project impacts. Natural communities that are identified as sensitive in the CNDDB are considered by the CDFW to be significant resources and fall under the CEQA Guidelines for addressing impacts.

Local

Lower American River Corridor Management Plan

The Lower American River Corridor Management Plan serves to promote a cooperative approach to managing and enhancing the lower American River within the framework of the 2008 American River Parkway Plan. The goals outlined in the plan are to protect and enhance fisheries and instream habitat, protect and enhance vegetation and wildlife habitat, improve the reliability of the existing flood control system, and enhance the lower American River's wild and scenic recreation values.

Water Forum Fish and Instream Habitat Plan

As part of the Sacramento Water Forum Agreement effort, the Water Forum Fish and Instream Habitat Plan, developed by federal, state, and local agency representatives, identified and prioritized opportunities for improving the health of the lower American River's fish and aquatic habitats, including both new initiatives and modifications to existing management practices. It also identified key data gaps and research efforts needed to address these gaps. A critical component of the Water Forum Fish and Instream Habitat Plan is the strategy for assessing the effectiveness of the recommended restoration actions through monitoring, data interpretation, and adaptive adjustments. The goals of the plan are to increase and maintain viable populations of naturally spawning fall-run Chinook salmon and steelhead, achieve and maintain a viable population of splittail, restore or maintain an appropriate distribution and abundance of other native fish species, and maintain American shad and striped bass populations of sufficient abundance to sustain these fisheries, consistent with restoring native species.

Lower American River Flow Management Standard

As introduced in subsection 3.5.2, *Environmental Setting*, current flow operations in the lower American River are managed according to the minimum-flow requirements established in the Water Forum's Lower American River Modified Flow Management Standard (ARWA, 2017). These requirements establish minimum flows, as measured by the total release at Nimbus Dam, which vary throughout the year in response to the hydrology of the Sacramento and American river basins:

- *October 1 through December 31:* Between 800 and 2,000 cubic feet per second (cfs).
- *January 1 through Labor Day:* Between 800 and 1,750 cfs.
- *Post–Labor Day through September 30:* Between 800 and 1,500 cfs.

As a general rule, the minimum-flow requirements must equal or exceed 800 cfs year-round. Narrowly defined exceptions to this rule allow Nimbus releases to drop below 800 cfs to avoid depleting water storage in Folsom Reservoir when dry or critical hydrologic conditions are forecasted to occur. These narrowly defined exceptions to the minimum-flow requirements are an important component of the Lower American River Modified Flow Management Standard. The stated goals for the modified standards include, "…protecting anadromous salmonids, preserving recreational and aesthetic values, avoiding catastrophic water shortages in the basin and contributing to the Delta's ecological health downstream" (ARWA, 2017). The Lower American River Modified Flow Management Standard includes criteria for ramping rate and flow fluctuation to minimize drastic changes in flows for the benefit of specific in-river fish life cycles.

As described in subsection 3.5.2, *Environmental Setting*, the Lower American River Modified Flow Management Standard manages water temperatures iteratively and involves the use of multiple target water temperature schedules. Generally, the temperature plan attempts to limit stressful temperatures (above 65°F) for juvenile steelhead and spawning fall-run Chinook salmon and also avoid water temperatures at or above 72oF that can be lethal for salmonids over an extended period (1 month or more).

City of Sacramento 2040 General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies that are applicable to the evaluation of biological resource effects are provided in **Table 3.5-2**. These policies guide the location, design, and quality of development to protect biological resources such as wildlife habitat, open space corridors, and ecosystems.

TABLE 3.5-2
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – BIOLOGICAL RESOURCES – AQUATIC

Element	Goals and Policies
Land Use and Placemaking	Goal LUP-1: Policies 1.1, 1.11, 1.12; Goal LUP-8: Policy 8.3; Goal LUP-11: Policies 11.5, 11.7, 11.8
Environmental Resources and Constraints	Goal ERC-1: Policies 1.1, 1.2, 1.3, 1.4; Goal ERC-2: Policies 2.1, 2.2, 2.3, 2.4, 2.5; Goal ERC-3: Policies 3.2, 3.3, 3.5, 3.7, 3.9, 3.11; Goal ERC-6: Policies 6.1, 6.2, 6.3, 6.9
Public Facilities and Safety	Goal PFS-3: Policy 3.13; Goal PFS-4: Policies 4.2, 4.3

SOURCE: City of Sacramento, 2024.

3.5.4 Impacts and Mitigation Measures

Method of the Analysis

This section assesses the potential for the proposed project to adversely change fisheries resources in or around the proposed project areas. The impact analysis focuses on foreseeable changes to existing conditions and compares those changes to the significance criteria presented below. Potential impacts are analyzed using information presented above regarding habitats present in and around the proposed project areas, and potential occurrence of special-status and protected species. Specific to this impact analysis, three principal factors were considered: (1) the magnitude of the impact (i.e., substantial/not substantial); (2) the uniqueness of the affected resource (i.e., rarity of the resource); and (3) susceptibility of the affected resource to perturbation (i.e., sensitivity of the resource). The evaluation of potential significance considered the interrelationship of these three principal factors. For example, a relatively small magnitude impact to a State or federally listed species would be considered significant if the species is exceptionally rare or believed to be highly susceptible to disturbance.

The proposed project would be regulated by the laws, regulations, plans, and policies summarized in subsection 3.5.3, *Regulatory Setting*. Therefore, the impact analysis assumes that the proposed project would comply with existing applicable regulatory and permitting requirements. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Construction Impacts

To evaluate whether implementation of the proposed project would result in aquatic biological resource impacts, the analysis considers how construction (short-term, temporary) activities would result in changes to existing conditions. Construction impacts on listed fish and their associated habitat are only analyzed for construction activities associated with both the new and existing water intakes on the Sacramento River as this project component involves in-water work (refer to Impact 3.5-1). Construction impacts on fish and their habitat resulting from implementation of these project components were analyzed based on review of relevant literature.

Construction activities associated with the other project components (e.g., treatment plant improvements at the FWTP and existing utility upgrades at both water treatment plants, and the potable water transmission pipelines) do not have an in-water component and therefore would not be expected to impact fish or their habitat. Refer to Impact 3.5-1 for additional details regarding potential impact associated with these project components.

Operation and Maintenance Impacts

To evaluate whether implementation of the proposed project would result in aquatic biological resource impacts, the analysis considers how O&M (long-term, temporary) activities would result in changes to existing conditions. Similar to construction impacts, O&M impacts on listed fish and their associated habitat are only analyzed for the new and existing Sacramento River water intakes project component. O&M activities associated with the other project components do not have an in-water component and therefore would not be expected to impact fish or their habitat (refer to Impacts 3.5-2 and 3.5-3 for additional discussion regarding no impact of these project components).

O&M of the Sacramento River water intakes could result in both near-field and far-field effects. Near-field effects are those that have the potential to impact fish immediately surrounding the water intakes, such as through entrainment or increased predation. Therefore, because the water intakes are located in the Sacramento River, near-field effects are only evaluated in the Sacramento River, adjacent to the location of the new and existing water intake (refer to Impact 3.5-2). Far-field effects are those that have the potential to impact fish upstream and/or further downstream of the water intakes, such as flow changes that result from increased diversions from the new water intake. Far-field flow effects that are associated with O&M of the new intake were evaluated in three areas: (1) the Lower American River, (2) the Sacramento River, and (3) the Delta (refer to Impact 3.5-3).

Hydrologic modeling results from the California Simulation Model 3.0 (CalSim 3) were used as the basis of analysis for the potential far-field effects to aquatic biological resources, as a reduction in instream flow resulting from increased diversions through the new water intake, depending on the season and magnitude of the change, could adversely affect habitat conditions for both resident and migratory fish species. Where larger changes in river flows were observed (i.e., in the Lower American River), two additional modeling efforts were used to further quantify potential impacts to listed fish and their associated habitat: (1) a flow-dependent habitat availability analysis using the Physical Habitat Simulation System (PHABSIM), and (2) water temperature modeling using HEC-5Q.

The CalSim 3 hydrologic modeling and HEC-5Q water temperature modeling are both summarized in Section 3.12, *Hydrology, Water Quality, and Water Supply*, and includes a description of the modeling approach, model scenarios, model outputs, modeling results interpretation, and modeling results. A detailed description of the modeling assumptions, scenarios, limitations, and simulation results are provided in **Appendix E**. The PHABSIM habitat availability analysis is further described under Impact 3.5-3.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would cause any of the following:

- A substantial adverse effect, either directly or through habitat modification, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.
- Substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Consistent with Section 3.12, *Hydrology, Water Quality, and Water Supply,* when comparing simulated model results, if the relative difference in a given parameter (i.e., river flow, Delta water quality, habitat availability, or water temperature) is 5 percent or less, the simulated changes can generally be considered negligible, or "no effect," compared to baseline conditions. The term "substantial" is used in this context to indicate relative differences that exceed the relevant threshold (5 percent).

Impacts and Mitigation Measures

Table 3.5-3 summarizes the impact conclusions presented in this section.

TABLE 3.5-3
SUMMARY OF IMPACT CONCLUSIONS – BIOLOGICAL RESOURCES – AQUATIC

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.5-1: Construction of the proposed project could result in direct or indirect impacts to listed fish species and their associated habitat and could interfere with movement of native resident or migratory fish.	NI (FWTP/ SRWTP)	NI (FWTP/ SRWTP)	LS (Existing) LSM (New)	NI
3.5-2: Operation and maintenance of the proposed project could result in near-field direct or indirect impacts to listed fish species and their associated habitat and could interfere with movement of native resident or migratory fish.	NI (FWTP/ SRWTP)	NI (FWTP/ SRWTP)	LS (Existing) LS (New)	NI
3.5-3: Operation of maintenance of the proposed project could result in far-field indirect impacts to listed fish species and their associated habitat.	NI (FWTP/ SRWTP)	NI (FWTP/ SRWTP)	NI (Existing) LS (New)	NI

NI: No Impact
LS: Less than Significant
LSM: Less than Significant with Mitigation

Impact 3.5-1: Construction of the proposed project could result in direct or indirect impacts to listed fish species and their associated habitat and could interfere with movement of native resident or migratory fish.

Treatment Plant Improvements, Existing Utility Upgrades and Potable Water Transmission Pipelines

Construction activities associated with treatment plant improvements at both FWTP and SRWTP, including the demolition of existing structures and facilities and construction of potable water transmission pipelines, would occur primarily within the City-owned property in previously disturbed areas. Construction activities associated with the existing utility upgrades at both treatment plants would also occur in previously disturbed areas. While the exact location of the potable water transmission pipelines is not known at this time, construction activities would likely occur in previously disturbed areas. Based on the location of these project components, construction activities would not occur in-water and there would be no in-water work. Therefore, construction activities would not result in direct or indirect impacts to listed fish species or interfere with movement of native resident or migratory fish.

Sacramento River Water Intakes

New Water Intake

As described in Chapter 2, *Project Description*, the proposed project involves construction and operation of a new water intake, a pump station, and a new pipeline for conveying raw water from the supply source (Sacramento River) to SRWTP facilities. Construction activities associated with installation of the new water intake could result in the temporary modification of habitat of listed species in the Sacramento River in the vicinity of the intake location. Indirect effects, although not directly resulting in mortality, could result in physiological stress, rendering affected fishes more susceptible to disease or predation or reduced reproductive fitness; disrupt spawning or foraging behavior; reduce the availability or quality of spawning and foraging habitat; and potentially expose special-status fishes to predation and other forms of mortality (e.g., due to entrapment or exposure in shallow or restricted water) when temporarily displaced from their preferred habitats. In addition, fish could be temporarily displaced from their habitats by noise, vibrations, chemicals (e.g., spilled fuel), or similar effects, or their habitats could be temporarily altered in quality or quantity.

Furthermore, the potential removal of streamside vegetation to prepare the construction work area may temporarily impair the movement of special-status fish species. Streamside vegetation provides shade and reduces water temperatures. Removing cover would increase solar radiation exposure and that may result in thermal stress on migratory fish, which could negatively affect fish movement along these corridors. The removal of riparian vegetation, broadly exposing streams, may also increase the visibility of migratory fishes to potential predators, and increase fish mortality rates during migration through these locations.

Acoustic Effects

All construction activities that use machinery and heavy equipment within or directly adjacent to occupied habitat have the potential to produce vibrations and acoustic disturbance that can temporarily disrupt fish movement or harass fish and reduce their ability to use certain aquatic habitats (Myrberg, 1990; Hastings and Popper, 2005). However, it is expected that this impact would be localized to areas adjacent to the disturbance, with listed fish species able to avoid the area and move into other parts of the aquatic environment, limiting the expected impact to fish species.

Installation of the new water intake would require in-water work in the Sacramento River to construct the tee screen intake and pump station**.** A sheet piling cofferdam would be installed in the riverbed and on the riverside of the levee to create a dewatered area for construction to occur. Sheetpile cofferdam installation includes pile driving activities which could have both direct and indirect effects on fish. Of primary concern with the in-water installation of piles is the potential for the generation of underwater noise at a level that is harmful to fish species. Pile driving can produce high-intensity noise resulting in damage to the soft tissues of fish, such as gas bladders or eyes (barotraumas) and/or result in harassment of fish such that they alter swimming, sleeping, or foraging behavior or temporarily abandon forage habitat. Furthermore, installation of a cofferdam would temporarily block a portion of the river that fish use for migration and foraging.

The striking of a pile by a pile-driving hammer creates a pulse of sound that propagates through the pile, radiating out through the water column, seafloor, and air. Sound pressure pulses, as a function of time, are referred to as a waveform. Peak waveform pressure underwater is typically expressed in decibels (dB) referenced to 1 microPascal (μPa).[2] Sound levels are generally reported as peak levels, root-mean-square pressure, and sound exposure levels. The peak pressure is the highest absolute value of the measured waveform. For pile driving pulses, the root-mean-square pressure level is determined by analyzing the waveform and computing the average of the squared pressures over time that comprise the portion of the waveform containing the vast majority of sound energy. Sound exposure level is a metric that provides an indication of the amount of acoustical energy contained in a sound event. For pile driving, sound exposure level can be used to describe a single pile driving pulse or many cumulative pulses when required to drive multiple piles. In addition to the pressure pulse of the waveform, the frequency of the sound, expressed in hertz, is also important to evaluating the potential for sound impacts. Low frequency sounds are typically capable of traveling over greater distances with less reduction in the pressure waveform than high frequency sounds.

Vibratory pile drivers work on a different principle than pile-driving hammers and therein produce a different sound profile. A vibratory driver works by inducting particle motion to the substrate immediately below and around the pile causing liquefaction of the immediately adjacent soft substrate, allowing the pile to sink downward. Sound levels are typically 10–20 dB lower in intensity relative to the higher, pulse-type noise produced by an impact hammer (Caltrans, 2020).

Scientific investigations on the potential effects of noise on fish indicate that sound levels below the 183 dB sound exposure level do not appear to result in any acute physical damage or mortality to fish (*barotraumas*) of any size (Dalen and Knutsen, 1987). **Table 3.5-4** provides a summary of known acute and sub-lethal effects of noise on fish. Noise levels that result in startle responses in steelhead trout and salmon have been documented to occur at sound levels as low as 150 dB root-mean-square pressure level (Halvorsen et al., 2012). Any disturbance to federal or state-listed fish

2 Therefore, 0 dB on the decibel scale would be a measure of sound pressure of 1 μPa.

species that results in altered swimming, foraging, movement along a migration corridor, or any other altered normal behavior is considered harassment, a potentially significant impact.[3]

TABLE 3.5-4
POTENTIAL EFFECTS TO FISH AT VARYING NOISE LEVELS

Taxa	Sound Level (dB)	Effect	Reference
All fish > 2 grams in size	206 peak 187 (SEL)	Acute Barotraumas	Fisheries Hydroacoustic Working Group, 2008
All fish < 2 grams	186 (SEL)	Acute Barotraumas	Fisheries Hydroacoustic Working Group, 2008
Salmon, steelhead	150 (RMS)	Avoidance behavior	Halvorsen et al., 2012

NOTES: SEL = sound exposure level; RMS = root-mean-square pressure level

Sediment Disturbance and Water Quality Effects

Construction associated with the new water intake and pump station would involve earth-disturbing activities (e.g., excavation, trenching, grading, etc.) that could result in the release of sediments into the Sacramento River. Suspended sediments in the water column have the potential to affect fish by disrupting normal feeding behavior, reducing growth rates, increasing stress levels, and reducing respiratory functions. Increased suspended solids can also affect aquatic organisms by reducing dissolved oxygen levels and light transmission, and when the sediment in the suspended solids resettles, it could have the potential to smother aquatic habitats and organisms. Changes in light transmission have the potential to limit photosynthesis and reduce foraging abilities for organisms that rely on visual signals for feeding (e.g., salmonids) (Anchor Environmental, 2003). Substantially depressed oxygen levels (i.e., below 5.0 mg/l) may cause respiratory stress to aquatic life, and levels below 3.0 mg/l may cause mortality.

Research with salmonids has shown that high turbidity concentrations can: reduce feeding efficiency, decrease food availability, reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and can also cause fish mortality (Berg and Northcote, 1985; Gregory and Northcote, 1993; Velagic, 1995; Waters, 1995). Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters, 1995), which can interrupt normal movement patterns, displace fish into less suitable habitat, and/or increase competition and predation, decreasing chances of survival. Nevertheless, much of the research mentioned above focused on turbidity levels significantly higher than those likely to result from the proposed instream activities, especially with implementation of the proposed mitigation measures. Therefore, the small pulses of moderately turbid water expected from the proposed instream activities will likely cause only minor physiological and behavioral effects, such as dispersing listed fish from established territories, potentially increasing interspecific and intraspecific competition, as well as predation risk for the small number of affected fish.

Furthermore, turbidity increases would be relatively brief and generally confined to within a few hundred feet of the activity. Turbidity levels would initially be higher than baseline levels; however, the sediment would disperse and be re-deposited, and background levels would be

3 It should be noted that the acoustic thresholds shown in Table 3.5-4 regard sound levels generated for impact pile driving, no criteria for vibratory pile driving exist at this time.

expected to be restored within hours of the disturbance. Therefore, fish would be able to use their preferred habitats and continue their normal migration routes in a matter of hours. However, construction activities could also accidentally introduce contaminants such as fuels, oils, hydraulic fluids, and other chemicals/compounds into the wetted environment either directly through spills or incrementally through surface runoff from haul routes and staging areas. Such alterations to aquatic habitats could affect fish by altering water temperature, pH, clarity, or chemical composition, as well as stream substrates, most likely by introducing silt, sand, soil, or gravel. These alterations could render otherwise suitable habitat unsuitable for fish, at least temporarily, or they could introduce contaminants that would affect fish health, reproductive success, and juvenile survivorship. If present in sufficient concentrations, contaminants could be toxic to fish and prey organisms occupying adjacent aquatic habitats. Contaminants could also alter oxygen diffusion rates and cause acute and chronic toxicity to aquatic organisms, thereby reducing growth and survival and possibly causing mortality of listed fish. As described in Section 3.12, *Hydrology, Water Quality, and Water Supply*, Impact 3.12-1, to minimize the potential effects of construction runoff on receiving water quality, the state requires that any construction activity affecting one acre or more obtain coverage under the Construction General Permit ([CGP]; Order No. 2022-0057-DWQ, effective September 1, 2023).

In accordance with National Pollutant Discharge Elimination System (NPDES) regulations, the City would obtain coverage under the CGP and require contractors to comply with the permit's conditions. Compliance with the CGP would require the development and implementation of a storm water pollution prevention plan (SWPPP) that would include standard BMPs required for all projects and any additional measures determined necessary to control stormwater run-on/runoff and sediment. Examples of typical construction BMPs include scheduling or limiting certain activities to dry weather periods, using erosion controls such as hydroseeding or erosion control blankets, installing sediment barriers such as silt fence and fiber rolls, implementing dust control measures, maintaining equipment and vehicles used for construction, storing and handling of chemicals and toxic materials to prevent spills from entering the aquatic environment. These BMPs are designed to avoid or reduce stormwater and water quality effects caused by construction site runoff.

For dewatering activities, the contractor would be required to implement dewatering requirements presented in the CGP (Attachment J), which include:

- pH and turbidity monitoring of discharge, with discharge ceasing if a single sample exceeds water quality numeric action levels.
- The use of outlet structures that withdraw water from the surface of impoundments, as feasible.
- Work to prevent dewatering discharge from contacting construction materials or equipment.
- BMPs that reduce the velocity of dewatering discharge (such as check dams and sediment traps).
- Immediate corrective actions identified and implemented by a qualified SWPPP developer to prevent exceedances if any occur.

Potential Loss of Habitat

The habitat adjacent to the new water intake in the Sacramento River acts as a migratory corridor and juvenile foraging habitat for juvenile salmonids. However, the juvenile salmonid habitat found at this portion of the Sacramento River is characterized by levees stabilized with riprap and lacking in emergent vegetation, a relatively deep, high velocity channel, and silt and sand substrate. Therefore, the current state of habitat is considered low quality and carries a high risk of predation, due to the presence of non-native predatory fish, such as striped bass and largemouth bass. Nonetheless, the construction of the new water intake would remove up to 0.23 acres of shade riverine aquatic habitat along banks of the Sacramento River.

In addition, construction of the new intake could result in the loss of shallow water habitat, important for Delta smelt and longfin smelt. However, the location of the proposed new intake is upstream of the Legal Delta boundaries and at the fringes of Delta smelt and longfin smelt habitat ranges (Moyle et. al, 2016; Merz et al., 2013).

To better characterize the importance of the nearby habitat for Delta smelt and longfin smelt, data from recent sampling efforts in the region, as part of the Interagency Ecological Program, were examined to determine the frequency of presence of various life stages of each smelt species. Delta smelt and longfin smelt data were obtained from the Environmental Data Initiative repository (Bachevkin et al., 2024) and the dataset was filtered to include records of Delta smelt and longfin smelt collected within a 2-mile radius of the intake structure between 2003 and 2023. **Figure 3.5-1** presents Interagency Ecological Program survey stations within 2 miles of the new intake facility on the Sacramento River at the confluence with the American River. No catches of longfin smelt were reported, so this species was excluded from further analysis. Delta smelt captures were categorized by sampling station, capture method, and size class (<25 millimeter and ≥25 millimeter). No larval Delta smelt (<25 millimeter) were recorded in the dataset. Consequently, the analysis focuses on juvenile and adult Delta smelt (≥25 millimeter), with results summarized as average monthly catches (refer to **Table 3.5-5**).

The summary of recent sampling data indicates that no longfin smelt or larval Delta smelt have been observed at the Interagency Ecological Program (IEP) sampling stations within 2 miles of the new intake location over the previous 20 years of available data. Also, juvenile and adult Delta smelt were observed very infrequently, with less than a single fish captured on average per month across the 20-year period. These results suggest that Delta smelt do not utilize the habitat adjacent to the new water intake for spawning, as corroborated by previous studies examining their distribution (Merz et al., 2011). Therefore, the construction of the new intake is not expected to impact shallow water habitat important for Delta smelt and longfin smelt life history.

Existing Water Intake

As described in Chapter 2, *Project Description*, the proposed project involves repairs to the existing public rotunda leading to the existing intake and installation of a second pipeline (2,000 feet of 12-inch-diameter pipe) to transport sediment from the existing intake to SRWTP. The pipeline would be located along a similar alignment as the raw water conveyance pipeline from the new intake (refer to Figure 2-5). Construction would involve many of the same earth-disturbing activities (e.g., excavation, trenching, grading, etc.) associated with the treatment plant improvements and existing utility upgrades.

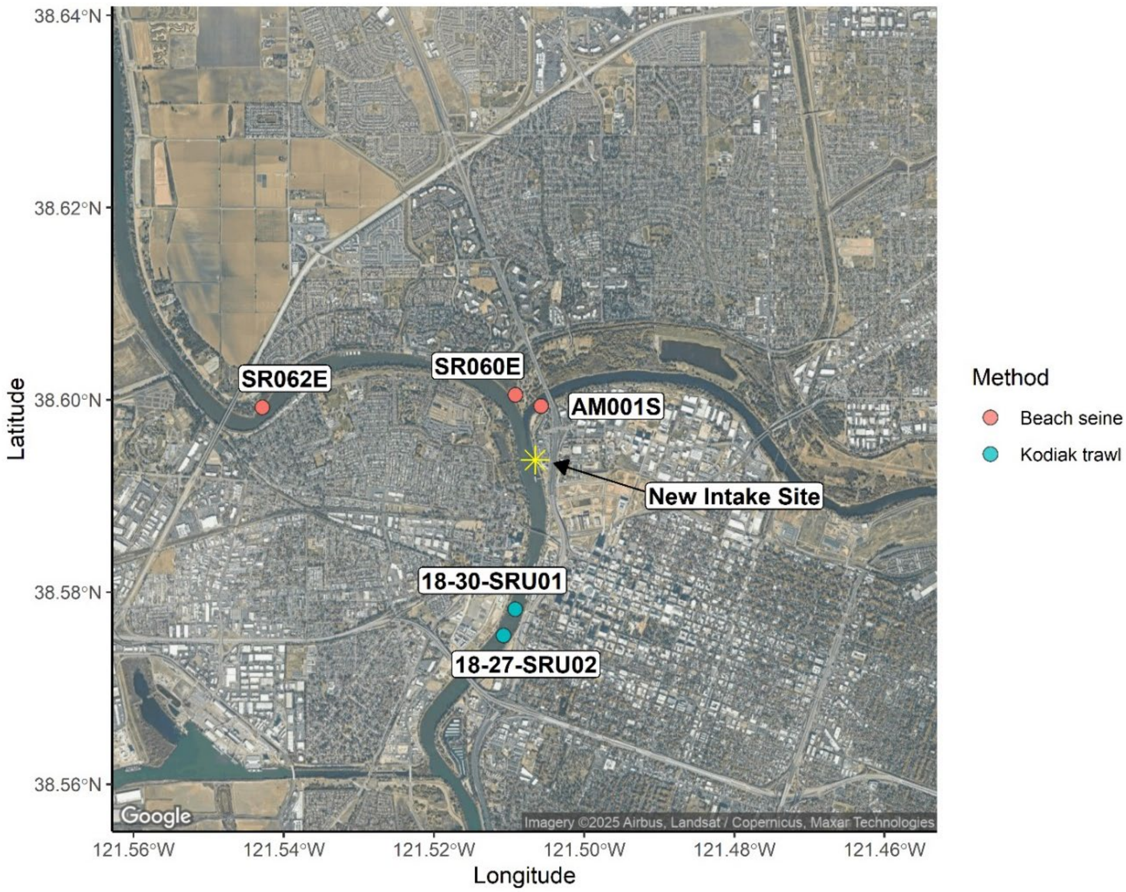


Figure 3.5-1
Interagency Ecological Program Survey Stations within 2 Miles of the New Intake Facility on the Sacramento River at the Confluence with the American River

TABLE 3.5-5
AVERAGE MONTHLY CATCH OF DELTA SMELT (≥25 MILLIMETER) AT INTERAGENCY ECOLOGICAL PROGRAM SURVEY STATIONS WITHIN 2 MILES OF THE NEW INTAKE FACILITY (2003 – 2023)

	Station ID (Capture Method)				
Month	**18-27-SRU02 (Kodiak Trawl)**	**18-30-SRU01 (Kodiak Trawl)**	**AM001S (Beach Seine)**	**SR060E (Beach Seine)**	**SR062E (Beach Seine)**
Jan	0	0	0	0	0
Feb	0	0	0	**0.2**	**0.2**
Mar	0	0	0	**0.1**	0
Apr	0	0	0	**0.2**	0
May	0	0	0	0	0
Jun	0	0	**0.1**	0	0
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0

Construction activities would not occur in-water, but installation of portions of the new pipeline at the existing water intake would be located near the Sacramento River. As described above, compliance with the CGP that requires the development and implementation of a SWPPP would include standard BMPs to avoid or reduce stormwater and water quality effects caused during construction site runoff. Therefore, with adherence to the CGP, construction associated with the existing water intake would not result in direct or indirect impacts to listed fish species or interfere with movement of native resident or migratory fish.

Impact Conclusion

Construction activities associated with the treatment plant improvements at FWTP and SRWTP, existing utility upgrades at both treatment plants, and potable water transmission pipelines would not occur in-water, and therefore there would be no direct or indirect impacts to listed fish species or interference with movement of native resident or migratory fish. There would be **no impact**.

Construction activities associated with the existing water intake would not occur in-water but would be located near the Sacramento River. With adherence to the CGP, construction associated with the existing water intake would not result in direct or indirect impacts to listed fish species or interfere with movement of native resident or migratory fish. This impact would be **less than significant**.

Construction activities associated with the new water intake could result in modification to fish habitat in the Sacramento River in the vicinity of the intake. Indirect effects include physiological stress; disruption of spawning or foraging behavior; reduction of the availability or quality of spawning and foraging habitat; and potential exposure to predation when temporarily displaced from their preferred habitats. Furthermore, pile driving activities could have both direct and indirect effects on fish, the primary concern of which is the potential for the generation of underwater noise at a level that is harmful to fish species. Increased underwater sound levels can cause a disruption to normal feeding and swimming behaviors, and in extreme cases, mortality. Increased sediment levels from in-water work could also cause respiratory stress to aquatic life. In-water construction, including pile driving, would be temporary and limited to the in-water work window. Therefore, the number of individuals potentially impacted by project activities is expected to be low. Furthermore, fish would likely avoid the work area and would use other parts of the river for movement and migration. Nonetheless, in-water work could still result in the potential for injury or mortality. Therefore, this would be a potentially **significant impact**.

Mitigation Measures

> **Mitigation Measure 3.5-1 (SRWI-New):** Prior to the start of any in-water construction that would require pile driving, the City or its contractors shall prepare a sound attenuation monitoring plan to protect fish and submit to NMFS, CDFW, and USFWS for approval. The approved plan shall be implemented during construction. This plan shall provide detail on the sound attenuation system, detail methods used to monitor and verify sound levels during pile driving activities (if required based on projected in-water noise levels), and describe best management practices to reduce impact pile-driving in the aquatic environment to an intensity level less than 183 dB (sound exposure level, SEL) impulse

noise level for fish at a distance of 33 feet. The plan shall incorporate, but not be limited to, the following best management practices:

(a) To the extent feasible vibratory pile drivers shall be used for the installation of all support piles.

(b) If impact hammer pile driving will be used, a soft start technique shall be implemented, at the start of each workday or after a break in impact hammer driving of 30 minutes or more, to give fish an opportunity to vacate the area.

(c) If during the use of an impact hammer, established pile driving thresholds are exceeded (greater than 183 dB), a bubble curtain or other sound attenuation method as described in the approved sound attenuation monitoring plan shall be utilized to reduce sound levels below the criteria described above.

Mitigation Measure 3.5-2 (SRWI-New): Incorporate best practices to avoid and/or minimize potential impacts from in-water construction. These include the following:

(a) All in-water construction shall occur during the designated in-water work window of June 1 through October 31 (or as otherwise specified by applicable permits from the Regional Water Quality Control Board, CDFW, NMFS, and/or U.S Army Corps of Engineers [USACE]), when listed fish are least likely to occur.

(b) All materials placed into the creek channel shall be nontoxic. Any combination of wood, plastic, cured concrete, steel pilings, or other materials used for in-channel structures shall not contain coatings or treatments or consist of substances toxic (e.g., copper, other metals, or pesticides, petroleum-based products, etc.) to aquatic organisms that may leach into the surrounding environment in amounts harmful to aquatic organisms.

(c) Construction supervisors and managers shall be educated on invasive species identification and the importance of controlling and preventing the spread of invasive species. The Project Applicant will follow the guidelines in the CDFW's California Aquatic Invasive Species Management Plan (CDFW, 2008) and Aquatic Invasive Species Disinfection/Decontamination Protocols (CDFW, 2022).

(d) Construction equipment such as portable equipment, vehicles, and supplies, including chemicals, shall be stored at designated construction staging areas or on barges, exclusive of any riparian or wetland areas. Any equipment that may leak shall be stored over impermeable surfaces, if available, and drip pans (or any other type of impermeable containment measure) will be placed under parked machinery and checked and replaced, when necessary, to prevent drips and leaks from entering the environment.

(e) Areas for fuel storage, refueling, and servicing of construction equipment shall be located in an upland location and following industry BMPs.

(f) The contractor/applicant to the Program shall inspect, maintain and repair all erosion control materials and devices prior to and after any storm event, at 24-hour intervals during extended storm events, and a minimum of every two weeks until all erosion control measures are no longer needed.

(g) Immediately after project completion and before the close of the seasonal work window, all exposed soil shall be stabilized with erosion control measures such as mulch, seeding, and/or placement of erosion control blankets. Where straw, mulch, or slash is used on bare mineral soil, the minimum coverage shall be 95 percent with two-inch minimum depth.

Mitigation Measure 3.5-3 (SRWI-New): During all in-water construction work associated with the installation of the proposed new intake, the City or its contractors shall develop a fish salvage and relocation plan and submit to NMFS, CDFW, and USFWS for approval. The approved plan shall be implemented after cofferdam installation and prior to dewatering to prevent fish stranding during dewatering. The plan will outline methods and procedures for rescue and relocation including:

(a) Salvage and relocation activities shall be conducted by Qualified Biologists approved by NMFS, CDFW, and USFWS and in accordance with required permits.

(b) Procedures for excluding fish from the construction zone and for removing fish, should they become trapped.

(c) Salvage methods including seining, dipnetting, and electrofishing, shall be implemented in a way that minimizes fish stress and mortality.

Mitigation Measure 3.5-4 (SRWI-New): In order to offset the permanent loss of 0.23 acres of shaded riverine aquatic habitat removed to accommodate the proposed new intake, the City shall purchase mitigation credits from a public or private mitigation bank approved by CDFW. The final number of credits purchased will be in a ratio agreeable to CDFW and other agencies consulted.

Significance After Mitigation: Mitigation Measures 3.5-1, 3.5-2, 3.5-3, and 3.5-4 would ensure that construction associated with the new water intake avoids or mitigates for impacts to listed fish species and their associated habitat through implementation of a sound attenuation monitoring plan, incorporation of best practices for in-water construction, development of a fish salvage and relocation plan, and purchase of compensatory mitigation credits. Adherence to the CGP and in-water construction BMPs would further reduce potential impacts to listed fish species. Furthermore, while listed fish species are likely to avoid the work area due to increased sound and activity, implementing an in-water work window would further reduce potential impacts to the movement of native resident and migratory fish. Therefore, this impact would be reduced to **less-than-significant with mitigation**.

Impact 3.5-2: Operation and maintenance of the proposed project could result in near-field direct or indirect impacts to listed fish species and their associated habitat and could interfere with movement of native resident or migratory fish.

Treatment Plant Improvements, Existing Utility Upgrades and Potable Water Transmission Pipelines

Once improvements are completed, O&M associated with the treatment plant improvements at FWTP and SRWTP, existing utility upgrades at both treatment plants, and potable water transmission pipelines would be similar to existing O&M activities. Based on the location of these project components, O&M would not occur in-water and therefore would not result in near-field direct or indirect impacts to listed fish species and their associated habitat or interfere with movement of native resident or migratory fish.

Sacramento River Water Intakes

As introduced above, near-field effects are defined as those effects that have the potential to impact fish immediately surrounding the water intakes, such as through entrainment or increased predation. The following presents an evaluation of the potential for O&M of the new and existing water intakes to result in near-field direct or indirect impacts to listed fish species and their associated habitat and/or interfere with movement of native resident or migratory fish. Because the water intakes are located in the Sacramento River, near-field effects are only evaluated in the Sacramento River. The existing water intake on the Sacramento River would remain operational during and after construction of the new water intake. Operation of the existing water intake would be the same as existing conditions. Therefore, the risk of entrainment or impingement will remain similar to existing conditions. Furthermore, predation risk on listed fish would also remain similar to existing conditions.

Entrainment and Impingement

Operation of the proposed new water intake in the Sacramento River has the potential to entrain or impinge listed fish species such as Delta smelt and outmigrating juvenile salmonids. During operations, water that is pulled into the new intake could entrain fish swimming or feeding in the water adjacent to the project location into the intake as well. However, as described in Chapter 2, *Project Description*, subsection 2.4.2, the proposed new intake would be designed to meet standards in accordance with CDFW (2000) and NMFS (1996) fish screening criteria. The screen would be designed to have an approach velocity equal to or less than 0.2 fps to meet the USFWS screening criteria when Delta smelt are present. Calculations suggest that a 1.75-millimeter screen opening size would be effective at excluding juvenile salmonids of 22-millimeter standard length and greater (ICF International, 2016), which is the equivalent of around 25-millimeter fork length. Therefore, this would be expected to exclude all juvenile salmonids occurring in the vicinity of the intake. Furthermore, placement of the tee screens on the bottom of the river channel should mostly avoid salmonid entrainment since they tend to migrate toward the top of the water column.

Larval smelt (less than 25 millimeters in length), however, still have the potential to be entrained by the intake. The upstream location of the proposed new water intake would likely limit the exposure of possible larval smelt entrainment due to smelt's now constrained distribution in the Delta (Merz et al., 2011). Most Delta smelt have been captured in the arc of habitat from the Cache–Lindsay Slough Complex in the north Delta, down the Sacramento River, to Montezuma Slough in Suisun Marsh (Moyle et al., 2016), with limited occurrence in the upper edge of the Delta near the proposed new water intake. Furthermore, analysis of IEP sampling data collected within 2 miles of the new intake location indicate no larval Delta smelt have been captured over the last 20 years (refer to subsection *Potential Loss of Habitat* under Impact 3.5-1). Therefore, the potential for loss of larval Delta smelt at the new intake is very low.

Increased Predation

Operation of the proposed new water intake also has the potential to provide habitat for predators, further increasing predation risk on listed fish. Physical structures, such as a tee screen structure, provide physical habitat and cover that may attract various predatory species of fish to the area. Predatory fish, such as largemouth bass and striped bass, could aggregate near the proposed new water intake, thus creating a predatory hotspot and increasing the likelihood of predation on native and special-status fish. Furthermore, predatory fish could utilize the structure to ambush their prey. A study conducted by Sabal et al. (2016) showed a greater abundance of predatory fish adjacent to manmade structures; however, other studies have found few potential juvenile salmonid predators in the vicinity of fish screens (Demetras et al., 2016; Michel et al., 2013).

In addition, the footprint of the new intake is small relative to the expanse of predator-dense habitat in the lower Sacramento River. The river-estuary transition of the Sacramento River (adjacent to the new intake) is heavily altered (channelized, armored banks, lack of fish cover) and supports large populations of non-native predatory fish, including striped bass and largemouth bass (Grossman, 2016). Therefore, predation risk to special-status fish species in the lower Sacramento River may not measurably increase with the addition of the new intake. Overall, the weight of available information suggests that near-field predation effects at the new intake would be limited, but uncertainty remains around the level the effect.

Maintenance Impacts

As described in Chapter 2, *Project Description*, subsection 2.6.3, maintenance activities associated with the proposed new intake would include periodic cleaning of the tee screens that would be accomplished both manually and with airburst equipment, which would be located at the proposed pump station and associated compressed air piping buried alongside the raw water conveyance pipeline. O&M related to sediment removal in the pumping bays of both water intakes would also be performed at most annually. These maintenance activities would occur infrequently (likely once per year) and occur during June 1 through October 31, when listed fish species are least likely to occur. Therefore, maintenance activities associated with the new and existing water intakes are not expected to impact listed fish species or interfere with movement of native resident or migratory fish.

Impact Conclusion

Based on the location of the treatment plant improvements at FWTP and SRWTP, existing utility upgrades at both treatment plants, and proposed potable water transmission pipelines, O&M would not occur in-water and therefore would not result in near-field direct or indirect impacts to listed fish species and their associated habitat or interfere with movement of native resident or migratory fish. Therefore, there would be **no impact** from these project components.

Operation of the existing water intake would be consistent with existing conditions and therefore not result in changes to near-field direct and indirect effects on listed fish compared to existing conditions. Additionally, maintenance activities associated with the new and existing water intakes would occur infrequently (likely once per year) and occur during June 1 through October 31, when listed fish species are least likely to occur. Therefore, potential impacts of O&M of the existing water intake would be **less than significant**.

Operation of the new water intake could lead to entrainment and impingement of Delta smelt, juvenile salmonids, and other listed fish species. However, the proposed new water intake is designed to avoid entrainment of juvenile salmonids and juvenile and adult-sized Delta smelt. Also, recent IEP sampling data indicate that Delta smelt do not spawn in the vicinity of the new water intake, with no larval Delta smelt being captured within 2 miles of the new intake location within the last 20 years (refer to subsection *Potential Loss of Habitat* under Impact 3.5-1).

The predation risk to special status fish species in the lower Sacramento River may increase with the addition of a new intake. As part of obtaining permit approvals (e.g., FESA Section 7, CESA [Fish and Game Code Sections 2080.1, 2081], the City will consult with NMFS, USFWS, and CDFW to determine necessary impact minimization actions, which may include conducting special studies at the new intake site to assess predation risk, potentially leading to adaptive management measures such as water intake design refinements like inclusion of predator refugia elements. The City will implement these measures developed in coordination with and approved by NMFS, USFWS and CDFW through the permit processes, to ensure that impacts are avoided and/or minimized. These additional measures would be anticipated to reduce the impact of increased predation risk to low levels. Therefore, impacts of the O&M of the new water intake would be **less than significant**.

Impact 3.5-3: Operation and maintenance of the proposed project could result in far-field indirect impacts to listed fish species and their associated habitat.

Treatment Plant Improvements, Existing Utility Upgrades and Potable Water Transmission Pipelines

As described above in Impact 3.5-2, once improvements are completed, O&M associated with the treatment plant improvements at FWTP and SRWTP, existing utility upgrades at both treatment plants, and potable water transmission pipelines would be similar to existing O&M activities. Based on the location of these project components, O&M would not occur in-water and therefore would not result in far-field indirect impacts to listed fish species and their associated habitat.

Sacramento River Water Intakes

As introduced above, far-field effects are defined as those effects that have the potential to impact fish upstream and/or further downstream of the water intakes. Operation of the existing water intake would be consistent with existing conditions (i.e., the proposed project would not divert additional water through the existing intake). Therefore, operation of the existing water intake would not result in changes to far-field indirect effects on listed fish and their associated habitat.

Operation of the new water intake, however, would increase diversions from the Sacramento River resulting in potential changes in river flows. The following presents an evaluation of the potential for operation of the new water intake to result in far-field indirect impacts on listed fish species and their associated habitat. The analysis is presented for the three areas: (1) the Lower American River, (2) the Sacramento River, and (3) the Delta.

Lower American River Habitat Effects

Habitat effects on the Lower American River were evaluated based on changes in river flows as simulated by the CalSim 3 hydrologic model, habitat availability as simulated by PHABSIM, and water temperature as simulated by HEC-5Q.

Lower American River Flows

Releases from Nimbus Dam to the Lower American River affect the quantity and quality of salmonid habitat, water quality, and water temperature (Snider et al., 2001). Flows provide spawning habitat for fall-run Chinook salmon from mid-October through February and for steelhead from December through early April. Chinook salmon fry emergence occurs from January through mid-April, and juvenile rearing extends from January to about mid-July in wetter years. Most Chinook salmon out-migrate as fry in February and March in relation to peak-flow events (PSMFC, 2014). Steelhead juveniles reportedly can rear in the lower American River for a year or more before out-migrating as smolts in association with higher flow events from January through June (Snider and Titus, 2000).

As described above in Section 3.5.3, *Regulatory Setting*, flow operations in the lower American River are managed according to the minimum-flow requirements established in the Water Forum's Lower American River Modified Flow Management Standard (ARWA, 2017). These requirements establish minimum flows, as measured by the total release at Nimbus Dam, which vary throughout the year in response to the hydrology of the Sacramento and American River basins:

- *October 1–December 31:* Between 800 and 2,000 cubic feet per second (cfs).
- *January 1–Labor Day:* Between 800 and 1,750 cfs.
- *Post–Labor Day through September 30:* Between 800 and 1,500 cfs.

As a general rule, the minimum-flow requirements must equal or exceed 800 cfs year-round. Narrowly defined exceptions to this rule allow Nimbus releases to drop below 800 cfs to avoid depleting water storage in Folsom Reservoir when dry or critical hydrologic conditions are forecasted to occur.

As discussed in Impact 3.12-3, on the Lower American River, simulated percent and magnitude changes in monthly averaged flow between proposed project scenarios and existing baseline conditions were highly variable depending on project scenario, month, water year type, and output location (e.g., Lower American River below Nimbus Dam and Lower American River below the FWTP). On average, percent changes in average monthly flows for the American River below Nimbus Dam output location were found to either not change or slightly increase for the proposed project scenarios compared to existing baseline conditions, whereas magnitude changes in average monthly flows were found to either not change or slightly decrease. On average, the percent change in average monthly flows for the Lower American River below FWTP output location were between 0.4 and 0.6 percent less than existing baseline conditions for the three proposed project scenarios. Magnitudes of simulated decreases in monthly average flow at the American River below FWTP output location did not exceed more than 6.4 percent of the long-term average observed flows.

Tables 3.5-6 and **3.5-7** summarize the modeling results for average monthly flows under the proposed project scenarios compared to the existing baseline conditions for the Lower American River below Nimbus Dam and below the FWTP. For context, long-term average monthly flows at these locations are 3,339 and 3,237 cfs, respectively (refer to Table 3.12-9 in Section 3.12, *Hydrology, Water Quality, and Water Supply*).

Table 3.5-6
Modeled Average Difference in Flows in American River below Nimbus, Proposed Project Modeling Scenarios vs. Baseline Conditions (percent change and absolute value [cfs])

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep	
All	Baseline	1521		2814		3250		4168		4818		3224		3165		4938		4585		3297		2500		1783	
	+75 MGD	-69.9	(-2.9)	21.1	(+2.1)	2.9	(+1)	8.0	(+2.8)	22.0	(+1.6)	4.0	(+0.1)	-22.2	(-0.3)	17.7	(+1)	-4.8	(-0.2)	-9.1	(-0.2)	-17.3	(-0.6)	-32.9	(-1)
	+150 MGD	-82.2	(-3.7)	25.7	(+3)	0.1	(+1.2)	-20.2	(+1.6)	6.5	(+1)	-1.6	(-0.1)	-20.5	(+1)	13.8	(+1)	-31.5	(-0.7)	-31.6	(-0.9)	-2.5	(+0.7)	-41.2	(-1.4)
	Projected Demand	-73.1	(-3.1)	16.3	(+2.4)	0.2	(+1)	-2.4	(+2.1)	11.8	(+1.2)	2.7	(+0.1)	-22.2	(+0.3)	16.7	(+1.1)	-29.6	(-0.7)	-33.7	(-1)	15.4	(+1.2)	-36.4	(-1.2)
Wet	Baseline	1700		3644		6121		8515		8834		5756		5682		8311		6942		4070		3251		2121	
	+75 MGD	-58.5	(-2.8)	6.5	(+2.6)	17.4	(+3.9)	-14.0	(-0.4)	-7.9	(-0.1)	-6.8	(-0.2)	-7.7	(-0.2)	-8.6	(-0.1)	-9.4	(-0.1)	-11.4	(-0.3)	-8.8	(-0.2)	-9.5	(-0.4)
	+150 MGD	-64.3	(-3.1)	-42.3	(+1.2)	-3.5	(+3.2)	-20.2	(-0.5)	-19.2	(-0.3)	-18.2	(-0.5)	-17.7	(-0.4)	-20.3	(-0.3)	-21.4	(-0.3)	-22.7	(-0.6)	-19.0	(-0.5)	-23.0	(-1.1)
	Projected Demand	-62.5	(-3)	-30.3	(+1.6)	5.8	(+3.5)	-12.6	(-0.4)	-13.4	(-0.2)	-12.3	(-0.3)	-12.9	(-0.3)	-14.6	(-0.2)	-15.7	(-0.2)	-17.0	(-0.4)	-14.0	(-0.4)	-15.2	(-0.7)
Above Normal	Baseline	1533		2582		2208		4670		5178		3625		2931		6063		5644		4016		2766		2143	
	+75 MGD	-11.0	(-0.5)	-13.1	(-0.6)	-1.2	(-0.1)	18.5	(+0.2)	10.5	(+0.5)	-5.3	(-0.2)	-5.6	(-0.3)	-11.1	(-0.3)	-6.8	(-0.1)	-8.2	(-0.2)	-6.1	(-0.2)	-231.6	(-5.5)
	+150 MGD	-16.9	(-1)	45.0	(+1.7)	-9.7	(-0.5)	-4.8	(-0.3)	0.7	(+0.2)	-13.6	(-0.5)	-14.5	(-0.6)	-19.4	(-0.5)	-15.6	(-0.3)	-161.5	(-4.4)	198.0	(+10.7)	-239.7	(-5.9)
	Projected Demand	-14.1	(-0.8)	53.9	(+2)	-6.5	(-0.3)	10.7	(0)	7.9	(+0.4)	-9.4	(-0.3)	-10.0	(-0.4)	-17.4	(-0.4)	-11.4	(-0.2)	-156.7	(-4.3)	201.2	(+10.8)	-237.5	(-5.8)
Below Normal	Baseline	1392		2941		2459		1948		3222		1954		2035		3864		3902		4006		2259		1774	
	+75 MGD	-7.8	(-0.5)	-36.9	(-1.6)	-7.5	(-0.6)	-12.9	(-1)	72.4	(+5.6)	35.9	(+1.4)	-11.1	(-0.4)	-18.2	(-0.4)	-1.2	(0)	-19.3	(-0.4)	-12.2	(-0.6)	-6.6	(-0.4)
	+150 MGD	-31.3	(-1.9)	21.1	(+1.6)	3.5	(+0.1)	-12.9	(+0.3)	38.0	(+4.3)	30.1	(+1)	-41.9	(-1.5)	-17.2	(-0.2)	-91.0	(-1.6)	-12.9	(-0.3)	36.5	(+2.1)	-11.8	(-0.7)
	Projected Demand	-10.8	(-0.8)	-46.9	(-2)	-12.9	(-1)	-15.9	(-1.2)	43.3	(+4.5)	34.7	(+1.2)	-35.9	(-1.2)	-13.5	(-0.1)	-89.4	(-1.6)	-29.7	(-0.6)	31.5	(+1.8)	-8.7	(-0.5)
Dry	Baseline	1488		2266		1574		1387		2043		1685		1645		2191		2648		1881		2103		1513	
	+75 MGD	-116.0	(-4.2)	126.8	(+5.7)	-4.7	(-0.7)	-6.6	(-0.5)	26.2	(+1.1)	-5.9	(-0.3)	-93.7	(-1.7)	110.8	(+5.3)	3.0	(+0.2)	-0.1	(0)	-64.0	(-2.1)	5.1	(+0.2)
	+150 MGD	-149.7	(-5.8)	149.3	(+6.9)	-11.4	(-1.2)	-22.1	(-1.4)	15.1	(+0.6)	-0.2	(0)	-135.1	(-3.4)	110.0	(+5.3)	-0.9	(-0.1)	0.1	(+0)	-165.3	(-5)	0.1	(-0.2)
	Projected Demand	-146.7	(-5.5)	151.9	(+7)	-8.6	(-1)	-15.0	(-1)	21.0	(+0.8)	3.4	(+0.2)	-109.8	(-2.3)	112.2	(+5.4)	1.0	(+0)	-0.2	(0)	-70.6	(-2.3)	2.0	(0)
Critical	Baseline	1370		1658		1149		1087		1580		1208		1485		1575		1917		1529		1496		1071	
	+75 MGD	-189.7	(-7.1)	52.2	(+5.2)	0.4	(+0.4)	95.5	(+21.7)	11.7	(+0.3)	-3.4	(-0.3)	-3.4	(+1)	48.6	(+2.1)	-8.1	(-1.1)	0.9	(0)	-0.1	(-0.1)	2.2	(-0.4)
	+150 MGD	-179.3	(-7.9)	20.6	(+5.6)	24.2	(+2.5)	-42.9	(+13.2)	7.1	(0)	-7.4	(-0.7)	132.5	(+14.2)	54.2	(+2.2)	-8.5	(-1.5)	-5.0	(-0.5)	-14.4	(-1)	-3.4	(-0.9)
	Projected Demand	-160.0	(-6.2)	28.4	(+6.1)	24.4	(+2.5)	44.1	(+17.8)	9.2	(+0.1)	-5.6	(-0.5)	69.1	(+7.9)	51.6	(+2.1)	-15.8	(-1.9)	-8.8	(-0.9)	-8.0	(-0.6)	3.4	(-0.4)

NOTES: cfs = cubic feet per second; MGD = million gallons per day

TABLE 3.5-7
MODELED AVERAGE DIFFERENCE IN FLOWS IN AMERICAN RIVER BELOW FWTP, PROPOSED PROJECT MODELING SCENARIOS VS. BASELINE CONDITIONS (PERCENT CHANGE AND ABSOLUTE VALUE [CFS])

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep	
All	Baseline	1421		2729		3197		4121		4772		3152		3068		4808		4432		3144		2347		1654	
	+75 MGD	-67.6	(-2.9)	-7.4	(+1.5)	-28.8	(-0.4)	-36.4	(+0.7)	-26.0	(-0.2)	-35.3	(-1.7)	-48.3	(-1.4)	10.3	(+1)	-4.8	(-0.2)	-9.1	(-0.2)	-17.3	(-0.7)	-31.5	(-1)
	+150 MGD	-84.1	(-4.4)	3.1	(+2.8)	-15.0	(+0.9)	-43.0	(+0.2)	-19.1	(-0.2)	-23.8	(-1.2)	-38.1	(+0.3)	2.1	(+0.7)	-39.6	(-1.1)	-40.5	(-1.3)	-12.4	(+0.3)	-48.3	(-2.1)
	Projected Demand	-79.8	(-3.9)	-3.2	(+2.5)	-38.6	(-0.4)	-72.4	(-0.7)	-52.8	(-1)	-42.3	(-2)	-46.6	(+0.2)	6.5	(+1)	-31.5	(-0.8)	-31.6	(-0.9)	-2.5	(+0.8)	-39.0	(-1.4)
Wet	Baseline	1601		3571		6085		8497		8804		5696		5593		8173		6788		3916		3097		1978	
	+75 MGD	-57.3	(-2.9)	-25.6	(+2.2)	-28.1	(+3.2)	-65.7	(-1.2)	-59.8	(-0.8)	-58.1	(-1.4)	-47.1	(-1)	-21.1	(-0.3)	-9.4	(-0.2)	-11.4	(-0.3)	-8.8	(-0.2)	-9.5	(-0.5)
	+150 MGD	-63.3	(-3.6)	-55.5	(+1.6)	-20.4	(+3.3)	-33.0	(-0.9)	-38.1	(-0.7)	-36.6	(-1)	-34.1	(-0.8)	-31.6	(-0.5)	-26.3	(-0.4)	-28.6	(-0.8)	-27.5	(-0.8)	-30.7	(-1.5)
	Projected Demand	-63.1	(-3.2)	-74.4	(+0.8)	-62.2	(+2.3)	-90.0	(-1.7)	-89.6	(-1.2)	-72.0	(-1.7)	-57.1	(-1.2)	-32.9	(-0.5)	-21.4	(-0.3)	-22.7	(-0.6)	-19.0	(-0.5)	-21.8	(-1.1)
Above Normal	Baseline	1434		2495		2155		4630		5146		3550		2830		5924		5490		3862		2612		2003	
	+75 MGD	-7.9	(-0.4)	-41.7	(-1.5)	-36.5	(-1.7)	-28.4	(-1.4)	-42.0	(-0.9)	-50.0	(-1.7)	-35.8	(-1.3)	-20.1	(-0.4)	-6.8	(-0.1)	-8.2	(-0.2)	-6.1	(-0.2)	-220.0	(-5.2)
	+150 MGD	-19.0	(-1.3)	18.2	(+0.8)	-29.7	(-0.9)	-25.3	(-1.4)	-14.6	(-0.5)	-43.8	(-1.6)	-39.1	(-1.4)	-33.1	(-0.7)	-22.9	(-0.4)	-170.1	(-4.9)	188.5	(+11.3)	-235.0	(-6)
	Projected Demand	-13.9	(-0.9)	16.4	(+0.8)	-54.4	(-2.5)	-62.5	(-2.2)	-66.7	(-1.5)	-61.6	(-2.1)	-44.6	(-1.7)	-28.4	(-0.6)	-15.6	(-0.3)	-161.5	(-4.6)	198.0	(+11.7)	-225.2	(-5.5)
Below Normal	Baseline	1291		2854		2401		1887		3164		1879		1936		3733		3748		3852		2105		1654	
	+75 MGD	-7.0	(-0.5)	-70.4	(-2.6)	-38.0	(-2.2)	-53.3	(-3.8)	22.9	(+3.8)	4.0	(-0.5)	-33.3	(-1.6)	-24.3	(-0.6)	-1.2	(0)	-19.3	(-0.4)	-12.2	(-0.6)	-6.6	(-0.4)
	+150 MGD	-37.3	(-2.6)	-11.3	(+0.9)	-16.9	(-0.9)	-40.2	(-1.2)	-1.6	(+2.7)	10.4	(-0.2)	-61.0	(-2.6)	-30.8	(-0.6)	-102.1	(-1.9)	-24.5	(-0.6)	25.8	(+1.8)	-20.9	(-1.3)
	Projected Demand	-30.4	(-2)	-14.9	(+0.6)	-33.7	(-1.6)	-56.7	(-2.4)	-22.2	(+2.1)	-2.1	(-0.9)	-64.1	(-2.7)	-23.3	(-0.3)	-91.0	(-1.6)	-12.9	(-0.3)	36.5	(+2.3)	-11.8	(-0.7)
Dry	Baseline	1386		2175		1503		1322		1988		1606		1547		2070		2493		1727		1949		1394	
	+75 MGD	-111.4	(-4.2)	98.2	(+4.8)	-22.0	(-2.2)	-45.1	(-4)	-15.1	(-1.4)	-36.5	(-2.4)	-108.6	(-2.9)	107.0	(+5.5)	3.0	(+0.2)	-0.1	(0)	-64.0	(-2.3)	5.1	(+0.2)
	+150 MGD	-151.2	(-6.3)	121.1	(+6.1)	-23.6	(-2)	-50.9	(-4.1)	-7.2	(-0.8)	-23.4	(-1.5)	-146.8	(-4.3)	98.8	(+5)	-10.1	(-0.6)	-8.6	(-0.5)	-175.5	(-5.8)	-9.7	(-1)
	Projected Demand	-145.1	(-5.9)	120.7	(+6.1)	-28.8	(-2.8)	-61.8	(-5)	-29.7	(-2)	-30.8	(-2)	-150.0	(-4.6)	106.2	(+5.5)	-0.9	(-0.1)	0.1	(+0)	-165.3	(-5.2)	0.1	(-0.3)
Critical	Baseline	1264		1564		1089		1016		1519		1129		1381		1459		1768		1379		1346		953	
	+75 MGD	-185.8	(-7.4)	39.2	(+5.4)	-17.0	(-1.7)	55.7	(+19.1)	-28.9	(-3.1)	-34.1	(-3.7)	-16.2	(-0.1)	47.7	(+2.2)	-8.1	(-1.3)	0.9	(-0.1)	-0.1	(-0.2)	2.2	(-0.6)
	+150 MGD	-181.7	(-9.1)	3.7	(+6)	22.0	(+3.4)	-74.9	(+11.2)	-23.3	(-2.4)	-33.2	(-2.8)	114.2	(+14.2)	45.3	(+1.7)	-18.1	(-2.5)	-16.5	(-1.5)	-25.7	(-2.1)	-13.4	(-2.3)
	Projected Demand	-175.4	(-8.3)	9.2	(+6.3)	6.9	(+0.5)	-80.1	(+10.5)	-36.4	(-3.6)	-38.1	(-4.1)	119.7	(+14.7)	53.4	(+2.3)	-8.5	(-1.8)	-5.1	(-0.6)	-14.3	(-1.2)	-3.4	(-1.2)

NOTES: cfs = cubic feet per second; MGD = million gallons per day

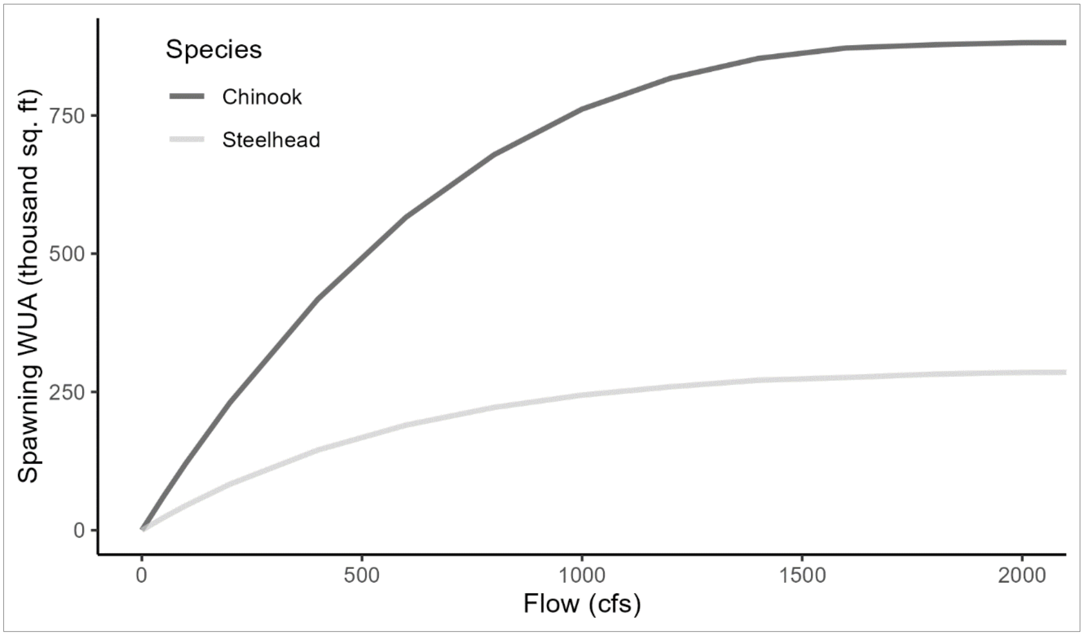
As shown in Table 3.5-6, the difference in average monthly flows by water-year type in the Lower American River below Nimbus Dam under the proposed project scenarios compared to the existing baseline conditions ranged from 0 to 239 cfs, generally equating to less than 5 percent change. As shown in Table 3.5-7, the difference in average monthly flows by water-year type in the Lower American River below FWTP under the proposed project scenarios compared to the existing baseline conditions ranged from 0 cfs to 235 cfs, generally equating to less than 5 percent change. Changes of less than 5 percent were observed for all month/water-year type combinations during the rearing and outmigration period for fall-run Chinook salmon and steelhead (January–July). As stated in Impact 3.12-3 of Section 3.12, *Hydrology, Water Quality, and Water Supply* (and detailed further in Appendix E), minimum flow requirements established under the Lower American River Modified Flow Management Standard were met under all proposed project scenarios.

Modeled average differences in Lower American River flows under the proposed project scenarios were higher during some late summer and fall months, indicating that these hydrologic changes under the proposed project scenarios could have the potential to affect spawning Chinook salmon (October through December) and rearing steelhead that may be present year-round in the Lower American River (refer to Tables 3.5-6 and 3.5-7). Changes in flow exceeding 5 percent (ranging from -5.0 to -9.1 percent) between the proposed project scenarios and existing baseline conditions occur during September in the above normal water-year type, August and October in the dry water year type, and October in the critically dry water year type. To further evaluate the potential influence of these flow changes on the amount of spawning habitat, a flow-dependent habitat availability analysis was conducted (discussed below).

Habitat Availability

Flow-dependent habitat availability refers to the quantity and quality of habitat available to individual species and life stages for a particular instream flow. PHABSIM is a commonly used method to express indices of the quantity and quality of habitat associated with specific flows (USACE et al., 2019). PHABSIM is the combination of hydraulic and habitat models, the output of which is expressed as weighted useable area (WUA). In general, the amount of habitat suitable for spawning increases as flows increase from very low flows up to a certain flow, and then the amount of suitable spawning habitat generally decreases as flows increase because of factors such as excessive velocities and depths (USACE et al., 2019).

The analysis of potential impacts on spawning habitat in the Lower American River focused on the frequency and magnitude of changes in average monthly WUA for spawning habitat for fall-run Chinook salmon and steelhead, as applied in the Folsom Dam Modification Project Water Control Manual Update Environmental Assessment/Environmental Impact Report (USACE et al., 2019). The composite spawning WUA relationships between flow and habitat identified by the U.S. Army Corps of Engineers and others (USACE et al., 2019) were applied for fall-run Chinook salmon and steelhead (**Figure 3.5-2**).



SOURCE: USACE et al., 2019.

Figure 3.5-2
Composite Weighted Usable Area Values for Fall-Run Chinook Salmon and Steelhead versus Flow below Nimbus Dam

Table 3.5-8 summarizes the WUA for spawning habitat for fall-run Chinook salmon and steelhead in the Lower American River under the proposed project scenarios compared to the existing baseline conditions. As shown in Table 3.5-8, the differences in WUA for fall-run Chinook salmon spawning between the proposed project scenarios and the existing baseline conditions were less than 5 percent (ranging from 1.7 to -2.8 percent) across all months (January, February and March) and all water year types. Similarly, the differences in WUA for steelhead spawning under the proposed project scenarios compared to existing baseline conditions were less than 5 percent (ranging from 2.2 to -1.2 percent) across all months (October, November and December) and all water year types.

In all cases, flows at this location under the proposed project scenarios always met the minimum flow requirements set forth in State Water Board Decision 893 and were above the minimum flow targets set forth in the Lower American River Modified Flow Management Standard (ARWA, 2017) at a near-identical rate across all proposed project scenarios (e.g., target flows were met above 99 percent of the time) (see Section 3.12.4 for more details). Therefore, operation of the new water intake would not be anticipated to substantially change habitat availability for spawning salmonids in the Lower American River.

Water Temperature

Warm water temperatures stress juvenile steelhead rearing in the Lower American River, particularly during summer and early fall (NMFS, 2019). Water temperature is the physical factor with perhaps the greatest influence on American River steelhead, as it directly affects survival, growth rates, distribution, and developmental rates (NMFS, 2019). Decreases in flows during the summer months could have the potential to cause increased water temperatures, leading to stressful conditions for juvenile steelhead rearing in the Lower American River.

TABLE 3.5-8
MODELED AVERAGE DIFFERENCE IN WEIGHTED USABLE AREA FOR SPAWNING IN AMERICAN RIVER BELOW NIMBUS, PROJECT-ONLY COMPARED TO BASELINE CONDITIONS
(PERCENT CHANGE AND AREA [SQ. FT.])

Water Year Type	Chinook Salmon			Steelhead		
	Oct	Nov	Dec	Jan	Feb	Mar
Proposed Project Scenario +75 MGD						
All	-0.3% (-2515)	0% (129)	0.3% (2012)	0.2% (492)	-0.4% (-751)	-0.1% (-315)
W	-1.4% (-11312)	1% (6704)	1.6% (8419)	0.2% (287)	0.1% (144)	0.1% (127)
AN	-0.1% (-435)	0.1% (1085)	0% (-382)	-0.4% (-770)	-0.3% (-520)	0% (96)
BN	-0.1% (-1025)	0.1% (723)	-0.2% (-1763)	-0.4% (-965)	-0.6% (-1380)	-0.5% (-1357)
D	1% (7923)	-2.4% (-17540)	-0.4% (-3043)	-0.1% (-310)	-0.7% (-1724)	0% (-33)
C	0% (281)	0.6% (4477)	0.3% (2044)	2.2% (5218)	-0.3% (-768)	-0.1% (-298)
Proposed Project Scenario– +150 MGD						
All	-0.5% (-4061)	-0.1% (-733)	0.4% (2518)	-0.1% (-104)	-0.2% (-479)	-0.1% (-296)
W	-1.5% (-11645)	0.8% (5523)	1.7% (9105)	0.4% (563)	-0.3% (351)	0.2% (361)
AN	-0.1% (-1114)	-0.8% (-6307)	0% (107)	-0.1% (-162)	-0.1% (-257)	0.1% (260)
BN	-0.4% (-2990)	-0.2% (-1426)	-0.3% (-2589)	0.5% (1175)	-0.1% (-318)	-0.6% (-1540)
D	0.7% (5828)	-2.8% (-19937)	-0.5% (-4408)	-0.3% (-791)	-0.7% (-1928)	0% (41)
C	-0.5% (-3323)	1.9% (13676)	0.9% (6413)	-1.2% (-2708)	-0.4% (-1047)	-0.2% (-613)
Proposed Project Scenario– Projected Demand						
All	-0.3% (-2193)	-0.1% (-416)	0.3% (2380)	0% (-38)	-0.3% (-522)	-0.1% (-310)
W	-1.5% (-11461)	0.8% (4896)	1.7% (8770)	0.3% (396)	0.2% (246)	0.1% (240)
AN	-0.1% (-757)	-0.9% (-7219)	0% (-130)	-0.3% (-538)	-0.2% (-388)	0.1% (175)
BN	-0.2% (-1536)	0.2% (1704)	-0.4% (-2867)	-0.5% (-1254)	-0.2% (-434)	-0.6% (-1514)
D	0.8% (6384)	-2.8% (-20049)	-0.5% (-4001)	-0.2% (-536)	-0.7% (-1838)	0% (83)
C	0.8% (5604)	1.8% (13137)	0.9% (6376)	0.8% (1942)	-0.4% (-916)	-0.2% (-462)

NOTES: sq. ft. = square feet; MGD = million gallons per day; Sacramento Valley Water Year Types: W = Wet; AN = Above Normal; BN = Below Normal; D = Dry; C = Critical

SOURCE: Data compiled by Environmental Science Associates in 2024.

As described in Section 3.12, *Hydrology, Water Quality, and Water Supply*, to further evaluate potential changes in water temperature under increased diversions through the new water intake, the American River HEC-5Q model version developed by DWR for the Delta Conveyance Project EIR (DWR, 2022a) was applied. Results from the HEC-5Q water temperature model were evaluated to determine whether these non-negligible decreases in flows in the Lower American River (greater than 5 percent) could result in substantial increases in water temperatures.

The analysis of potential impacts on water temperatures in the Lower American River focused on the frequency of days in a year when the average daily water temperature at the Watt Avenue Bridge exceeds 65°F and 72°F. The analysis considered this frequency by water year type and as compared to existing baseline conditions. The temperature threshold of 65°F at the Watt Avenue Bridge was chosen because it represents the water temperature objective for the Lower American River that has been developed for the Biological Opinions on Long-Term Operation of the CVP and SWP (refer to Section 3.5.3, *Regulatory Setting*). This temperature is deemed stressful for juvenile steelhead and spawning fall-run Chinook salmon under the Lower American River

Modified Flow Management Standard. The temperature threshold of 72°F was also evaluated since it is considered the lethal limit for salmonids when exposed over an extended period under the Lower American River Modified Flow Management Standard). Water temperature effects were evaluated for the period May 15 through November 30 to evaluate change in suitable habitat for rearing steelhead in the summer and early fall, and for spawning fall-run Chinook salmon in the early fall.

Table 3.5-9 presents the modeled average difference in days exceeding an average daily water temperature threshold of 65°F at the Lower American River at Watt Avenue from May through November. As shown, the number of days exceeding the 65°F water temperature threshold (deemed stressful for salmonids) was generally negligible, with increases of less than one day between proposed project scenarios and existing baseline conditions in most all combinations of month and water year type. The number of days exceeding the 65°F water temperature threshold between proposed project scenarios and existing baseline conditions ranged from -0.7 to 1.2 days. The number of days above the 65°F threshold was greater than one day in only one instance: during July in above normal water year types for the +150 MGD proposed project scenario.

TABLE 3.5-9
MODELED AVERAGE DIFFERENCE IN DAYS EXCEEDING AN AVERAGE DAILY WATER TEMPERATURE OF 65°F AT AMERICAN RIVER AT WATT AVENUE, PROPOSED PROJECT MODELING SCENARIOS VS. BASELINE CONDITIONS (DAYS)

Water Year Type	May	June	July	August	September	October	November
Proposed Project Scenario– +75 MGD							
All	-0.1	-0.1	0	0	-0.1	-0.3	-0.1
W	0	0	0.1	-0.1	0.1	-0.6	-0.2
AN	0	0	-0.2	0	-0.6	0.5	0
BN	0	0	0	0	0	-0.7	0
D	-0.5	-0.1	0	0.4	-0.2	0.2	0
C	-0.2	-0.3	-0.2	-0.6	0.1	-0.4	-0.1
Proposed Project Scenario– +150 MGD							
All	-0.1	0	0.2	0	0.2	-0.2	-0.1
W	0	0	0	-0.1	0.1	-0.4	-0.2
AN	0	0	1.2	0	0.8	0.1	0
BN	0	0.1	0.4	-0.5	0.7	-0.2	0
D	-0.3	0	0.1	0.6	-0.7	0	0
C	-0.4	-0.2	-0.6	0.5	0.1	-0.5	-0.1
Proposed Project Scenario– Projected Demand							
All	-0.1	0	0.2	0.1	0.2	-0.2	-0.1
W	0	0	0.1	0.1	0.1	-0.3	-0.2
AN	0	0	1.2	0	0.8	-0.3	0
BN	0	0	0.4	-0.2	0.2	-0.2	0
D	-0.4	-0.1	-0.1	0.6	-0.1	0.2	0
C	-0.2	-0.1	-0.5	0.5	0.1	-0.4	-0.1

NOTES: °F = degrees Fahrenheit; MGD = million gallons per day; Water Year Types: W = Wet; AN = Above Normal; BN = Below Normal; D = Dry; C = Critical

SOURCE: Data compiled by Environmental Science Associates in 2024.

Table 3.5-10 presents the modeled average difference in days exceeding an average daily water temperature threshold of 72°F at the Lower American River at Watt Avenue from May through November. As shown, the number of days exceeding the 72°F water temperature threshold (deemed lethal for extended periods) was generally negligible, with increases of less than one day between proposed project scenarios and existing baseline conditions in all combinations of month and water year type. The number of days exceeding the 72°F water temperature threshold between proposed project scenarios and existing baseline conditions ranged from 0 to 0.7 days.

TABLE 3.5-10
MODELED AVERAGE DIFFERENCE IN DAYS EXCEEDING AN AVERAGE DAILY WATER TEMPERATURE OF 72°F AT AMERICAN RIVER AT WATT AVENUE, PROPOSED PROJECT MODELING SCENARIO VS. BASELINE CONDITIONS (DAYS)

Water Year Type	May	June	July	August	September	October	November
Proposed Project Scenario– +75 MGD							
All	0	0.1	0	0.1	0.1	0	0
W	0	0	0	0	0	0	0
AN	0	0	0	0	0	0	0
BN	0	0	0	0	0	0	0
D	0	0.1	0	0	0.1	0	0
C	0	0.7	0.1	0.4	0.6	0	0
Proposed Project Scenario– +150 MGD							
All	0	0.1	0.1	0.1	0.1	0	0
W	0	0	0	0	0	0	0
AN	0	0	0	0	0	0	0
BN	0	0	0	0	0.1	0	0
D	0	0	0	0	0.1	0	0
C	0	0.7	0.5	0.4	0.3	0	0
Proposed Project Scenario– Projected Demand							
All	0	0.1	0.1	0.1	0.1	0	0
W	0	0	0	0	0	0	0
AN	0	0	0	0	0	0	0
BN	0	0	0	0	0.1	0	0
D	0	0.1	0	0	0.1	0	0
C	0	0.7	0.5	0.6	0.4	0	0

NOTES: °F = degrees Fahrenheit; MGD = million gallons per day; Water Year Types: W = Wet; AN = Above Normal; BN = Below Normal; D = Dry; C = Critical

SOURCE: Data compiled by Environmental Science Associates in 2024.

Given the mostly negligible changes in average days exceeding the water temperature thresholds in most months and water year types, and because the slightly larger average changes (more than one day) occur very infrequently, increased diversion associated with operation of the new water intake would not be expected to lead to adverse impacts on juvenile rearing habitat quality or habitat availability for rearing steelhead in the Lower American River.

Summary

Habitat effects on the Lower American River were evaluated based on changes in river flows as simulated by the CalSim 3 hydrologic model, habitat availability as simulated by PHABSIM, and water temperature as simulated by HEC-5Q. Based on the simulation results presented above, increased diversion associated with operation of the new water intake would not result in far-field indirect impacts on listed fish and their associated habitat.

Sacramento River Habitat Effects

Habitat effects on the Sacramento River were evaluated based on changes in river flows as simulated by the CalSim 3 hydrologic model.

The Sacramento River acts as an important migration corridor for a multitude of special-status species including green sturgeon, white sturgeon, Chinook salmon, and steelhead. Reductions in river flows associated with increased diversion through the new water intake have the potential to affect water quality and temperature, both of which are important factors for migrating special-status species. Section 3.12, *Hydrology, Water Quality and Water Supply*, Impact 3.12-3, evaluates the potential effects of increased diversion associated with operation of the proposed new intake on surface water quality. The following discussion extends this analysis to evaluate the extent to which changes in water quality and temperature (as measured by changes in river flows) could result in far-field indirect impacts on listed fish and their associated habitat.

As discussed in Impact 3.12-3, flows in the Sacramento River below SRWTP were directly influenced by proposed project diversions, but decreases in long-term average monthly flow did not exceed 5 percent for any combination of month and water year type (simulated changes in average monthly flows ranged between 0.6 and 1.3). At other Sacramento River output locations (i.e., Feather River below Thermalito Afterbay, Feather River at Mouth, and Sacramento River nodes upstream of SRWTP) simulated percent and magnitude changes in monthly averaged river flows were either negligible or generally increased[4] for the proposed project scenarios compared to existing baseline conditions.

Tables 3.5-11 and **3.5-12** summarize the modeling results for average monthly flows under the proposed project scenarios compared to the existing baseline conditions for the Sacramento River below the SRWTP and the Sacramento River at Freeport.[5] For context, long-term average monthly flows at this location are 21,078 cfs and 21,171 cfs, respectively (refer to Table 3.12-9 in Section 3.12, *Hydrology, Water Quality, and Water Supply*).

As shown in Tables 3.5-11 and 3.5-12, the difference in average monthly flows by water-year type in the Sacramento River below SRWTP and at the Sacramento River at Freeport under the proposed project scenarios compared to the existing baseline conditions ranged from 0 to 397 cfs, equating to less than 5 percent change. Decreases in long-term average monthly flow did not exceed 5 percent for any combination of month and water year type.

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4 Increased streamflows likely reflect changes in CVP-SWP operations needed to convey water downstream to the SRWTP to meet simulated increased City demand.

5 Flows at the Sacramento River at Freeport are only presented in this section as the results were used to quantify water temperature changes at this location (refer to Table 3.12-7 for American River HEC-5Q model output nodes and parameters).

TABLE 3.5-11
MODELED AVERAGE DIFFERENCE IN FLOWS IN SACRAMENTO RIVER BELOW SRWTP, PROPOSED PROJECT MODELING SCENARIOS VS. BASELINE CONDITIONS (PERCENT CHANGE AND ABSOLUTE VALUE [CFS])

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep	
All	Baseline	11337		13695		22277		30045		36200		31733		22637		20672		16966		18200		14795		14376	
	+75 MGD	-170.5	(-1.8)	-110.5	(-0.9)	-22.5	(+0.1)	-41.8	(+0.1)	-95.2	(-0.4)	-53.1	(-0.2)	-111.0	(-0.7)	-74.8	(-0.5)	-89.5	(-0.7)	-105.3	(-0.6)	-111.4	(-0.9)	-151.3	(-1.3)
	+150 MGD	-269.0	(-2.9)	-181.4	(-1.5)	-141.7	(-0.7)	-194.3	(-0.9)	-195.9	(-0.8)	-135.4	(-0.6)	-175.5	(-1)	-142.4	(-1)	-160.9	(-1.1)	-191.2	(-1.1)	-207.4	(-1.6)	-308.6	(-2.6)
	Projected Demand	-218.5	(-2.4)	-164.0	(-1.4)	-92.5	(-0.4)	-117.7	(-0.3)	-136.8	(-0.6)	-104.1	(-0.4)	-146.8	(-0.9)	-114.5	(-0.8)	-128.2	(-0.9)	-152.7	(-0.9)	-165.2	(-1.3)	-252.8	(-2.1)
Wet	Baseline	13406		18241		37366		50346		58326		50542		39538		32970		23477		20187		17145		18950	
	+75 MGD	-164.3	(-1.6)	-141.6	(-1.1)	-59.6	(+0.1)	-115.4	(-0.4)	-77.6	(-0.3)	-67.1	(-0.4)	-115.4	(-0.4)	-77.6	(-0.3)	-67.1	(-0.4)	-75.1	(-0.4)	-83.0	(-0.5)	-85.4	(-0.5)
	+150 MGD	-241.8	(-2.5)	-259.1	(-2)	-157.4	(-0.3)	-188.2	(-0.7)	-142.0	(-0.6)	-141.1	(-0.7)	-188.2	(-0.7)	-142.0	(-0.6)	-141.1	(-0.7)	-146.5	(-0.7)	-156.6	(-0.9)	-154.1	(-0.8)
	Projected Demand	-200.8	(-2.1)	-222.3	(-1.7)	-102.1	(-0.1)	-153.5	(-0.5)	-123.4	(-0.5)	-115.8	(-0.6)	-153.5	(-0.5)	-123.4	(-0.5)	-115.8	(-0.6)	-112.8	(-0.6)	-122.7	(-0.7)	-123.9	(-0.7)
Above Normal	Baseline	11319		12886		19720		38125		42567		38660		22556		25429		19127		20647		18253		17997	
	+75 MGD	-118.2	(-1)	-136.5	(-1)	-87.9	(-0.5)	-118.8	(-0.6)	-185.2	(-1)	-115.0	(-0.8)	-118.8	(-0.6)	-185.2	(-1)	-115.0	(-0.8)	-158.8	(-0.8)	-106.4	(-0.6)	-168.0	(-0.9)
	+150 MGD	-136.9	(-1.3)	-139.3	(-0.9)	-235.3	(-1.4)	-207.4	(-1)	-243.0	(-1.3)	-173.9	(-1.1)	-207.4	(-1)	-243.0	(-1.3)	-173.9	(-1.1)	-332.3	(-1.6)	-95.0	(-0.5)	-370.8	(-2.1)
	Projected Demand	-75.9	(-0.7)	-115.8	(-0.7)	-191.7	(-1.1)	-173.7	(-0.8)	-213.7	(-1.1)	-148.3	(-1)	-173.7	(-0.8)	-213.7	(-1.1)	-148.3	(-1)	-248.6	(-1.2)	-64.5	(-0.3)	-298.9	(-1.7)
Below Normal	Baseline	11008		13120		17243		20397		25933		23436		15584		15325		13633		20195		16524		13732	
	+75 MGD	-176.2	(-1.9)	-125.2	(-1)	-67.9	(-0.5)	-116.2	(-0.8)	-68.1	(-0.5)	-72.2	(-0.5)	-116.2	(-0.8)	-68.1	(-0.5)	-72.2	(-0.5)	-83.0	(-0.4)	-89.7	(-0.6)	-140.0	(-1)
	+150 MGD	-299.7	(-3.2)	-160.1	(-1.1)	-177.1	(-1.3)	-225.4	(-1.5)	-128.8	(-0.9)	-144.3	(-1.1)	-225.4	(-1.5)	-128.8	(-0.9)	-144.3	(-1.1)	-149.0	(-0.8)	-216.0	(-1.4)	-397.5	(-3)
	Projected Demand	-231.8	(-2.4)	-194.5	(-1.7)	-148.9	(-1.2)	-181.5	(-1.2)	-98.4	(-0.7)	-110.4	(-0.8)	-181.5	(-1.2)	-98.4	(-0.7)	-110.4	(-0.8)	-153.9	(-0.8)	-181.8	(-1.1)	-338.4	(-2.5)
Dry	Baseline	10384		11257		11774		13969		22874		19133		12277		11698		13540		16934		11406		9430	
	+75 MGD	-181.8	(-2)	33.6	(+0.5)	-85.5	(-0.7)	-62.8	(-0.5)	30.8	(+0.3)	-86.6	(-0.7)	-62.8	(-0.5)	30.8	(+0.3)	-86.6	(-0.7)	-130.8	(-0.8)	-153.0	(-1.3)	-220.5	(-2.3)
	+150 MGD	-337.5	(-3.6)	-9.9	(+0)	-203.2	(-1.8)	-138.1	(-1.2)	-37.7	(-0.3)	-177.7	(-1.4)	-138.1	(-1.2)	-37.7	(-0.3)	-177.7	(-1.4)	-255.7	(-1.5)	-380.2	(-3.2)	-378.7	(-4)
	Projected Demand	-287.1	(-3.1)	19.2	(+0.4)	-132.6	(-1.1)	-103.1	(-0.9)	-7.9	(0)	-132.1	(-1)	-103.1	(-0.9)	-7.9	(0)	-132.1	(-1)	-198.0	(-1.2)	-306.2	(-2.6)	-309.0	(-3.2)
Critical	Baseline	8526		8339		12046		13154		14690		12927		9414		8900		10312		10155		7951		8135	
	+75 MGD	-207.0	(-2.6)	-163.2	(-1.8)	256.3	(+2.8)	-141.6	(-1.4)	-105.2	(-1.3)	-146.5	(-1.3)	-141.6	(-1.4)	-105.2	(-1.3)	-146.5	(-1.3)	-129.9	(-1.3)	-163.3	(-2)	-217.1	(-2.5)
	+150 MGD	-314.2	(-4.1)	-280.2	(-3.3)	98.3	(+1.1)	-85.5	(-0.8)	-198.0	(-2.5)	-199.2	(-1.8)	-85.5	(-0.8)	-198.0	(-2.5)	-199.2	(-1.8)	-158.6	(-1.6)	-201.2	(-2.5)	-366.2	(-4.4)
	Projected Demand	-279.3	(-3.6)	-241.9	(-2.9)	147.9	(+1.6)	-104.9	(-1)	-157.7	(-2)	-160.9	(-1.5)	-104.9	(-1)	-157.7	(-2)	-160.9	(-1.5)	-102.6	(-1)	-155.1	(-1.9)	-291.1	(-3.5)

NOTES: cfs = cubic feet per second; MGD = million gallons per day

Table 3.5-12
Modeled Average Difference in Flows in Sacramento River at Freeport, Proposed Project Modeling Scenarios vs. Baseline Conditions (percent change and absolute value [cfs])

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep	
All	Baseline	11272		13724		22574		30312		36635		32284		22601		20623		16905		18110		14709		14297	
	+75 MGD	-170.5	(-1.8)	-110.5	(-1)	-22.6	(+0.2)	-41.9	(+0.2)	-95.2	(-0.4)	-53.1	(-0.2)	-110.9	(-0.7)	-74.7	(-0.5)	-89.4	(-0.7)	-105.2	(-0.7)	-111.3	(-0.9)	-151.3	(-1.3)
	+150 MGD	-269.0	(-3)	-181.5	(-1.5)	-141.8	(-0.7)	-194.4	(-0.8)	-196.0	(-0.8)	-135.4	(-0.6)	-175.5	(-1)	-142.4	(-1)	-160.9	(-1.1)	-191.2	(-1.1)	-207.3	(-1.6)	-308.6	(-2.6)
	Projected Demand	-218.5	(-2.4)	-164.1	(-1.4)	-92.6	(-0.4)	-117.8	(-0.3)	-136.9	(-0.6)	-104.0	(-0.4)	-146.8	(-0.9)	-114.5	(-0.8)	-128.2	(-0.9)	-152.8	(-0.9)	-165.2	(-1.3)	-252.9	(-2.1)
Wet	Baseline	13345		18342		37743		50485		58981		51299		39510		32926		23418		20120		17083		18896	
	+75 MGD	-164.3	(-1.7)	-141.6	(-1.1)	-59.6	(+0.1)	-109.3	(-0.3)	-72.1	(-0.1)	-40.6	(-0.1)	-115.4	(-0.4)	-77.6	(-0.3)	-67.1	(-0.4)	-75.1	(-0.4)	-83.0	(-0.5)	-85.4	(-0.5)
	+150 MGD	-241.8	(-2.5)	-259.1	(-2)	-157.4	(-0.3)	-173.9	(-0.4)	-150.7	(-0.3)	-110.9	(-0.3)	-188.2	(-0.7)	-142.0	(-0.6)	-141.1	(-0.8)	-146.5	(-0.7)	-156.6	(-0.9)	-154.1	(-0.8)
	Projected Demand	-200.8	(-2.1)	-222.3	(-1.7)	-102.1	(-0.1)	-150.2	(-0.4)	-103.0	(-0.2)	-80.1	(-0.2)	-153.5	(-0.5)	-123.4	(-0.5)	-115.8	(-0.6)	-112.8	(-0.6)	-122.7	(-0.7)	-123.9	(-0.7)
Above Normal	Baseline	11281		12922		20238		38711		43125		39224		22527		25385		19068		20581		18191		17943	
	+75 MGD	-118.2	(-1)	-136.5	(-1)	-87.9	(-0.5)	-63.2	(-0.2)	-150.8	(-0.3)	-147.3	(-0.4)	-118.7	(-0.6)	-185.0	(-1)	-114.7	(-0.8)	-158.5	(-0.8)	-106.0	(-0.6)	-167.8	(-0.9)
	+150 MGD	-137.8	(-1.3)	-140.0	(-0.9)	-235.9	(-1.4)	-177.3	(-0.6)	-249.2	(-0.6)	-195.4	(-0.6)	-207.2	(-1)	-242.5	(-1.3)	-173.2	(-1.1)	-331.6	(-1.6)	-94.3	(-0.5)	-370.3	(-2.1)
	Projected Demand	-76.8	(-0.7)	-116.5	(-0.8)	-192.3	(-1.1)	-134.0	(-0.4)	-208.9	(-0.5)	-260.8	(-0.7)	-173.6	(-0.8)	-213.4	(-1.1)	-147.9	(-1)	-248.2	(-1.2)	-64.1	(-0.3)	-298.6	(-1.7)
Below Normal	Baseline	10944		13158		17448		20726		26164		23826		15556		15282		13576		20124		16457		13673	
	+75 MGD	-176.0	(-1.9)	-125.4	(-1)	-68.0	(-0.5)	-88.3	(-0.5)	-104.9	(-0.5)	-49.4	(-0.3)	-116.2	(-0.8)	-68.1	(-0.5)	-72.2	(-0.5)	-83.0	(-0.4)	-89.7	(-0.6)	-140.0	(-1)
	+150 MGD	-299.3	(-3.2)	-160.2	(-1)	-177.1	(-1.3)	-275.1	(-1.8)	-232.4	(-0.9)	-133.3	(-0.9)	-225.3	(-1.6)	-128.6	(-0.9)	-144.0	(-1.1)	-148.7	(-0.8)	-215.7	(-1.4)	-397.3	(-3)
	Projected Demand	-231.5	(-2.5)	-194.6	(-1.7)	-149.1	(-1.2)	-224.1	(-1.5)	-145.9	(-0.6)	-67.8	(-0.6)	-181.5	(-1.2)	-98.2	(-0.7)	-110.1	(-0.8)	-153.6	(-0.8)	-181.5	(-1.1)	-338.2	(-2.5)
Dry	Baseline	10312		11211		12002		14247		23381		19645		12241		11652		13480		16807		11283		9312	
	+75 MGD	-181.7	(-2)	33.6	(+0.4)	-85.5	(-0.7)	-85.6	(-0.6)	-72.6	(-0.5)	-106.0	(-0.6)	-62.7	(-0.5)	31.0	(+0.3)	-86.3	(-0.7)	-130.4	(-0.8)	-152.7	(-1.3)	-220.3	(-2.3)
	+150 MGD	-337.5	(-3.7)	-9.9	(0)	-203.2	(-1.8)	-151.7	(-1.1)	-182.0	(-0.9)	-227.1	(-1.2)	-138.0	(-1.2)	-37.4	(-0.3)	-177.2	(-1.4)	-255.2	(-1.5)	-379.7	(-3.2)	-378.4	(-4)
	Projected Demand	-287.1	(-3.1)	19.2	(+0.3)	-132.6	(-1.1)	-135.1	(-1)	-111.7	(-0.7)	-177.5	(-1)	-103.0	(-0.9)	-7.6	(0)	-131.7	(-1)	-197.6	(-1.2)	-305.8	(-2.6)	-308.7	(-3.3)
Critical	Baseline	8435		8280		12209		13309		14789		13326		9344		8827		10239		10007		7806		7993	
	+75 MGD	-207.0	(-2.6)	-163.2	(-2)	256.3	(+3.1)	243.8	(+3.4)	-107.7	(-1)	55.7	(+0.6)	-141.6	(-1.4)	-105.2	(-1.3)	-146.5	(-1.4)	-129.8	(-1.3)	-163.3	(-2.1)	-217.1	(-2.6)
	+150 MGD	-313.9	(-4.1)	-280.3	(-3.5)	98.2	(+1.4)	-174.5	(-0.1)	-206.3	(-1.8)	-34.7	(-0.2)	-85.5	(-0.8)	-198.9	(-2.5)	-200.6	(-1.9)	-160.2	(-1.6)	-202.7	(-2.6)	-367.3	(-4.5)
	Projected Demand	-279.1	(-3.7)	-242.0	(-3)	147.8	(+1.9)	152.6	(+2.7)	-162.5	(-1.4)	6.0	(+0.2)	-104.9	(-1)	-158.6	(-2)	-162.3	(-1.5)	-104.1	(-1.1)	-156.6	(-2)	-292.3	(-3.5)

NOTES: cfs = cubic feet per second; MGD = million gallons per day

Summary

Habitat effects on the Sacramento River were evaluated based on changes in river flows simulated by the CalSim 3 hydrologic model. Based on the simulation results presented above, increased diversion associated with operation of the new water intake would not result in far-field indirect impacts on listed fish and their associated habitat.

Delta Habitat Effects

Habitat effects in the Delta were evaluated based on changes in river flows (Delta outflow) and X2 location as simulated by the CalSim 3 hydrologic model.

Delta Outflow and Location of X2

Water resource development has altered the seasonal timing of flows passing into and through the Delta. Over the past several decades, the volume of the Delta's freshwater supply has been reduced by upstream diversions, in-Delta use, and Delta exports. Seasonal flows influence the transport of eggs and young organisms (e.g., zooplankton, fish eggs, larvae) through the Delta and into San Francisco Bay. Flows during April, May, and June play an especially important role in determining the reproductive success and survival of many estuarine species, such as salmon, striped bass, American shad, delta smelt, longfin smelt, and Sacramento splittail (Stevens et al., 1985).

As introduced in Section 3.5.2, *Environmental Setting*, the transition area between saline waters and fresh water in the Delta, as measured by the position of X2, historically has had high prey densities and other favorable habitat conditions for rearing juvenile delta smelt, striped bass, and other fish species (Kimmerer, 2004). The best combination of habitat factors for some aquatic species is believed to occur when X2 is located downstream of the confluence of the Sacramento and San Joaquin rivers. When Delta outflow is low, X2 moves eastward and is located in the relatively narrow channel of these rivers; at higher outflows, it moves downstream to the west into more open waters with larger area. Jassby et al. (1995) showed that when X2 is in the vicinity of Suisun Bay, several estuarine organisms tend to show increased abundance.

Therefore, simulated changes in Delta outflow and the location of X2 were used to assess potential effects of increased diversion from the Sacramento River on native fish species in the Delta. The analysis of potential impacts on Delta water quality focused on the frequency and magnitude of changes in mean monthly Delta outflow rates and X2 location by water year types under the proposed project scenarios compared to existing baseline conditions.

Tables 3.5-13 and **3.5-14** summarize the modeled average difference in Delta outflow rates (cfs) and X2 location (kilometers) under the proposed project scenarios compared to the existing baseline conditions. As shown, the modeled average differences in Delta outflow and position of X2 between proposed project scenarios and existing baseline conditions were negligible across all combinations of month and water year type (changes were less than 5 percent). The modeled average differences in Delta outflow ranged from 3.7 to -1.7 percent across all months and water year types (refer to Table 3.5-13). The modeled average difference in X2 location was 0 percent under most months and water year types, with only slight differences of less than 1 percent in January, June, and July in some water year types (refer to Table 3.5-14). The maximum increase in the X2 location between the proposed project scenarios and existing baseline conditions was

TABLE 3.5-13
MODELED AVERAGE DIFFERENCE IN DELTA OUTFLOW, PROJECT-ONLY COMPARED TO BASELINE CONDITIONS (PERCENT CHANGE AND ABSOLUTE VALUE [CFS])

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep	
All	Baseline	6729		9198		22630		39806		50367		42569		27762		21916		13227		7969		5017		6708	
	+75 MGD	-10.4	(-0.2)	-25.7	(-0.2)	8.4	(+0.6)	-41.4	(-0.1)	-26.5	(-0.1)	-19.6	(-0.1)	-46.9	(-0.1)	-7.8	(0)	-7.4	(-0.1)	3.9	(+0.1)	-5.1	(-0.2)	-8.7	(-0.2)
	+150 MGD	-8.9	(-0.1)	-40.8	(-0.3)	32.2	(+0.8)	-107.3	(-0.5)	-73.6	(-0.1)	-22.2	(-0.2)	-67.9	(-0.2)	-10.2	(-0.1)	-8.1	(-0.1)	-2.8	(0)	-8.4	(-0.3)	-21.0	(-0.5)
	Projected Demand	-2.6	(+0)	-46.9	(-0.5)	48.7	(+0.9)	-77.8	(-0.3)	-53.0	(-0.1)	-38.2	(-0.2)	-60.3	(-0.2)	-10.4	(-0.1)	-9.7	(-0.1)	-2.1	(0)	-6.2	(-0.2)	-20.6	(-0.5)
Wet	Baseline	8501		14690		46744		81025		97508		81260		53019		38401		22961		11023		6693		10875	
	+75 MGD	-7.4	(-0.1)	-48.4	(-0.4)	-65.9	(+0.4)	-133.5	(-0.2)	-22.7	(0)	4.5	(0)	-104.3	(-0.2)	-9.1	(0)	-5.8	(+0)	-4.4	(0)	5.2	(+0.1)	-8.6	(-0.1)
	+150 MGD	-15.5	(-0.1)	-78.2	(-0.5)	-75.0	(+0.2)	-142.7	(-0.2)	-3.0	(+0.1)	-11.8	(-0.1)	-110.9	(-0.2)	-15.4	(0)	-8.2	(+0)	-7.6	(-0.1)	4.7	(+0.1)	-8.7	(-0.1)
	Projected Demand	-6.2	(0)	-75.9	(-0.5)	-42.6	(+0.4)	-140.1	(-0.2)	-10.9	(+0)	-20.8	(-0.1)	-109.1	(-0.2)	-21.0	(-0.1)	-15.8	(+0)	-5.0	(0)	4.8	(+0.1)	-9.8	(-0.1)
Above Normal	Baseline	6609		6669		15915		45975		55221		47374		26242		26511		15190		9355		6238		10247	
	+75 MGD	-5.2	(-0.1)	-30.2	(-0.3)	-20.1	(-0.1)	-3.2	(0)	-144.9	(-0.2)	-135.5	(-0.3)	-49.4	(-0.2)	-125.5	(-0.6)	-43.8	(-0.5)	28.9	(+0.3)	-23.9	(-0.4)	13.0	(+0.1)
	+150 MGD	35.7	(+0.9)	-52.8	(-0.6)	288.5	(+2.9)	-112.5	(-0.2)	-388.0	(-0.5)	-100.0	(-0.2)	-68.4	(-0.3)	-123.3	(-0.7)	-32.0	(-0.4)	-21.1	(-0.2)	-11.7	(-0.2)	13.0	(+0.1)
	Projected Demand	44.6	(+1.1)	-62.6	(-0.8)	316.3	(+3.2)	-95.5	(-0.1)	-361.3	(-0.4)	-282.9	(-0.6)	-67.2	(-0.3)	-120.7	(-0.7)	-38.5	(-0.5)	0.1	(0)	-12.8	(-0.2)	13.0	(+0.1)
Below Normal	Baseline	6506		7665		13750		19230		27029		24352		17198		14869		7889		7514		4173		4043	
	+75 MGD	-26.3	(-0.5)	-22.9	(-0.2)	-9.9	(0)	0.7	(+0)	-33.9	(-0.2)	17.6	(0)	-42.9	(-0.2)	-0.4	(+0)	0.0	(+0)	1.5	(+0)	4.9	(+0.1)	-25.9	(-0.6)
	+150 MGD	-26.6	(-0.5)	-25.3	(0)	-28.9	(-0.1)	-108.1	(-1.1)	-109.5	(-0.5)	53.5	(-0.1)	-84.6	(-0.5)	7.4	(+0.1)	-1.4	(0)	1.9	(+0)	-3.7	(-0.1)	-66.2	(-1.6)
	Projected Demand	-25.6	(-0.5)	-35.4	(-0.3)	-16.4	(+0)	-87.5	(-0.9)	-47.7	(-0.3)	82.2	(0)	-68.3	(-0.4)	8.1	(+0.1)	0.8	(+0)	-8.5	(-0.1)	-2.0	(-0.1)	-64.8	(-1.6)
Dry	Baseline	5664		6261		6711		12017		23254		18397		12487		10359		7191		5262		3885		3144	
	+75 MGD	-5.2	(-0.1)	30.8	(+0.6)	17.1	(-0.1)	-15.0	(-0.1)	51.5	(+0.3)	-36.1	(-0.2)	9.8	(+0.1)	91.1	(+0.9)	0.3	(+0)	2.5	(+0)	-10.5	(-0.3)	-7.2	(-0.2)
	+150 MGD	-7.9	(-0.2)	52.0	(+1)	-34.7	(-0.9)	15.6	(+0.3)	35.6	(+0.3)	-86.9	(-0.4)	7.5	(+0.1)	88.8	(+0.8)	-6.3	(-0.1)	3.3	(+0.1)	-14.4	(-0.4)	-23.4	(-0.7)
	Projected Demand	-6.8	(-0.2)	43.5	(+0.8)	-16.1	(-0.6)	-26.2	(-0.2)	62.8	(+0.4)	-69.0	(-0.4)	9.1	(+0.2)	88.5	(+0.8)	0.4	(+0)	2.7	(+0.1)	-10.5	(-0.3)	-20.9	(-0.6)
Critical	Baseline	4603		5360		8861		10284		12853		11792		8999		6938		5973		4043		3000		3005	
	+75 MGD	-2.4	(0)	-41.9	(-0.8)	211.0	(+3.6)	26.8	(-0.3)	-10.5	(-0.2)	-11.7	(-0.1)	6.9	(+0.1)	-28.7	(-0.5)	0.0	(0)	5.5	(+0.1)	-20.7	(-0.7)	-2.4	(-0.1)
	+150 MGD	-6.4	(-0.1)	-80.9	(-1.5)	214.5	(+3.7)	-166.1	(-1.4)	-23.6	(-0.4)	-23.2	(-0.2)	-35.3	(-0.4)	-43.0	(-0.9)	0.0	(0)	8.5	(+0.2)	-34.0	(-1.1)	-2.7	(-0.1)
	Projected Demand	5.5	(+0.3)	-92.5	(-1.7)	191.4	(+3.3)	27.1	(+0.2)	-19.5	(-0.3)	-19.7	(-0.2)	-16.2	(-0.2)	-35.4	(-0.7)	0.0	(0)	7.0	(+0.2)	-26.0	(-0.9)	-2.5	(-0.1)

NOTES: cfs = cubic feet per second; MGD = million gallons per day

TABLE 3.5-14
MODELED AVERAGE DIFFERENCE IN X2 LOCATION, PROJECT-ONLY COMPARED TO BASELINE CONDITIONS (PERCENT CHANGE AND ABSOLUTE VALUE [KM])

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	85		85		85		78		70		64		63		66		70		75		81		85		76
	+75 MGD	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0
	+150 MGD	0.0	(+0)	0.0	(+0)	0.0	(+0.1)	0.0	(0)	0.0	(+0)	0.1	(+0.1)	0.0	(+0)	0.0	(+0.1)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0
	Projected Demand	0.0	(+0)	0.0	(+0)	0.0	(+0.1)	-0.1	(-0.1)	0.0	(0)	0.0	(+0.1)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0
Wet	Baseline	84		83		80		66		56		53		54		57		60		67		75		80		68
	+75 MGD	0.0	(+0)	0.0	(+0)	0.0	(+0.1)	0.0	(0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(0)	0
	+150 MGD	0.0	(+0)	0.0	(+0.1)	0.1	(+0.1)	0.0	(+0)	0.0	(+0)	0.0	(0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(0)	0
	Projected Demand	0.0	(+0)	0.0	(+0)	0.0	(+0.1)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(0)	0
Above Normal	Baseline	85		85		86		78		64		58		57		62		64		70		78		83		72
	+75 MGD	0.0	(+0)	0.0	(+0)	0.0	(+0.1)	0.0	(+0.1)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.1	(+0.1)	0.1	(+0.1)	0.0	(+0)	0.0	(+0)	0
	+150 MGD	0.0	(+0)	0.0	(0)	0.0	(+0)	-0.3	(-0.3)	0.0	(-0.1)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.1	(+0.1)	0.1	(+0.1)	0.0	(+0)	0.0	(+0)	0
	Projected Demand	0.0	(+0)	0.0	(0)	0.0	(+0)	-0.3	(-0.3)	0.0	(-0.1)	0.0	(+0)	0.0	(+0.1)	0.0	(+0.1)	0.1	(+0.1)	0.1	(+0.1)	0.0	(+0)	0.0	(+0)	0
Below Normal	Baseline	85		85		85		81		74		67		65		68		72		78		83		86		78
	+75 MGD	0.0	(+0)	0.0	(+0)	0.0	(+0.1)	0.0	(+0)	0.0	(0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(0)	0
	+150 MGD	0.0	(+0)	0.0	(+0)	0.1	(+0.1)	0.0	(+0)	0.1	(+0.1)	0.1	(+0.2)	0.0	(+0)	0.1	(+0.1)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(+0)	1
	Projected Demand	0.0	(+0)	0.0	(+0)	0.1	(+0.1)	0.0	(+0)	0.1	(+0.1)	0.1	(+0.1)	0.0	(+0)	0.0	(+0.1)	0.0	(+0)	0.0	(0)	0.0	(+0)	0.0	(+0)	0
Dry	Baseline	86		86		88		88		82		70		68		73		78		82		85		89		81
	+75 MGD	0.0	(+0)	0.0	(+0)	0.0	(0)	-0.1	(-0.1)	0.0	(+0)	0.0	(+0.1)	0.0	(+0)	0.0	(+0)	-0.1	(-0.1)	-0.1	(-0.1)	0.0	(0)	0.0	(0)	0
	+150 MGD	0.0	(+0)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(+0)	0.1	(+0.1)	0.0	(+0)	-0.1	(-0.1)	0.0	(-0.1)	0.0	(0)	0.0	(+0)	0
	Projected Demand	0.0	(+0)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(+0.1)	0.0	(+0)	0.0	(+0.1)	0.0	(+0)	-0.1	(-0.1)	-0.1	(-0.1)	0.0	(0)	0.0	(0)	0
Critical	Baseline	90		90		91		87		83		78		77		79		83		86		89		91		85
	+75 MGD	0.0	(+0)	0.0	(+0)	0.0	(+0.1)	-0.2	(-0.2)	-0.3	(-0.4)	0.1	(+0.1)	0.0	(0)	0.1	(+0.1)	0.1	(+0.1)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0
	+150 MGD	0.0	(+0)	0.0	(+0)	0.1	(+0.1)	-0.1	(-0.1)	-0.1	(-0.1)	0.2	(+0.2)	0.0	(0)	0.1	(+0.1)	0.1	(+0.1)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0
	Projected Demand	0.0	(+0)	0.0	(+0)	0.1	(+0.1)	-0.1	(-0.1)	-0.3	(-0.3)	0.1	(+0.1)	0.0	(0)	0.1	(+0.1)	0.1	(+0.1)	0.0	(+0)	0.0	(+0)	0.0	(+0)	0

NOTES: MGD = million gallons per day

0.2 kilometers. A comparison of February–June X2 location found that X2 location was west of Collinsville (i.e., less than 81 kilometers) in accordance with D-1641 objectives.

In addition to meeting D-1641 X2 objectives, simulated results for all model scenarios met other D-1641 objectives, Net Delta Outflow Index outflow standards, and the export-to-import ratio. Salinity criteria at Rock Slough, Emmaton, Jersey Point, and Collinsville were met consistently across all model scenarios (i.e., there were either no or only negligible differences between proposed project scenarios and the existing baseline conditions baseline) and were found to be met on more than 93 percent of simulation time steps, which is consistent with other CalSim 3 modeling (DWR, 2021; DWR 2022b).

Summary

Habitat effects in the Delta were evaluated based on changes in river flows (Delta outflow) and X2 location as simulated by the CalSim 3 hydrologic model. Based on the simulated results presented above, increased diversion associated with operation of the new water intake would not result in far-field indirect impacts on listed fish and their associated habitat.

Summary and Impact Conclusion

Based on the location of the treatment plant improvements at FWTP and SRWTP, existing utility upgrades at both treatment plants, and proposed potable water transmission pipelines, O&M would not occur in-water. Operation of the existing water intake would be consistent with existing conditions (i.e., the proposed project would not divert additional water through the existing intake). Therefore, O&M of these project components would not result in far-field indirect impacts to listed fish species and their associated habitat. There would be **no impact**.

Increased diversion from the Sacramento River associated with operation of the new water intake, could cause far-field indirect effects on listed fish in the Lower American River, Sacramento River and Delta. To assess potential habitat effects in each of these areas, changes in river flows that would occur under the proposed project scenarios in comparison to the existing baseline were evaluated. As detailed above, in most instances, the proposed project would not result in notable changes in river flows in the Lower American or Sacramento rivers. In a few instances, the proposed project would result in discernable flow reductions, but not to a magnitude, frequency or extent that would result in a significant impact (changes greater than 5 percent). Modeled changes in Delta outflow and X2 location between the proposed project scenarios and existing baseline conditions were also negligible.

For the Lower American River, habitat effects were also evaluated based on changes in habitat availability and water temperature. This additional analysis of weighted useable habitat and water temperature found that increased diversion associated with operation of the new intake would not result in adverse impacts to listed fish (i.e., Chinook salmon and steelhead) and their associated habitat. Lastly, model simulations found that flow and temperature standards would continue to be met under the proposed project scenarios. Therefore, operation of the new water intake would not result in far-field indirect impacts to listed fish species and their associated habitat. This impact would be **less than significant**.

3.6 Biological Resources – Terrestrial

3.6.1 Introduction

This section of the Draft EIR addresses the potential impacts of implementation of the proposed project on terrestrial biological resources. The potential impacts of implementation of the proposed project on aquatic biological resources is discussed in Section 3.5, *Biological Resources – Aquatic*.

As presented in Section 3.5, *Biological Resources* – Aquatic, CDFW provided comments on the NOP requesting that the EIR include an assessment and map of habitat types and species along with an inventory and an assessment of rare, threatened, endangered, and other sensitive species that could be affected by the proposed project. The comment letter also requested the inclusion of appropriate and adequate avoidance, minimization, and/or mitigation measures. Their comment letter identified Swainson's hawk (*Buteo swainsoni*), white-tailed kite (*Elanus leucurus*), western pond turtle (*Emys marmorata*), purple martin (*Progne subis*), nesting birds and birds of prey, and roosting bats as special-status terrestrial species with potential to occur. CDFW's comments are addressed in this section. See **Appendix A** for NOP comment letters.

The analysis in this section is based on field reconnaissance and review of potentially occurring special-status species,[1] wildlife habitats, vegetation communities, and jurisdictional waters of the United States (U.S.) and of the State. Site reconnaissance surveys and a tree inventory were conducted on July 25, August 30, September 9, and September 15, 2022. An additional biological survey and tree inventory was conducted for proposed utility improvements in the FWTP and SRWTP project areas by an ESA biologist on August 18, 2023. The surveys were conducted on foot and existing habitat types, plants, and wildlife species within the project area were recorded. While a formal aquatic resources delineation was not conducted, potential wetlands and other waters of the U.S. were noted and informally mapped.

Prior to the survey, a review of pertinent literature and database queries were conducted for the FWTP and SRTWP project areas and vicinity. The sources of reference data reviewed for this evaluation include the following:

- City of Sacramento 2040 General Plan (City of Sacramento, 2024).
- Sacramento East U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle.
- CNDDB List of Regionally Occurring Special-Status Species (CDFW, 2023a) (**Appendix C**).
- USFWS List of Federally Threatened and Endangered Species that May Occur in the Project Location (UFWS, 2023a) (Appendix C).
- California Native Plant Society (CNPS) Plant List of Regionally Occurring Special-Status Plants (CNPS, 2023) (Appendix C).

1 Species that are protected pursuant to Federal or State endangered species laws, or have been designated as a Species of Special Concern by CDFW, or species that are not included on any agency listing but meet the definition of rare, endangered, or threatened species of the CEQA Guidelines section 15380(b), or are collectively referred to as "special-status species."

3.6.2 Environmental Setting

Regional Setting

The study area for biological resources includes the existing and proposed facilities at the FWTP and the SRWTP and the immediate vicinity (proposed project areas). The two water treatment plants are located in the City of Sacramento within the Sacramento Valley floristic province of the Great Central Valley (Baldwin et al., 2012). Historically, the region supported extensive marshes, riparian woodland intermixed with oak woodland, vernal pool complexes, and native grasslands. Intensive agricultural and urban development has resulted in substantial changes and conversions of these habitats. The remaining native vegetative communities exist now as isolated remnant patches within urban and agricultural landscapes.

Project Areas

FWTP Project Area

As described in Chapter 2, *Project Description*, the FWTP project area, including the approximately 34-acre FWTP property and associated storm drainage pipelines, is located adjacent to the south bank of the American River and near California State University, Sacramento (Sacramento State) (see Figure 2-2 in Chapter 2). The FWTP project area is bounded by State University Drive to the west, College Town Drive to the south, and Howe Avenue to the east. Adjacent land uses include the Sacramento State campus to the west and apartment complexes and student housing to the east and south. A paved pedestrian path runs along the northern edge of the FWTP property.

The FWTP property and street right-of-way for the proposed drainage improvements along College Town Drive are currently designated Public/Quasi-Public spaces within the City of Sacramento 2040 General Plan Land Use Diagram. Habitat within the FWTP project area primarily consists of structures and urban landscaping. Topography is generally flat with a raised levee at the north end of the site. No work is proposed on the levee; proposed improvements would occur on previously disturbed areas within the plant boundaries. Elevations range from about 30 to 50 feet above mean sea level.

SRWTP Project Area

As described in Chapter 2, *Project Description*, the SRWTP project area, including the approximately 50-acre SRWTP property, is located near the confluence of the Sacramento River and American River (see Figure 2-3 in Chapter 2). The SRWTP project area is bounded on the north by the American River, on the east by 7th Street, on the south by the Union Pacific Railroad, and on the west by the Sacramento River. The SRWTP project area also includes the existing Sacramento River water intake and the site of the proposed new water intake, which are located on the east bank of the Sacramento River.

The SRWTP project area is located in a largely commercial/industrial area, although some existing residences and state and local offices are located nearby. The SRWTP property is bordered on the north by Bannon Street, on the east by the Union Gospel Mission and Volunteers of America, on the south by Summit Tunnel Drive, and on the west by Bercut Drive. The American River is located approximately 0.35 mile to the north of the SRWTP property, and the confluence of the

Sacramento and American rivers is located approximately 0.30 mile to the northwest of the SRWTP property.

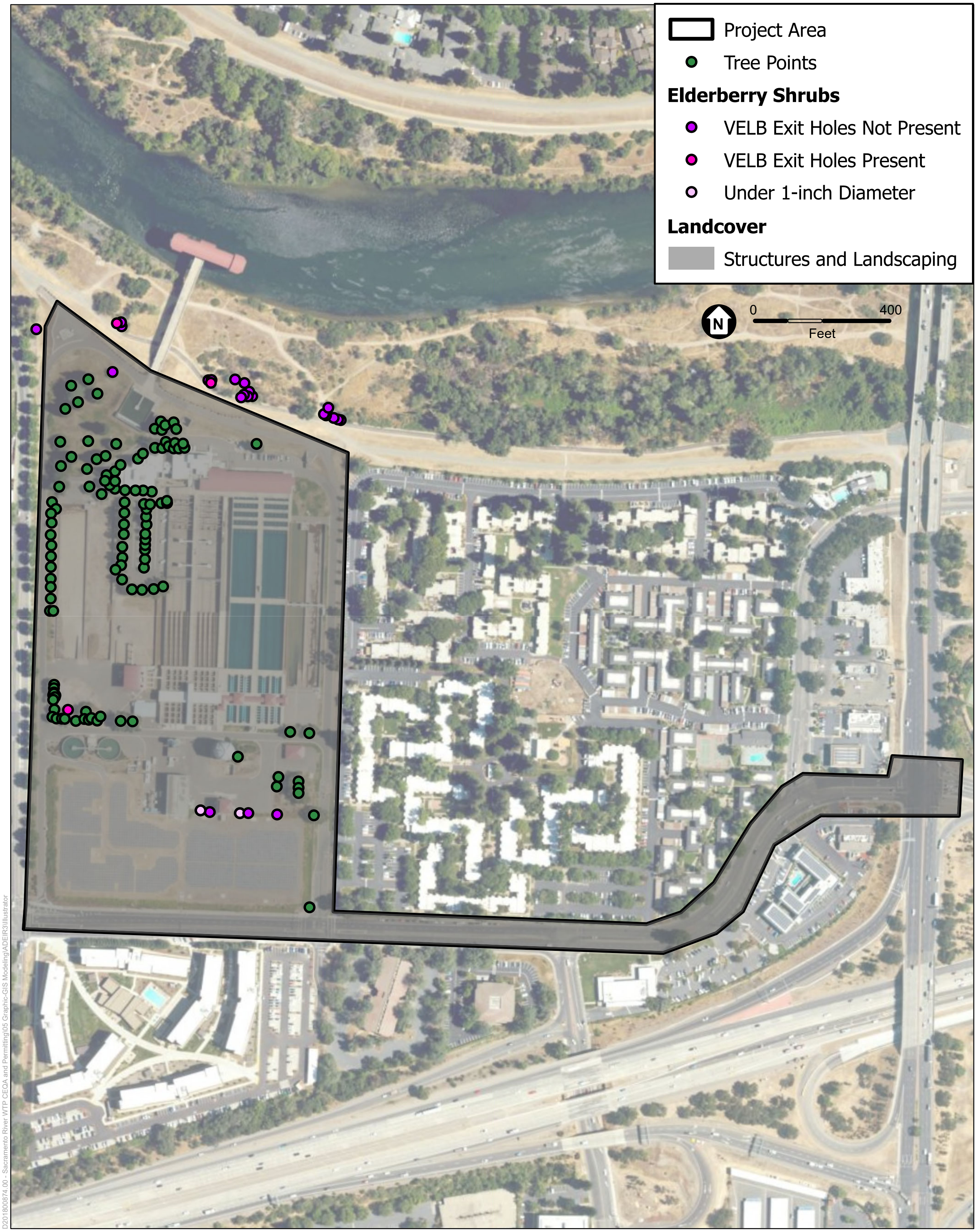
The SRWTP property is primarily designated Public/Quasi-Public on the City of Sacramento 2040 General Plan Land Use Diagram. The proposed project area along the south side of Bannon Street is designated Residential Mixed-Use, and the original and proposed new water intake structures are located on land designated Parks and Recreation. Habitat at the SRWTP property primarily consists of structures and urban landscaping. Proposed improvements would occur in previously disturbed areas within the plant boundaries. A narrow strip of Fremont cottonwood riparian forest occurs along the Sacramento River at the existing water intake and within the proposed construction area for the proposed intake structures and conveyance pipelines. Topography is generally flat with elevations that range from about 20 to 35 feet above mean sea level. SRWTP elevations are at this lower end and approximately 25 feet on average. The intake site along the levee has elevations of approximately 35 feet.

Habitat Types

Reconnaissance-level biological surveys were conducted by an ESA biologist on July 25, 2022, at both the FWTP and SRWTP properties and the SRWTP intake area. A tree inventory was conducted by an International Society of Arboriculture Certified Arborist on August 30, 2022, at the FWTP property, and on September 9 and 15, 2022, at the SRWTP property and Sacramento River intake locations. An additional biological survey and tree inventory was conducted for proposed utility improvements in the FWTP and SRWTP project areas by an ESA biologist on August 18, 2023. The surveys were conducted on foot in all areas where construction activities are anticipated to occur, and existing habitat types, plants, and wildlife species were recorded. While a formal aquatic resources delineation was not conducted, potential wetlands and other waters of the U.S. were noted and informally mapped. A reconnaissance-level biological survey of the proposed potable water transmission pipelines was not conducted because their exact locations have yet to be determined. Habitat types in the FWTP and SRWTP project areas are presented in **Figures 3.6-1** and **3.6-2**, respectively.

Structures and Landscaping

Structures and urban landscaping comprise the majority of both the FWTP and the SRWTP project areas. Onsite structures include O&M buildings, grit basins, flocculation tanks, sedimentation tanks, and reservoirs among other water treatment infrastructure. Among the structures are paved access roads and parking areas. Along the northern boundary of the SRWTP, just south of Bannon Street, is a row of single-family residences. Several of these residential parcels are now empty where previous improvements have been demolished down to grade level. Both water treatment plants contain a block of solar panels. The solar panels at the FWTP are at the southern boundary adjacent to College Town Drive. The solar panels at the SRWTP are located near the northern boundary, in the center of the site.

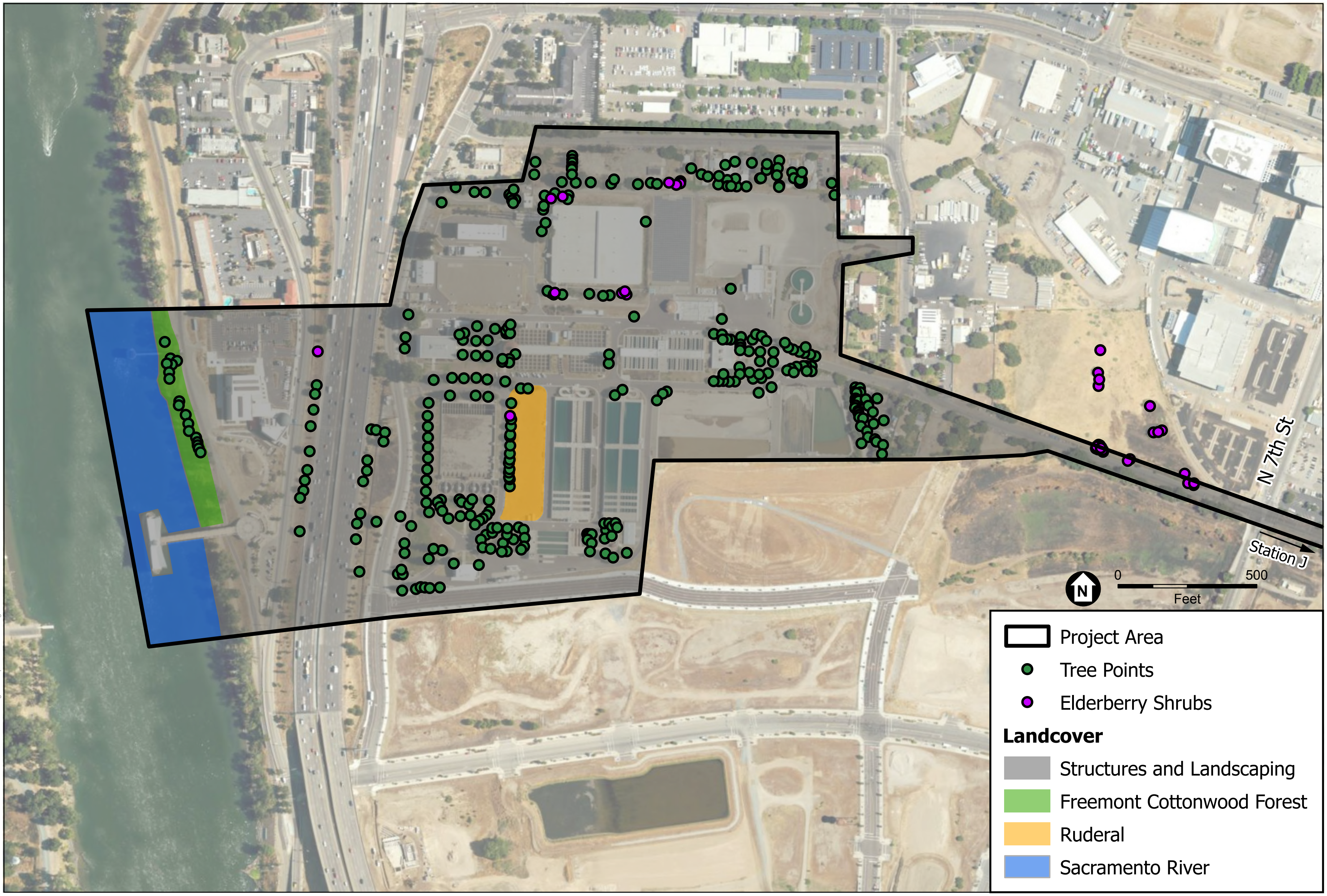


SOURCE: NAIP 2022; ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 3.6-1
Habitat Types in the FWTP Project Area

ESA



SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 3.6-2
Habitat Types in the SRWTP Project Area

ESA

Among the paved roads and infrastructure of both water treatment plants are areas of lawn, landscaping, and vegetated stormwater treatment and buffer areas. Common species found in these areas are Bermuda grass (*Cynodon dactylon*), dallis grass (*Paspalum dilatatum*), oat (*Avena* sp.), brome fescue (*Festuca bromoides*), California burclover (*Medicago polymorpha*), English plantain (*Plantago lanceolata*), common plantain (*Plantago major*), bristly ox-tongue (*Helminthotheca echioides*), cranesbill (*Geranium molle*), mock-strawberry (*Duchesnea indica* var. *indica*), scarlet pimpernel (*Anagallis arvensis*), and dandelion (*Taraxacum* sp.). Ornamental trees are planted around the parking areas and roads, around the buildings, and in the lawns. Common ornamental trees planted around each water treatment plant include coast redwood (*Sequoia sempervirens*), crape myrtle (*Lagerstroemia* sp.), southern magnolia (*Magnolia grandiflora*), Deodar cedar (*Cedrus deodara*), London planetree (*Platanus × acerifolia*), sweetgum (*Liquidambar styraciflua*), Bradford pear (*Pyrus calleryana*), glossy privet (*Ligustrum lucidum*), Chinese pistache (*Pistacia chinensis*), and Japanese maple (*Acer palmatrum*). Blue elderberry shrubs (*Sambucus mexicana*) are also scattered in this community in undeveloped areas around the treatment plant infrastructure.

Each water treatment plant has a small area planted with fruit trees. At the FWTP this area is located parallel to the paved access road along the western boundary. At the SRWTP this area is located near the southwest corner of the existing facility. Fruit trees at the FWTP include orange (*Citrus sinensis*), satsuma (*Citrus reticulata*), plum (*Prunus domestica*), apple (*Malus domestica*), nectarine and peach (*Prunus persica*), cherry (*Prunus avium*), fuyu persimmon (*Diospyros kaki 'Fuyu'*), and avocado (*Persea americana*). Fruit trees at the SRWTP include peach, pear (*Pyrus* sp.), lemon (*Citrus limon*), and cherry.

The existing intake and proposed new water intake are located on the east bank of the Sacramento River. Additionally, a portion of a paved pedestrian pathway runs north-south along the top of the levee parallel to the Sacramento River. Where the conveyance pipelines would be constructed, include a small segment of both the north and southbound lanes of I-5 and adjacent right-of-way, Jibboom and Bercut Streets, and the parking lot associated with the Sacramento Municipal Utility District Museum of Science and Curiosity. The I-5 right-of-way is primarily vegetated with nonnative trees consisting of an ornamental oak (Quercus sp.) and London planetree. One elderberry shrub occurs at the edge of the project boundary in the I-5 right-of-way across from the museum parking lot.

Ruderal

A small undeveloped area located in the south-central portion of the SRWTP property contains ruderal vegetation. This habitat is bordered on all sides by paved roads and is frequently mowed. The substrate is primarily gravel. Based on a review of aerial photos, this area previously contained a portion of treatment basins which were removed between late 2013 and early 2104. Construction of new treatment basins to the east of the ruderal area began shortly thereafter and were completed between late 2015 and early 2016. During construction of the new treatment basins, the ruderal area was used for staging equipment and materials. After completion of the new treatment basins, no further development occurred in the ruderal area though materials are occasionally stored around the edges. Dominant species in this community include everlasting (*Pseudognaphalium* sp.), red brome (*Bromus madritensis* ssp. *rubens*), rye grass (*Festuca* *perennis*), tarweed (*Deinandra* sp.), brome fescue, and scarlet pimpernel. Along the west side of the ruderal area there is a row of southern magnolia trees with a few scattered tree-of-heaven (*Ailanthus altissima*). One elderberry shrub occurs in this row of trees.

Fremont Cottonwood Forest

Fremont cottonwood forest is a riparian community that occurs along the east bank of the Sacramento River in the vicinity of the existing water intake and where the proposed new water intake would be located. This community is part of the broader riparian forest along the Sacramento River. The dominant species in this community is Fremont cottonwood (*Populus fremontii* ssp. *fremontii*). Several valley oaks (*Quercus lobata*) are also scattered within this community. The understory is open and dominated by nonnative grasses.

Wetlands/Waters of the U.S.

A formal aquatic resources delineation has not been conducted for the proposed project. No areas of wetland vegetation were found within the FWTP or the SRWTP project areas (i.e., the FWTP and SRWTP properties, the location of the existing intake, the proposed new water intake and associated facilities, and the locations of proposed upgrades to existing utilities at both treatment plants). While the potable water transmission pipelines are proposed primarily in previously disturbed areas in the vicinity of the SRWTP, their exact locations have yet to be determined so a reconnaissance-level biological survey of this component of the project was not conducted. Once the exact water transmission pipeline alignments are determined, additional review would be completed if necessary. The Sacramento River, which is along the western border of the SRWTP project area is a traditionally navigable water which is considered waters of the U.S. and under the jurisdiction of the USACE.

Sensitive Natural Communities

A sensitive natural community is a biological community that is regionally rare, provides important habitat opportunities for wildlife, is structurally complex, or is in other ways of special concern to local, State, or federal agencies. Most sensitive natural communities are given special consideration because they perform important ecological functions, such as maintaining water quality and providing essential habitat for plants and wildlife. Some natural communities support a unique or diverse assemblage of plant species and therefore are considered sensitive from a botanical standpoint. CEQA may identify the elimination of such communities as a significant impact.

Sensitive natural communities include: (a) habitats and natural communities that are regulated by federal and State resource agencies, (b) natural communities ranked S1, S2, or S3 by CDFW (2018), and (c) areas protected by County ordinance. The CNDDB generates a list of ecologically sensitive and/or threatened habitat types within the state of California. The CNDDB list documents the following sensitive communities within the vicinity of the project site: northern claypan vernal pool, northern hardpan vernal pool, northern volcanic mud flow vernal pool, elderberry savannah, great valley cottonwood riparian forest, and great valley oak riparian forest. No CNDDB-listed sensitive natural communities are present at the FWTP or the SRWTP properties or the location of the proposed upgrades to existing utilities. The Sacramento River at the SRWTP is a federal and State regulated sensitive natural community.

Wildlife Corridors

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization creates isolated "islands" of wildlife habitat. Fragmentation can also occur when a portion of one or more habitats is converted into another habitat, such as when woodland or scrub habitat is altered or converted into grasslands after a disturbance such as fire, mudslide, or grading activities. Wildlife corridors mitigate the effects of this fragmentation by: (1) allowing animals to move between remaining habitats, thereby permitting depleted populations to be replenished and promoting genetic exchange; (2) providing escape routes from fire, predators, and human disturbances, thus reducing the risk of catastrophic events (such as fire or disease) on population or local species extinction; and (3) serving as travel routes for individual animals as they move within their home ranges in search of food, water, mates, and other needs.

Both water treatment plants are not located within major or local wildlife corridor/travel routes because they do not connect two significant habitat areas. Both sites are heavily developed and lack overstory vegetation used by wildlife for cover. Additionally, both project areas are located in urban settings.

A narrow strip of riparian forest occurs along the Sacramento River at the location of the existing water intake and new water intake. Riparian forest habitat types are often used by wildlife; however, the segment of riparian forest in the project area is in a highly disturbed area with a paved pedestrian path crossing through. The riparian forest is also very narrow with steep slopes thus likely provides minimal benefit to wildlife movement. Any wildlife crossing through this area are likely already adapted to disturbance. Project construction is not expected to impact wildlife corridors.

Special-Status Species

As described in Section 3.5, *Biological Resources – Aquatic*, special-status species are regulated under the FESA and CESA or other regulations or are species that are considered sufficiently rare by the scientific community to qualify for such listing. These species are classified in the following categories:

- Species listed or proposed for listing as threatened or endangered under the FESA (50 CFR 17.12 [listed plants], 50 CFR 17.11 [listed animals], and various notices in the Federal Register [FR] [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under the FESA (61 FR 40, February 28, 1996).
- Species listed or proposed for listing by the State of California as threatened or endangered under the CESA (California Code of Regulations, Title 14, Section 670.5).
- Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.).
- Animal species of special concern to CDFW.

- Animals fully protected under the California Fish and Game Code (Section 3511 [birds], Section 4700 [mammals], and Section 5050 [reptiles and amphibians]).
- Species that meet the definitions of rare and endangered under CEQA; a plant or animal species may be treated as "rare or endangered" even if not on one of the official lists (CEQA Guidelines Section 15380).
- Plants considered by CDFW and CNPS to be "rare, threatened, or endangered in California" (California Rare Plant Ranks 1A, 1B, and 2).

A list of special-status plant and terrestrial wildlife species that have the potential to occur in the project areas was compiled based on data contained in the CNDDB (CDFW, 2023a); the USFWS List of Threatened and Endangered Species that May Occur in your Proposed Project Location or May Be Affected by Your Proposed Project prepared for each water treatment plant (USFWS, 2023a); and the CNPS Inventory of Rare and Endangered Plants (see Appendix C) (CNPS, 2023). **Table 3.6-1** provides a list of special-status species, their general habitat requirements, and an assessment of their potential to occur in the vicinity of the project areas. The analysis below also includes consideration of nesting birds regulated by the federal Migratory Bird Treaty Act (MBTA) and/or California Fish and Game Code.

The "Potential to Occur" categories are defined as follows:

- **None**: A species is determined to have no potential to occur if (1) its specific habitat requirements are not present; **AND/OR** (2) it is outside the range or presumed to be extirpated from the area or region; **AND/OR** (3) a survey has been conducted according to agency protocol and the species was not found.
- **Low**: A species is determined to have a low potential to occur if (1) its known current distribution or range is outside of but near the study area; **AND/OR** (2) only limited or marginally suitable habitat is present.
- **Moderate**: A species is determined to have a moderate potential to occur if (1) habitat is present in the study area or immediately adjacent areas; **AND** (2) the study area is in the known range of the species, even if the species was not observed during general biological surveys.
- **High**: A species is determined to have a high potential to occur or be present if (1) habitat is present in the study area or immediately adjacent areas; **AND** (2) the study area is in the known range of the species; **AND/OR** (3) there are recent and reliable records of the species on or near the site.

Conclusions regarding habitat suitability and species occurrence are based on the analysis of existing literature and databases described previously and known habitats occurring within the project areas and regionally. Database queries identify 44 special-status plant and wildlife species and sensitive natural communities. Of these, 38 species were eliminated from further consideration based upon a lack of suitable habitat in the project areas, or the project areas being outside the known range of the species. One special-status species has high potential to occur and three special-status species have moderate potential to occur in the project areas. Two species have low potential to occur in the project areas. Only species classified as having a moderate or high potential for occurrence were considered in the impact analysis.

TABLE 3.6-1
SPECIAL-STATUS SPECIES WITH THE POTENTIAL TO OCCUR IN THE VICINITY OF THE PROJECT AREAS

Scientific Name	Common Name	Listing Status: Federal/State/Other	Habitat Description	Potential for Occurrence within the Project Areas
Amphibians				
Spea hammondii	Western spadefoot	--/SSC/--	Occurs throughout the Central Valley and adjacent foothills primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying. Most of the year is spent in underground burrows up to 36 inches deep, which they construct themselves.	**None**. The project areas do not provide habitat for this species. There are no vernal pools on or adjacent to the project areas.
Ambystoma californiense	California tiger salamander	FT/ST/--	Found in vernal pools, ephemeral wetlands, and seasonal ponds, including constructed stock ponds, in grassland and oak savannah plant communities from 3 to 1,054 meters.	**None**. The project areas do not provide habitat for this species. There are no vernal pools on or adjacent to the project areas.
Birds				
Agelaius tricolor	Tricolored blackbird	--/ST, SSC/--	Highly colonial species, most numerous in the central valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging areas with insect prey within a few miles of the colony.	**None**. The project areas do not provide a habitat for this species.
Aquila chrysaetos	Golden eagle	--/FP/--	Nests and forages in a variety of open habitats, including grassland, shrubland, and cropland; most common in foothill habitats; rare foothill breeder; nests in cliffs, rock outcrops, and large trees.	**None.** This species avoids nesting near cities and other urban habitats. The project areas do not provide a habitat for this species.
Athene cunicularia	Burrowing owl	--/SSC/--	Nests and forages in grasslands, agricultural fields, and low scrub habitats, especially where ground squirrel burrows are present; occasionally inhabits artificial structures and small patches of disturbed habitat.	**Low.** While historical habitat for the species is present, urbanization of the areas has reduced available foraging habitat. Only marginal burrowing habitat is present in the undeveloped areas within the project areas.
Buteo swainsoni	Swainson's hawk	--/ST/--	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**Moderate.** Large trees on and adjacent to the project areas provide potential nesting habitat for Swainson's hawk. Suitable nearby foraging habitat is limited.
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	FT/SE/--	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	**None**. The project areas do not provide habitat for this species. The CNDDB considers previous records in the Sacramento region to be extirpated.

Scientific Name	Common Name	Listing Status: Federal/State/Other	Habitat Description	Potential for Occurrence within the Project Areas
Elanus leucurus	White-tailed kite	--/FP/--	Inhabits rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	**Moderate.** Trees on and adjacent to the project areas provide potential nesting habitat for white-tailed kite. Suitable nearby foraging habitat is limited.
Laterallus jamaicensis coturniculus	California black rail	--/ST, FP/--	Nests in high portions of salt marshes, shallow freshwater marshes, wet meadows, and flooded grassy vegetation.	**None.** The project areas do not provide habitat for this species.
Melospiza melodia pop. 1	Song sparrow “Modesto” population	--/SSC/--	Emergent freshwater marshes dominated by tule (*Scirpus* spp., *Schoenoplectus* spp.) and cattail (*Typha* spp.) as well as riparian willow (*Salix* spp.) thickets. Also nest in riparian forests of valley oak (*Quercus lobata*) with a sufficient understory of blackberry (*Rubus* spp.), along vegetated irrigation canals and levees, and in recently planted valley oak restoration sites.	**Moderate.** Marginal nesting habitat for this species occurs in the riparian habitats in the project areas and in areas of dense shrubby vegetation underneath large trees.
Progne subis	Purple martin	--/SSC/--	Inhabits woodlands, low elevation coniferous forest of Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), and Monterey pine (*Pinus radiata*). In the Sacramento area, purple martins have colonial nests in the weep holes of the freeway and overpasses.	**None.** The project areas do not provide nesting habitat for this species.
Riparia riparia	Bank swallow	--/ST/--	Colonial nester; nests primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	**None**. The project areas do not provide nesting habitat for this species.
Vireo bellii pusillus	Least Bell's vireo	FE/SE/--	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 feet. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, *Baccharis* sp., and mesquite.	**None**. The project areas do not provide nesting habitat for this species.
Xanthocephalus xanthocephalus	Yellow-headed blackbird	--/--/SSC	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.	**None.** The project areas do not provide habitat for this species.
Invertebrates				
Branchinecta lynchi	Vernal pool fairy shrimp	FT/--/--	Endemic to the grasslands of the central valley, central coast mountains, and south coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	**None**. The project areas do not provide habitat for this species.

Scientific Name	Common Name	Listing Status: Federal/State/Other	Habitat Description	Potential for Occurrence within the Project Areas
Danaus plexippus plexippus pop. 1	Monarch butterfly – California overwintering population	FC/--/--	During the breeding season, monarchs lay their eggs on their obligate milkweed host plant (primarily *Asclepias* spp.). After larvae emerge, they feed on the milkweed, sequestering toxic chemicals as a defense against predators. The larva then pupates into a chrysalis before emerging 6 to 14 days later as an adult butterfly. There are multiple generations of monarchs produced during the breeding season, with most adult butterflies living approximately two to five weeks; overwintering adults enter into reproductive diapause (suspended reproduction) and live six to nine months. In temperate climates, such as western North America, monarchs undergo long-distance migration their overwintering sites. Overwintering monarchs required specific microclimates which are primarily located at sites along the Pacific Coast, roosting in eucalyptus, Monterey pines, and Monterey cypress trees.	**None.** No milkweed occurs on the project areas and the project areas occur outside the range of the overwintering population.
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	FT/--/--	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus nigra* ssp. *caerulea*). Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries.	**High.** Elderberry shrubs that are suitable habitat for valley elderberry longhorn beetle are present on and adjacent to both project areas.
Lepidurus packardi	Vernal pool tadpole shrimp	FE/--/--	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed & highly turbid.	**None**. The project areas do not provide habitat for this species.
Mammals				
Taxidea taxus	American badger	--/SSC/--	Drier open shrub, forest, and herbaceous habitats with friable soils	**None.** This species is not found in highly urbanized areas. There is insufficient foraging area in and around the project areas.
Reptiles				
Emys marmorata	Western pond turtle	FP/--/SSC	An aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.3 mile from water for egg-laying.	**Low.** The Sacramento River at the proposed new water intake provides only marginal habitat for western pond turtle due to its deep, fast-flowing nature. There is no suitable habitat for western pond turtle at the FWTP project area.
Thamnophis gigas	Giant garter snake	FT/ST/--	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California.	**None.** The project areas do not provide habitat for this species. Waterways near the project areas are too deep and lack vegetation to be suitable habitat for giant garter snake.

Scientific Name	Common Name	Listing Status: Federal/State/Other	Habitat Description	Potential for Occurrence within the Project Areas
Plants				
Astragalus tener var. *ferrisiae*	Ferris' milk-vetch	--/--/1B.1	Annual herb found in vernally mesic meadows and seeps and subalkaline flats of valley and foothill grassland from 5 to 245 feet. Blooms April through May.	**None.** The project areas do not provide habitat for this species.
Carex comosa	Bristly sedge	--/--/2B.1	Perennial rhizomatous herb found in coastal prairie, margins of marshes and swamps, and valley and foothill grassland from 0 to 2,050 feet. Blooms May through September.	**None.** The project areas do not provide habitat for this species.
Centromadia parryi ssp. *parryi*	Pappose tarplant	--/--/1B.2	Annual herb found in chaparral, coastal prairie, meadows and seeps, coastal salt marshes and swamps, and vernally mesic valley and foothill grassland from 0 to 420 feet. Often found in alkaline substrates. Blooms May through November.	**None.** The project areas do not provide habitat for this species.
Cuscuta obtusiflora var. *glandulosa*	Peruvian dodder	--/--/2B.2	Annual parasitic vine found in freshwater marshes and swamps from 50 to 920 feet. Blooms July through October.	**None.** The project areas do not provide habitat for this species.
Downingia pusilla	Dwarf downingia	--/--/2B.2	Annual herb found in mesic valley and foothill grassland and in vernal pools from 5 to 1,460 feet. Blooms March through May.	**None.** The project areas do not provide habitat for this species.
Gratiola heterosepala	Boggs Lake hedge-hyssop	--/SE/1B.2	Annual herb found on clay substrate along the margins of marshes and swamps, and in vernal pools from 35 to 7,790 feet. Blooms April through August.	**None.** The project areas do not provide habitat for this species.
Hibiscus lasiocarpos var. *occidentalis*	Woolly rose-mallow	--/--/1B.2	Emergent perennial rhizomatous herb found in freshwater marshes and swamps, often in riprap on sides of levees, from 0 to 395 feet. Blooms June through September.	**None.** The project areas do not provide habitat for this species. The nearest presumed extant CNDDB occurrence is from 1988 and located 2.2 miles northwest of the proposed new water intake.
Juncus leiospermus var. *ahartii*	Ahart's dwarf rush	--/--/1B.2	Annual herb found in mesic valley and foothill grasslands from 100 to 750 feet. Blooms March through May.	**None.** The project areas do not provide habitat for this species.
Lasthenia chrysantha	Alkali-sink goldfields	--/--/1B.1	Annual herb found in alkaline substrates of vernal pools from 0 to 655 feet. Blooms February though April.	**None.** The project areas do not provide habitat for this species.
Legenere limosa	Legenere	--/--/1B.1	Annual herb found in vernal pools from 5 to 2,885 feet. Blooms April through June.	**None.** The project areas do not provide habitat for this species.
Lepidium latipes var. heckardii	Heckard's pepper-grass	--/--/1B.2	Annual herb found in alkaline flats of valley and foothill grassland from 5 to 655 feet. Blooms March-May.	**None.** The project areas do not provide habitat for this species.
Lilaeopsis masonii	Mason's lilaeopsis	--/--/1B.1	Perennial rhizomatous herb found in brackish freshwater of marshes and swamps and riparian scrub from 0 to 35 feet. Blooms April through November.	**None.** The project areas do not provide habitat for this species.

Scientific Name	Common Name	Listing Status: Federal/State/Other	Habitat Description	Potential for Occurrence within the Project Areas
Orcuttia tenuis	Slender Orcutt grass	FT/SE/1B.1	Annual herb found in often gravelly soils of vernal pools from 115 to 5,775 feet. Blooms May through September, sometimes October.	**None.** The project areas do not provide habitat for this species.
Orcuttia viscida	Sacramento Orcutt grass	FE/SE/1B.1	Annual herb found in vernal pools from 100 to 330 feet. Blooms April through July, sometimes September.	**None.** The project areas do not provide habitat for this species.
Sagittaria sanfordii	Sanford's arrowhead	--/--/1B.2	Emergent perennial rhizomatous herb found in shallow freshwater marshes and swamps from 0 to 2,135 feet. Blooms May through October, sometimes November.	**None.** The project areas do not provide habitat for this species. The nearest presumed extant CNDDB occurrence is from 2005 and located 0.2 miles west of the FWTP project area.
Symphyotrichum lentum	Suisun Marsh aster	--/--/1B.2	Perennial rhizomatous herb found in brackish freshwater marshes and swamps from 0 to 10 feet. Blooms May, sometimes April, through November.	**None.** The project areas do not provide habitat for this species.
Trifolium hydrophilum	Saline clover	--/--/1B.2	Found in marshes and swamps; mesic, alkaline valley and foothill grassland; and vernal pools from 0 to 985 feet. Blooms April through June.	**None.** The project areas do not provide habitat for this species.
Sensitive Natural Communities				
Elderberry savanna	--	--/--/S2.1	Open to moderately closed stands characterized by *Sambucus mexicana*. Understory typically dominated by grasses. Occurs in association with remnant riparian forest vegetation.	**None**. The project areas do not contain this sensitive natural community.
Great Valley Cottonwood Riparian Forest	--	--/--/S2.1	A dense, broadleafed, winter deciduous riparian forest dominated by Fremont cottonwood (*Populus fremontii*) and Gooding’s black willow (*Salix gooddingii*). The understory is usually dense, with abundant vegetative reproduction of canopy dominants and California wild grape is the most conspicuous vine. Habitat experiences frequent flooding.	**None**. The project areas do not contain this sensitive natural community.
Great Valley Valley Oak Riparian Forest	--	--/--/S1.1	A medium to tall (rarely to 100 feet), broadleafed, winter-deciduous, closed-canopy riparian forest dominated by valley oak (*Quercus lobata*). Canopy is open to continuous. Shrub layer is open to intermittent. Herbaceous layer may be grassy. Soils are alluvial or residual.	**None**. The project areas do not contain this sensitive natural community.
Northern Claypan Vernal Pool	--	--/--/S1.1	Similar to Northern Hardpan Vernal Pools, but with less topographical relief, and usually lower overall cover. Pools range in size from the small (a few square meters) to quite large (covering several hectares).	**None**. The project areas do not contain this sensitive natural community.

Scientific Name	Common Name	Listing Status: Federal/State/Other	Habitat Description	Potential for Occurrence within the Project Areas
Northern Hardpan Vernal Pool	--	--/--/S3.1	Community is dominated by annual grasses and herbs that grow in and out of the water. Germination and growth begin with winter rains, often continuing even when inundated. These pools gradually evaporate during spring, leaving concentric bands of vegetation that colorfully encircle the drying pools.	**None**. The project areas do not contain this sensitive natural community.
Northern Volcanic Mud Flow Vernal Pool	--	--/--/S1.1	Vernal pools occur on tertiary volcanic mudflows called lahars. The pools are small, forming in irregular depressions in gently sloping surfaces.	**None**. The project areas do not contain this sensitive natural community.

KEY:

Federal: (USFWS)
FE = Listed as Endangered by the Federal Government
FT = Listed as Threatened by the Federal Government
FC = Candidate for listing by the Federal Government
FP = Proposed for listing by the Federal Government

State: (CDFW)
SE = Listed as Endangered by the State of California
ST = Listed as Threatened by the State of California
SSC = California Species of Special Concern
FP = CDFW Fully Protected Species

CRPR: (California Rare Plant Rank)
Rank 1A = Plants presumed extinct in California
Rank 1B = Plants rare, threatened, or endangered in California and elsewhere
Rank 2A = Plants presumed extirpated in California but common elsewhere
Rank 2B = Plants rare, threatened, or endangered in California but more common elsewhere

Note: Ranks at each level also includes a threat rank (e.g., CRPR 2B.2) and are determined as follows:
0.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

SOURCES: CDFW 2023a; CNPS 2023; and USFWS 2023a.

Special-Status Wildlife

Birds

Swainson's hawk

Swainson's hawk is listed as a threatened species under CESA. Swainson's hawk is a breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mohave Desert. Swainson's hawk nests in open riparian habitat, in scattered trees, or small groves in sparsely vegetated flatlands. Their nest is typically placed in a tree, bush, or utility pole from 4 to 100 feet above the ground. They forage in adjacent grasslands or suitable grain or alfalfa fields, or livestock pastures (CWHR and C. Battistone, 2006).

Suitable Swainson's hawk nesting habitat occurs within or in close proximity to the Sacramento and American Rivers in association with riparian habitat. In addition, this species may utilize large trees located within the FWTP and the SRWTP project areas and within adjacent urban areas for nesting.

There are 201 CNDDB recorded occurrences of Swainson's hawk within the nine quad area centered on the project areas. The closest CNDDB record to the FWTP project area occurs approximately 0.7 mile to the east-northeast along the American River. A nest was found in a cottonwood tree within a small stand of cottonwoods on a mid-channel island in the American River in June 2006. The closest CNDDB record to the SRWTP project area occurs approximately 0.15 mile to the west, on the west bank of the Sacramento River. A nest was observed in a riparian cottonwood tree during a 2007 survey (CDFW, 2023b).

White-tailed kite

The white-tailed kite is listed as a "fully protected" raptor under Section 3511 of the California Fish and Game Code. The white-tailed kite is a year-round resident in coastal and valley lowlands. This species typically occurs in herbaceous lowlands with variable tree growth and dense populations of voles; rarely far from agricultural areas. White-tailed kite nest and roost in groves of dense, broad-leafed deciduous trees. Nests are typically placed near open foraging areas near the top of dense oak, willow, or other tree stand 20 to 100 feet above the ground. They forage in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands (CWHR and C. Battistone, 2005).

Suitable white-tailed kite nesting habitat occurs within or in close proximity to the Sacramento and American Rivers in association with riparian habitat. In addition, this species may utilize large trees located within the FWTP and the SRWTP project areas and within adjacent urban areas for nesting.

There are 24 CNDDB recorded occurrences of white-tailed kite within the nine quad area centered on the project areas. The closest CNDDB record to the FWTP project site occurs approximately 1.4 miles to the west-northwest at Paradise Beach along the south side of the American River. A pair was observed nesting here from April to May 1988. The closest CNDDB record to the SRWTP project area occurs approximately 1.1 miles to the east, on the north bank of the American River. A nest was observed in a riparian cottonwood tree in a thicket of riparian habitat along the riverbank in 1974. Two young fledged from this site (CDFW, 2023b).

Song Sparrow "Modesto" population

The Modesto song sparrow (*Melospiza melodia*), a California Species of Special Concern, is a year-round resident in California and is locally numerous in the Sacramento Valley, the Sacramento-San Joaquin River Delta, and the northern San Joaquin Valley. Throughout the year, Modesto song sparrows typically occur in emergent freshwater marshes dominated by tules (*Scirpus* spp.) and cattails (*Typha* spp.) as well as riparian willow (*Salix* spp.) thickets. This species is also known to nest in riparian forests or valley oak with a sufficient understory of blackberry (*Rubus* spp.), along vegetated irrigation canals and levees, and in recently planted valley oak restoration sites (Shuford and Gardali, 2008). Nests are built on the ground and in shrubs, thickets, emergent vegetation, and small trees within four feet of the ground. The species is seldom found in densely wooded habitats. Primary diet consists of seeds, but song sparrows also consume insects, spiders, and other small invertebrates (CWHR and C. Battistone, 2007).

Marginal nesting habitat for this species occurs in the riparian habitat along the Sacramento River in the SRWTP project area. There are 9 CNDDB recorded occurrences of Modesto song sparrow within the nine quad area centered on the project areas. The closest CNDDB location to the SRWTP project area is from 1877 and 1900. The exact location of this occurrence is unknown and is therefore mapped as circle with a 5-mile radius generally centered on Sacramento and encompasses both project areas. Development has replaced much of the wetlands and other suitable habitat that existed in the area at the time of the recorded observation. The next closest and more recent record is from 2011, located approximately 8 miles southwest of the SRWTP project area in the Yolo Bypass Wildlife Area (CDFW, 2023b).

Common Bird-of-Prey Species

Common bird-of-prey species, such as the red-tailed hawk (*Buteo jamaicensis*) and red-shouldered hawk (*Buteo lineatus*), are not considered special-status species because they are not rare or protected under the federal or State Endangered Species Acts. However, nests of these species are protected under the MBTA and Section 3503.5 of the California Fish and Game Code. Common bird-of-prey species may nest in trees within and adjacent to the project areas. Common bird-of-prey species observed during the biological field survey work are osprey (*Pandion haliaetus*) and turkey vulture (*Cathartes aura*).

Common Migratory Bird Species

A large number of common bird species are migratory and are afforded protection under the MBTA. Occupied nests of all migratory birds are protected under the MBTA, which makes it illegal to destroy any active migratory bird nest. Common migratory bird species observed during the biological fieldwork are black phoebe (*Sayornis nigricans*), house finch (*Haemorhous mexicanus*), mourning dove (*Zenaida macroura*), lesser goldfinch (*Spinus psaltria*), western bluebird (*Sialia mexicana*), northern mockingbird (*Mimus polyglottos*), and California scrub jay (*Aphelocoma californica*).

Invertebrates

Valley elderberry longhorn beetle (VELB)

The VELB (*Desmocerus californicus dimorphus*) occurs throughout the year in riparian woodlands and other Central Valley habitats containing elderberry shrubs (*Sambucus* spp.), upon which the VELB are completely dependent for all stages of their life cycle. The females lay their eggs on the bark of the elderberry shrub. After hatching, the larvae burrow into the stems of the shrub where they feed on the interior wood for the next one to two years (USFWS, 2023b). Prior to forming their pupae, the larvae chew through the bark and then plug the holes with wood shavings. The larvae crawl back to their pupal chamber which they pack with frass. In the pupal chamber, the larvae metamorphose into their pupae and then into adults where upon they emerge from the elderberry stem between mid-March through June. As the larvae and adults are rarely seen, these exit holes are often the only evidence of this species' presence. After emergence from the stems, the adults remain in association with the elderberry shrub, where they will feed on the elderberry foliage and eventually reproduce (USFWS, 2006).

VELB is listed as Threatened by USFWS, with critical habitat designated in 1980 and a final Recovery Plan issued in 1984. Decline has been primarily due to loss of riparian forests. It has been estimated that over 90% of historical riparian forests in the Central Valley have been lost to development or agriculture. Additional threats include inappropriate grazing, levee construction, stream channelization, bank stabilization, and predation by nonnative ants. Although the USFWS 5-year review of the status of VELB released in September 2006 (USFWS, 2006) recommended delisting of this species, VELB currently remains federally listed as Threatened.

There are 30 CNDDB recorded occurrences of VELB within the nine quad area centered on the project areas. The majority of these occurrences are associated with riparian habitat along the Sacramento and American Rivers (CDFW, 2023b). The closest VELB CNDDB record to the FWTP project area is located approximately 0.03 mile to the northwest along the south side of the American River in a cottonwood and sycamore riparian habitat. Upwards of 22 elderberry shrubs were observed with signs of VELB occupancy in 2006, 2007, 2008, and 2009. The two closest VELB CNDDB records to the SRWTP project area are located on the west side of the Sacramento River, approximately 0.2 mile west of the western project boundary at the proposed new water intake. Both records are from 1985 and consist of observations of exit holes in elderberry shrubs in an elderberry savannah and a cottonwood riparian woodland.

The USFWS *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (the framework) (USFWS, 2017) provides guidelines for determining the potential effects and developing appropriate avoidance and minimization measures. The framework recommends assessing elderberry shrubs on or within 165 feet of a project site. The VELB metapopulation in the Central Valley occurs throughout contiguous intact riparian habitat as subpopulations. VELB typically stay within the local elderberry clump from which they emerge. VELB may occupy non-riparian elderberry shrubs when they are reasonably close to riparian areas or known VELB populations (USFWS, 2017). In non-riparian areas, the framework recommends using exit hole surveys and evaluating the distance to riparian areas to assess the likelihood of VELB occupancy. Isolated, non-riparian elderberry clumps are less likely to be occupied or become colonized by

VELB, and those beyond 2,526 feet (0.48 mile) from the nearest VELB record become increasingly less likely to be occupied.

A total of five elderberry shrubs are located within the FWTP property. An additional 16 elderberry shrubs are located approximately 65 to 115 feet north of the northern boundary of the FWTP property along the paved bike path adjacent to the American River. One additional elderberry shrub occurs just outside the northwest corner of the FWTP property along State University Drive. One elderberry on the FWTP property, and one elderberry north of the FWTP property (next to the paved bike path) were noted to have potential VELB exit holes. Several elderberry shrubs were not accessible for close inspection due to overgrown blackberries.

The five elderberry shrubs within the FWTP property and the single elderberry shrub along State University Drive are not located in riparian habitat. The 16 elderberry shrubs located north of the FWTP property are located in riparian habitat along the American River. Elderberry shrubs in the project area range from 0.4 mile at the south end to 0.1 mile at the north end to the closest known VELB record. Elderberry shrubs in and adjacent to the FWTP project area are shown on Figure 3.6-1.

A total of 11 elderberry shrubs are located within the SRWTP property; one additional elderberry shrub occurs within the I-5 right-of-way in the project area within the proposed conveyance water pipelines corridor. No VELB exit holes were observed, though not all the shrubs were accessible to survey due to overgrown blackberries and grape vines and/or being located on private property (to the east of the SRWTP property line and north of North B Street). Approximately 15 elderberry shrubs occur under the power lines along the north side of North B Street between the SRWTP property and North 7th Street where utility work may occur. An additional six elderberry shrubs occur on an undeveloped parcel on the north side of North B Street (two of which occur within 165 feet of proposed work). All of the elderberry shrubs on the north side of North B Street are located on a private parcel and were not accessible for close inspection for exit holes.

The elderberry shrubs within the area of anticipated project activities at the SRWTP are not located in riparian habitat. The elderberry shrubs along North B Street are located approximately 0.8 mile from known VELB records. Elderberry shrubs on the SRWTP property range from approximately 0.4 to 0.5 mile from the VELB records along the west side of the Sacramento River. The isolated elderberry shrub along the I-5 right-of-way occurs approximately 0.25 mile from the VELB records along the west side of the Sacramento River. Elderberry shrubs in and adjacent to the SRWTP project area are shown on Figure 3.6-2.

Special-Status Plants

The FWTP and SRWTP project areas do not provide habitat for special-status plants, as described in Table 3.6-1. Habitat suitable for special-status plants in the region includes vernal pools, seeps, marshes, swamps, chaparral, coastal prairies, and in alkaline and clay soil substrates. These habitat types do not occur in the project areas.

Critical Habitat

Critical habitat is defined in Section 3(5)A of the FESA as a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Designated critical habitats are not present in the project area.

Tree Inventory

A tree inventory was conducted by International Society of Arboriculture Certified Arborist Jessica Orsolini (Certification #WE-7845A). The tree inventory at the FWTP property was conducted on August 30, 2022, and the tree inventory at the SRWTP property and intake area was conducted on September 9 and 15, 2022. An additional tree inventory was conducted for the proposed utility upgrades in the FWTP and SRWTP project areas on August 18, 2023. All accessible locations where construction activities would be anticipated to occur were included in the survey. Trees were surveyed according to standard professional practices. All surveyed trees are completely or partially located on City property and thus are considered City trees per the City tree ordinance (City of Sacramento, 2016). The locations of surveyed trees are presented in Figures 3.6-1 and 3.6-2.

3.6.3 Regulatory Setting

Federal

Federal Endangered Species Act

The FESA (U.S. Code Title 16, sections 1531–1544 [16 USC 1531–1544]) prohibits unauthorized take of fish, wildlife, and plants that are listed as threatened or endangered and their designated critical habitat. *Candidate species* are those for which there is sufficient information on their biological status and threats to proposed listing, but for which the development of a proposed listing regulation is precluded by other higher priority listing activities but are usually evaluated as special-status species during the environmental review process. FESA specifies procedures for addressing effects or consequences of proposed actions on federally listed species.

Procedures for addressing impacts to federally listed species follow two principal pathways. The first pathway is a Section 10(a) incidental take permit, which applies to situations where a non-federal government entity must resolve potential adverse impacts to species protected under the FESA. The second pathway involves Section 7 consultation, which applies to projects directly undertaken by a federal agency or private projects requiring a federal permit or approval such as a Section 404 permit under the Clean Water Act (CWA) or receiving federal funding.

Migratory Bird Treaty Act

The MBTA (16 USC 703–712) enacts the provisions of treaties between the U.S., Great Britain, Mexico, Japan, and the former Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. Unless and except as permitted by regulations, the MBTA states that without a permit issued by the U.S. Department of the Interior, it is unlawful to pursue, hunt, take, capture, or kill any migratory bird. The law also applies to the intentional disturbance and removal of nests occupied by migratory birds or their eggs during the breeding season. USFWS is responsible for overseeing compliance with the MBTA.

Clean Water Act

The CWA establishes the basic structure for regulating discharges of pollutants to waters of the U.S. The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply,* for a detailed description of the Clean Water Act.

Section 404

CWA Section 404 (33 U.S.C. Section 1344) regulates the discharge of dredged and fill materials into waters of the U.S. Waters of the U.S. is specifically defined by 40 C.F.R. pt. 120, but generally includes oceans, bays, rivers, streams, lakes, ponds, and adjacent wetlands (33 C.F.R pt. 328). Waters of the U.S. are under the jurisdiction of the USACE and the U.S. Environmental Protection Agency. Applicants must obtain a permit from the USACE for all discharges of dredged or fill material into waters of the U.S., including wetlands, before proceeding with a proposed activity.

Compliance with CWA Section 404 requires that the lead federal agency comply with applicable federal environmental laws and regulations. The USACE cannot issue an individual permit or verify the use of a general nationwide permit until the requirements of FESA and the National Historic Preservation Act have been met. In addition, the USACE cannot issue or verify any permit until a water quality certification has been issued or waived pursuant to CWA Section 401.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code §13000 et seq.), passed in 1969, articulates the federal CWA. The State Water Board and regional water boards are the state agencies with primary responsibility for the coordination and control of water quality. Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply,* for a detailed description of the Porter-Cologne Water Quality Control Act.

California Endangered Species Act

The CESA was enacted in 1984. Under CESA, the California Fish and Game Commission has the responsibility for maintaining a list of threatened species and endangered species. Pursuant to the requirements of the CESA, an agency reviewing a project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project site and determine whether the project would have a potentially significant impact on such species.
In addition, CDFW encourages informal consultation on any project which may impact a candidate species. The CESA prohibits the take of California listed animals and plants in most cases, but the CDFW may issue incidental take permits under special conditions.

Pursuant to the requirements of the CESA, an agency reviewing a project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project study area and determine whether the project will have a potentially significant impact on such species. Project-related impacts to species on the CESA endangered or threatened list would be considered significant. "Take" of protected species incidental to otherwise lawful management activities may be authorized under Fish and Game Code Section 206.591. Authorization from CDFW would be in the form of an Incidental Take Permit under Section 2801.

California Fish and Game Code

Lake and Streambed Alteration Agreement (CA Fish and Game Code Section 1602)

Fish and Game Code Section 1602 requires any person, government agency, or public utility proposing any activity that will divert or obstruct the natural flow or change the bed, channel or bank of any river, stream, or lake, or proposing to use any material from a streambed, to first notify CDFW of such proposed activity.

Native Plant Protection Act (CA Fish and Game Code Section 1900-1913)

The Native Plant Protection Act prohibits the taking, possessing, or sale within the state, of any plants with a state designation of rare, threatened, or endangered. An exception to this prohibition in the Act allows landowners, under specified circumstances, to take listed plant species, provided that the owners first notify CDFW and give that state agency at least 10 days to come and retrieve the plants before they are disturbed or destroyed. Fish and Game Code Section 1913 exempts from take prohibition "the removal of endangered or rare native plants from a canal, lateral ditch, building site, or road, or other right of way."

Fully Protected Species (CA Fish and Game Code Section 3511, 4700, 5050)

Certain species are considered *fully protected*, meaning that the code explicitly prohibits all take of individuals of these species except for take permitted for scientific research. Section 5050 lists fully protected amphibians and reptiles, Section 5515 lists fully protected fish, Section 3511 lists fully protected birds, and Section 4700 lists fully protected mammals. Except as provided in Sections 2081.7 or 2835, fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the species for the protection of livestock.

Nesting Birds and Birds of Prey (CA Fish and Game Code Section 3503, 3503.5, 3800, 3505)

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 of the code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Migratory non-game birds are protected under Section 3800, while other specified birds are protected under Section 3505.

Take Prohibition (CA Fish and Game Code Section 86, 2080)

Fish and Game Code Section 86 defines 'take' and Section 2080 prohibits 'taking' of a species listed as threatened or endangered under CESA (CA Fish and Game Code Section 2080) or otherwise fully protected, as defined in CA Fish and Game Code Section 3511, 4700, and 5050.

CEQA Guidelines Section 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines Section 15380(d) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specific criteria.

CEQA also specifies the protection of other locally or regionally significant resources, including natural communities or habitats. Although natural communities do not presently have legal protection, CEQA requires an assessment of such communities and potential project impacts. Natural communities that are identified as sensitive in the CNDDB are considered by the CDFW to be significant resources and fall under the CEQA Guidelines for addressing impacts.

Local

City of Sacramento 2040 General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies that are applicable to the evaluation of terrestrial biological resource effects are provided in **Table 3.6-2**. These policies guide the location, design, and quality of development to protect biological resources such as wildlife habitat, open space corridors, and ecosystems.

TABLE 3.6-2
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES –
BIOLOGICAL RESOURCES – TERRESTRIAL

Element	Goals and Policies
Land Use and Placemaking	Goal LUP-1: Policies 1.1, 1.11, 1.12; Goal LUP-8: Policy 8.3; Goal LUP-11: Policies 11.5, 11.7, 11.8
Environmental Resources and Constraints	Goal ERC-1: Policies 1.1, 1.2, 1.3, 1.4; Goal ERC-2: Policies 2.1, 2.2, 2.3, 2.4, 2.5; Goal ERC-3: Policies 3.2, 3.3, 3.5, 3.7, 3.9, 3.11; Goal ERC-6: Policies 6.1, 6.2, 6.3, 6.9
Public Facilities and Safety	Goal PFS-3: Policy 3.13; Goal PFS-4: Policies 4.2, 4.3

SOURCE: City of Sacramento, 2024

City of Sacramento Tree Ordinance

The City of Sacramento recognizes that trees are a signature of the city and are an important element in promoting the well-being of the citizens of Sacramento. The City finds that trees enhance the natural scenic beauty of the city; increase oxygen levels; promote ecological balance; provide natural ventilation and air filtration; provide temperature and erosion controls; increase property values; and improve the quality of life. City Code Title 12, Chapter 12.56, Ordinance 2016-0026 Section 4 (City of Sacramento, 2016) includes provisions to protect City and private trees. Regulated work, including removal, pruning, or construction around trees that are protected by the tree ordinance, requires a tree permit.

City trees are defined as any tree the trunk of which, when measured 4.5 feet above the ground, is partially or completely located in a City park, on real property the City owns in fee, or on a public right-of-way, including any street, road, sidewalk, park strip, mow strip, or alley.

Private protected trees are defined as trees designated to have special historical value, special environmental value, or significant community benefit, and are located on private property. Private protected trees are any valley oak (*Quercus lobata*), blue oak (*Q. douglasii*), coast live oak (*Q. agrifolia*), interior live oak (*Q. wislizenii*), California sycamore (*Platanus racemosa*), and California buckeye (*Aesculus californica*) that has a diameter at standard height (DSH)[2] of 12 inches or more; all trees 32 inches DSH or more which are located on private property with an existing single family or duplex dwelling; and all trees 24 inches DSH or more on private undeveloped land or any other type of property such as commercial, industrial, and apartments.

3.6.4 Impacts and Mitigation Measures

Method of the Analysis

This section assesses the potential for the proposed project to adversely change biological resources in or around the project areas. The impact analysis focuses on foreseeable changes to the baseline condition and compares those changes to the significance criteria presented below. Potential impacts are analyzed using information presented above regarding habitats present in and around the project areas, and potential occurrence of special-status and protected species.

In the impact analysis, three principal factors were considered: (1) magnitude of the impact (e.g., substantial/not substantial); (2) uniqueness of the affected resource (i.e., rarity of the resource); and (3) susceptibility of the affected resource to perturbation (i.e., sensitivity of the resource). The evaluation of the significance considered the interrelationship of these three factors. For example, a relatively small magnitude impact to a State or federally listed species would be considered significant if the species is exceptionally rare or believed to be highly susceptible to disturbance. Conversely, a plant community such as annual grassland is not necessarily rare or sensitive to disturbance. Therefore, a much larger magnitude of effect would be necessary to result in a significant impact.

See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would cause any of the following:

- A substantial adverse effect, either directly or through habitat modification, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.
- A substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS.

[2] Diameter at standard height (DSH) is a tree’s diameter measured at 4.5 feet above the ground.

- A substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- Substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- Conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan.

Impacts Not Further Evaluated

Result in a substantial adverse effect, either directly or through habitat modification, on any species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.

The proposed project areas do not provide habitat for special-status amphibians, mammals, reptiles, or plants. Therefore, no impact would occur and this topic is not further evaluated in the EIR. Refer to Section 3.5, *Biological Resources – Aquatic*, for an evaluation of potential impacts of the proposed project on aquatic biological resources (i.e., listed fish and their associated habitat).

Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.

No established native resident or migratory wildlife corridors are known to occur at the project areas. Therefore, no impact would occur, and this topic is not further evaluated in the EIR. Refer to Section 3.5, *Biological Resources – Aquatic*, for an evaluation of potential impacts of the proposed project on aquatic biological resources (i.e., the movement of native resident or migratory fish in the Lower American River, Sacramento River and Delta).

Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state Habitat Conservation Plan.

There is no adopted Habitat Conservation Plan, natural community conservation plan, or other approved local, regional, or state Habitat Conservation Plan that applies to the proposed project areas. Therefore, no impact would occur, and this topic is not further evaluated in the EIR.

Impacts and Mitigation Measures

Table 3.6-3 summarizes the impact conclusions presented in this section.

TABLE 3.6-3
SUMMARY OF IMPACT CONCLUSIONS – BIOLOGICAL RESOURCES – TERRESTRIAL

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.6-1: Construction of the proposed project could impact nesting migratory birds and birds of prey.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.6-2: Operation and maintenance of the proposed project could impact nesting migratory birds and birds of prey.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.6-3: Construction of the proposed project could impact valley elderberry longhorn beetle.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.6-4: Operation and maintenance of the proposed project could impact valley elderberry longhorn beetle.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.6-5: Construction of the proposed project could impact riparian habitat.	NI (FWTP/ SRWTP)	NI (FWTP/ SRWTP)	LSM (Existing/ New)	NI
3.6-6: Operation and maintenance of the proposed project could impact riparian habitat.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.6-7: Construction of the proposed project could result in net reduction of waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters.	NI (FWTP/ SRWTP)	NI (FWTP/ SRWTP)	LS (Existing) LSM (New)	LSM
3.6-8: Operation and maintenance of the proposed project could result in net reduction of waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.6-9: Construction of the proposed project could conflict with local policies protecting trees.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.6-10: Operation and maintenance of the proposed project could conflict with local policies protecting trees.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

NI: No Impact
LS: Less than Significant
LSM: Less than Significant with Mitigation

Impact 3.6-1: Construction of the proposed project could impact nesting migratory birds and birds of prey.

All Project Components

Migratory birds and other birds of prey that are protected under 50 CFR 10 of the MBTA and/or Section 3503 of the California Fish and Game Code could nest on or in the vicinity of the proposed project components in the FWTP and SRWTP project areas. Nesting habitat for birds of prey and migratory bird species at the project areas include trees, shrubs, unpaved ground surfaces, and structures. Habitat within the FWTP project area primarily consists of structures and urban landscaping. Habitat at the SRWTP property primarily consists of structures and urban landscaping. Both water treatment plants include existing ornamental trees planted around the parking areas and roads, around the buildings, and in the lawns. A narrow strip of Fremont cottonwood riparian forest occurs along the Sacramento River at the existing water intake and within the proposed construction area for the proposed intake structures and conveyance pipelines. Large trees on and adjacent to the project areas provide potential nesting habitat for Swainson's hawk, although suitable nearby foraging habitat is limited. Project construction activities, including increased noise and vibrations, structure demolition, and vegetation removal could result in direct mortality to nesting migratory birds or birds of prey should they be present on or adjacent to a construction site through removal of, damage to, or abandonment of eggs or young. This would be a potentially **significant impact**.

Mitigation Measures

Mitigation Measure 3.6-1 (ALL):

(a) Project construction shall occur outside of the nesting season to the extent feasible. If project construction begins during the nesting season (**Table 3.6-4**), a qualified biologist shall conduct a preconstruction survey for active nests on and adjacent to the project area. The pre-construction survey shall be conducted within 14 days prior to commencement of construction activities (e.g. ground disturbing activities, materials staging, demolition activities). If no active nests are found during the pre-construction survey, no additional mitigation measures are required. If construction does not commence within 14 days of the pre-construction survey, or halts for more than 14 days, an additional pre-construction survey is required. Additional survey requirements for Swainson's hawk are provided below.

TABLE 3.6-4
NESTING SEASON FOR SPECIAL-STATUS AND COMMON NESTING BIRDS

Species	Nesting Season
White-tailed kite	February 1 to September 30
Swainson's hawk	March 1 to September 15
Common nesting birds (raptors, passerines, herons, and egrets)	February 1 to August 31

(b) If an active nest is located on or adjacent to the project area, an appropriate buffer zone shall be established around the nest, as determined by the qualified biologist. The biologist shall mark the buffer zone with construction tape or pin flags and maintain the buffer zone until the end of breeding season or until the young have successfully fledged or the nest is determined to no longer be active. Buffer zones are typically 50−100 feet for migratory bird nests and 250−500 feet for bird of prey nests (excluding Swainson's hawk). Buffer size shall be determined by the qualified biologist based on the species of bird, the location of the nest relative to the project, project activities during the time the nest is active, and other project-specific conditions.

(c) If establishing the typical buffer zone is impractical, the qualified biologist may reduce the buffer depending on the species and daily monitoring would be required to ensure that the nest is not disturbed, and no forced fledging occurs. Daily monitoring shall occur until the qualified biologist determines that the nest is no longer active.

Additional Measures for Swainson's Hawk

(d) If construction activities are anticipated to commence during the Swainson's hawk nesting season (March 1 to September 15), a qualified biologist shall conduct a minimum of two pre-construction surveys during the recommended survey periods in accordance with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee, 2000). All potential nest trees within 0.25 mile of the project areas shall be visually examined for potential Swainson's hawk nests, as accessible. If no active Swainson's hawk nests are identified on or within 0.25 mile, no additional mitigation measures are required.

(e) If an active Swainson's hawk nest is found within 0.25 mile of the project areas, the following measures will be implemented to avoid and minimize impacts to the nest:

i. A Worker Awareness Training Program shall be conducted prior to the start of construction;

ii. A no-disturbance buffer zone shall be established and work shall be scheduled to avoid impacting the nest during critical periods. To the extent feasible, no work shall occur within 500 feet of the nest while it is in active use. If work would occur within 500 feet of the nest, then construction shall be monitored daily by a qualified biologist to ensure no disturbance occurs to the nest;

iii. A biological monitor shall conduct weekly monitoring of the nest during construction activities; and

iv. The biologist may halt construction activities if they determine that the construction activities are disturbing the nest. CDFW shall be consulted prior to re-initiation of activities that may disturb the nest.

Significance After Mitigation: Mitigation Measure 3.6-1 would ensure that the proposed project would avoid impacts to migratory birds and other birds of prey through clearing vegetation outside of the nesting season or conducting preconstruction surveys. No-work buffers would be established if birds are observed nesting in the vicinity of the construction footprint. Therefore, this impact would be reduced to **less-than-significant with mitigation**.

Impact 3.6-2: Operation and maintenance of the proposed project could impact nesting migratory birds and birds of prey.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, there would be additional maintenance activities and the operation of new equipment at the water treatment plants and new intake. O&M activities for all other project components would be completed under existing maintenance programs. The nesting habitat for birds of prey and migratory bird species on and around proposed project areas include trees, shrubs, unpaved ground surfaces, and structures. Migratory birds and other birds of prey are protected under 50 CFR 10 of the MBTA and/or Section 3503 of the California Fish and Game Code. Because O&M activities would generally be similar to existing activities and would not substantially increase above existing activities, the potential to adversely affect nesting migratory birds and birds of prey would be a **less than significant impact**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.6-3: Construction of the proposed project could impact valley elderberry longhorn beetle.

All Project Components

Multiple elderberry shrubs, host plant for federal-threatened VELB, grow in the proposed project areas. Elderberry shrubs are located within the FWTP property (Figure 3.6-1) and the SRWTP property (Figure 3.6-2). Elderberry shrubs are also located elsewhere in the SRWTP project area, and one elderberry shrub occurs in the I-5 right-of-way where the conveyance pipelines alignment is proposed (Figure 3.6-2). The USFWS *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS, 2017) assumes that any impacts to riparian habitat with elderberry shrubs present are likely to result in adverse effects to VELB. In non-riparian habitats, the USFWS *Framework* assumes that a project may affect VELB if project activities occur within 165 feet of an elderberry shrub with exit holes or disturbs elderberry shrubs reasonably close to riparian areas or known VELB populations.

A total of five elderberry shrubs with stems one inch diameter and greater are located within the FWTP property. Two elderberry shrubs with stems less than one inch diameter at the time of the survey also are located within the FWTP property. An additional 16 elderberry shrubs are located approximately 65 to 115 feet north of the northern boundary of the FWTP property along the paved bike path adjacent to the American River. One additional elderberry shrub is located just outside the northwest corner of the FWTP property along State University Drive. One elderberry on the FWTP property and two elderberries north of the FWTP property (next to the paved bike path) were noted to have potential VELB exit holes. However, several elderberry shrubs were not accessible for close inspection due to overgrown blackberries. There are no elderberry shrubs on or within 165 feet of the proposed storm drainage pipeline to be installed along College Town Drive from State University Avenue to Howe Avenue; therefore, installation of the drainage pipeline would not remove or impact elderberry shrubs and would not impact VELB.

A total of 11 elderberry shrubs are located within the SRWTP property; one additional elderberry shrub is located within the I-5 right-of-way in the project area within the proposed conveyance pipelines corridor. No VELB exit holes were observed, although not all the shrubs were accessible to survey due to overgrown blackberries and grape vines. Approximately 15 elderberry shrubs are located under the existing electrical lines along the north side of North B Street between the SRWTP property and North 7th Street where work to upgrade the electrical infrastructure could occur. An additional six elderberry shrubs are located on an undeveloped parcel on the north side of North B Street (two of which occur within 165 feet of proposed work). All of the elderberry shrubs on the north side of North B Street are located on a private parcel and were not accessible for close inspection for exit holes.

The elderberry shrubs along North B Street are located approximately 0.8 mile from known VELB records. Elderberry shrubs located within the SRWTP property range from approximately 0.4 to 0.5 mile from the VELB records along the west side of the Sacramento River. At the SRWTP project area, none of the elderberry shrubs are located in riparian habitat. No known elderberry shrubs with exit holes occur within 165 feet of the elderberries in the SRWTP project area, though not all could be closely inspected due to access issues. The majority of the elderberry shrubs within the SRWTP project area are at the edge of the maximum dispersal distance

(0.48 mile) for VELB from known records. The only elderberry shrub within the dispersal range of a known VELB record is a single, small, isolated shrub in the I-5 right-of-way where habitat is unsuitable for VELB. The location of the potable water transmission pipelines has not been finalized but has the potential to have or occur within 165 feet of an elderberry shrub. If VELB are present in the elderberry shrubs, work occurring within 165 feet of the elderberry shrubs could impact VELB.

Because the elderberry is the sole host plant of the VELB, any activities that adversely impact an elderberry shrub could also adversely impact the VELB. Activities that reduce the suitability of an area for elderberry plants or elderberry recruitment and increase fragmentation could have adverse impacts to mating, foraging, and dispersal of VELB. This would be a potentially **significant impact.**

Mitigation Measures

Mitigation Measure 3.6-2(a) (TPI - FWTP/SRWTP, EUU-FWTP/SRWTP, SRWI-Existing/New): The following measures shall be implemented for avoided elderberry shrubs:

i. Activities that may damage or kill an elderberry shrub (e.g., trenching, paving, etc.) shall have an avoidance area of at least 20 feet from the dripline of the elderberry shrub.

ii. All areas within 165 feet of an elderberry shrub to be avoided during construction activities shall be fenced using high visibility construction fencing, followed by silt fencing, as close to construction limits as feasible. The silt fencing shall be installed to prevent migration of soils into the protected zone around the elderberry shrubs.

iii. A qualified biologist shall provide training for all contractors, work crews, and any onsite personnel on the status of the VELB, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for non-compliance.

iv. During work within 165 feet of any elderberry shrub, a qualified biologist shall monitor the work area on a weekly basis to ensure that all avoidance and minimization measures are implemented. Time spent onsite will be sufficient to verify that no damage to elderberry shrubs has occurred, to ensure that protective fencing is in place and in good working order, and to coordinate any concerns with the client/contractor.

v. As much as feasible, all activities that occur within 165 feet of an elderberry shrub shall be conducted outside the flight season of the VELB (March – July).

vi. Herbicides shall not be used within the dripline of any elderberry shrub. Insecticides shall not be used within 98 feet of an elderberry shrub. All chemicals shall be applied using a backpack sprayer or similar direct application method.

vii. Mechanical weed removal within the dripline of an elderberry shrub shall be limited to the season when adults are not active (August – February) and shall avoid damaging the elderberry.

Mitigation Measure 3.6-2(b) (TPI - FWTP/SRWTP, EUU-FWTP/SRWTP, SRWI-Existing/New): The following measures shall be implemented for elderberry shrubs which cannot be avoided:

i. If elderberry shrubs cannot be avoided, or if indirect effects would result in death of the shrub, elderberries shall be transplanted. Where possible, the elderberry shrubs shall be relocated as close as possible to their original location. If not possible, the shrub may be transplanted to a USFWS-approved mitigation site.

ii. A qualified biologist shall be on-site for the duration of transplanting activities to assure compliance with avoidance and minimization measures and other conservation measures.

iii. Exit-hole surveys shall be completed immediately before transplanting. The number of exit holes found, GPS location of the plant to be relocated, and the GPS location of where the plant is transplanted shall be reported to the USFWS and to the CNDDB.

iv. Elderberry shrubs shall be transplanted when the shrubs are dormant (November through the first two weeks in February) and after they have lost their leaves. Transplanting during the non-growing season will reduce shock to the shrub and increase transplantation success.

v. Transplanting shall follow the most current version of the ANSI A300 (Part 6) guidelines for transplanting.

vi. Trimming shall occur between November and February and should minimize the removal of branches or stems that exceed 1 inch in diameter.

vii. In addition to transplanting, mitigation credits at a USFWS-approved bank shall be purchased whenever direct impacts cannot be avoided to elderberry shrubs. All elderberry shrubs in the project areas and with potential to be directly impacted are non-riparian. Directly impacted non-riparian elderberry shrubs with exit holes present or directly impacted non-riparian elderberry shrubs located within 165 feet of elderberry shrubs with exit holes present shall be mitigated using the compensation ratio outlined in **Table 3.6-5**, based on the USFWS Framework (USFWS, 2017):

TABLE 3.6-5
VALLEY ELDERBERRY LONGHORN BEETLE SHRUB-LEVEL IMPACT COMPENSATION

Habitat	Compensation Ratio[1]	If the entire shrub will be removed[2]
Non-riparian (exit holes present on or within 165 feet of project site)	1:1	Transplant the shrub + 1:1 compensation

1. number of credits: number of shrubs trimmed
2. One credit (unit) = 1,800 square feet or 0.041 acre

Mitigation Measure 3.6-2(c) (TP): After the location of the potable water transmission pipelines are known, and prior to commencement of construction (e.g. ground disturbing activities, materials staging, demolition activities), a survey for elderberry shrubs will be conducted of the pipeline alignment and areas within 165 feet. If no elderberry shrubs with diameter at ground level of one inch are found, no further measures will be required. If elderberry shrubs with at least one stem with a diameter at ground level of one inch or greater are found, Mitigation Measure 3.6-2a shall be implemented.

Significance After Mitigation: Mitigation Measures 3.6-2(a) through 3.6-2(c) would ensure that the project avoids or mitigates for impacts to VELB through implementation of a no-work buffer for activities that may damage or kill an elderberry shrub, through minimization of project activities which could impact the shrubs, and through transplanting and compensatory mitigation for shrubs that will be directly impacted. Therefore, this impact would be reduced to **less-than-significant with mitigation**.

Impact 3.6-4: Operation and maintenance of the proposed project could impact valley elderberry longhorn beetle.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, there would be additional maintenance activities and the operation of new equipment at the water treatment plants and new intake. O&M activities for all other project components would be completed under existing maintenance programs. Elderberry shrubs, host plant for federal-threatened VELB, could remain in the FWTP and SRWTP project areas after construction is complete, including elderberry shrubs within 165 feet of the FWTP property and the SRWTP existing utilities upgrades. Existing O&M activities include landscaping and vehicle and pedestrian travel within 165 feet of elderberry shrubs. Post-construction O&M activities within 165 feet of elderberry shrubs would be similar. No excavation, trenching, building construction, or paving activities which could impact VELB are part of post-construction O&M activities. Because O&M activities would generally be similar to existing activities and would not substantially increase above existing activities, impacts to VELB would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.6-5: Construction of the proposed project could impact riparian habitat.

Sacramento River Water Intakes

Riparian habitat occurs along the Sacramento River in the SRWTP project area where the new water intake and pump house would be constructed and where the new conveyance pipelines would be installed from the new and existing water intakes. Construction of the new water intake could impact riparian habitat through tree and vegetation removal for construction of the new pump station and creation of equipment access and staging through and in the riparian habitat.

Treatment Plant Improvements, Existing Utility Upgrades, and Potable Water Transmission Pipelines

There is no riparian habitat within the SRWTP or FWTP properties, within the area of the proposed existing utility upgrades, or in the area of the proposed transmission pipelines Therefore, construction activities would not remove riparian habitat.

Impact Conclusion

Due to the lack of riparian habitat in the FWTP project area, at the SRWTP and associated utility upgrade and transmission pipeline locations, no riparian habitat would be removed, and no impact would occur. However, construction of the new water intake could impact riparian habitat through tree and vegetation removal for construction of the new pump station and creation of equipment access and staging through and in the riparian habitat. This would be a potentially **significant impact**.

Mitigation Measures

Mitigation Measure 3.6-3(a) (SRWI – Existing/New):

i. Tree removal shall be minimized to the extent possible.

ii. Prior to the removal of any protected tree as defined by City Code 12.56, the applicant shall submit a tree removal permit application for the removal of protected trees and comply with all conditions of any issued permit.

Mitigation Measure 3.6-3(b) (SRWI- Existing/New):

i. High-visibility fencing shall be erected at the edge of the project footprint to prevent encroachment into unpermitted areas by construction equipment and personnel. Trucks and other vehicles will not be allowed to park beyond the fencing, nor shall equipment be stored beyond the fencing. No vegetation removal or ground disturbing activities will be permitted beyond the fencing.

ii. After project work is completed, any temporary fill and construction debris will be removed, and temporarily disturbed areas will be restored to pre-project or better conditions. Before restoration, all non-biodegradable materials will be removed. Restoration may include recontouring disturbed areas to their original configurations.

Significance After Mitigation: Mitigation Measures 3.6-3(a) and 3.6-3(b) would reduce the potential for significant impacts on riparian habitat by preventing removal of riparian trees in unpermitted areas, by ensuring the project avoids or mitigates for impacts to riparian trees protected by the City tree ordinance, by restoring temporarily disturbed habitat in riparian areas, and by preventing soil and water contamination. Therefore, this impact would be reduced to **less-than-significant with mitigation**.

Impact 3.6-6: Operation and maintenance of the proposed project could impact riparian habitat.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, there would be additional maintenance activities and the operation of new equipment at the water treatment plants and new intake. O&M activities for all other project components would be completed under existing maintenance programs. Riparian habitat occurs along the Sacramento River where the proposed new intake would be constructed. There is no riparian habitat within the SRWTP and FWTP properties nor in the proposed existing utility upgrade or transmission pipeline locations. After completion of construction, no additional excavation, building construction, paving, or tree removal will occur within riparian habitat or elsewhere in the project areas. O&M activities would not substantially increase above existing activities and thus would not increase impacts to riparian habitat. This would be a **less than significant impact**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.6-7: Construction of the proposed project could result in net reduction of waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters.

Sacramento River Water Intakes and Potable Water Transmission Pipelines

The Sacramento River is a traditionally navigable water and is therefore considered a water of the U.S. under the jurisdiction of the USACE. Construction of the new intake would result in fill of the Sacramento River through construction of pilings to support the new tee screen foundation, construction of a mechanically stabilized earth wall between the wet well and the levee, and through placement of rip rap around the edges of the new tee screen foundation and over the buried piping. Temporary impacts would occur as the result of constructing a temporary sheet pile cofferdam within the river to create a dewatered area, and through installation of piping below the riverbed elevation between the tee screens and the pump station. The location of the potable water transmission pipelines has not been finalized but wetlands subject to jurisdiction under the USACE or State have the potential to occur in the project alignment. Before construction, the City would obtain a CWA Section 404 permit for impacts on waters of the U.S. from USACE, a Section 401 water quality certification from the Central Valley Regional Water Quality Control Board, and a Section 1600 streambed alteration agreement from CDFW. The City would comply with all conditions of permits received.

Treatment Plant Improvements and Existing Utility Upgrades

There are no waters of the U.S. or State jurisdictional waters within the SRWTP or FWTP properties, nor the existing utilities upgrade areas.

Impact Conclusion

Construction within the water treatment plant properties, and utilities upgrades project areas would not occur in or fill waters of the U.S. or State jurisdictional waters. Therefore, no impact would occur. Because contamination and permanent fill of potential waters of the U.S. could result due to construction of the proposed new water intake and installation of the potable water transmission lines, this impact would be **potentially significant.**

Mitigation Measures

Mitigation Measure 3.6-4(a) (SRWI - New):

i. All fueling and maintenance of vehicles and other equipment and staging areas shall occur in designated areas away from any water body.

ii. Diesel fuel and oil shall be used, stored, and disposed of in accordance with standard protocols for handling hazardous materials. All personnel involved in the use of hazardous materials shall be trained in emergency response and spill control.

iii. All concrete washing and spoils dumping shall occur in a designated location away from any water body.

iv. Construction stockpiles shall be covered within 24 hours of a weather event to prevent blow-off or runoff during weather events.

v. All excavated material will be placed in previously disturbed upland areas where it will not be subject to regular flooding.

vi. Erosion control measures shall be placed in areas that are upslope of aquatic habitat to prevent any soil or other materials from entering aquatic habitat. Silt fencing and natural/biodegradable erosion control measures (i.e., straw wattles and hay bales) shall be used.

vii. Turbidity curtains, temporary barriers, or similar methods shall be used during in-channel work to control silts and sediments.

viii. Areas temporarily disturbed on the banks of the Sacramento River will be revegetated and reseeded with native grasses and other native herbaceous annual and perennial species or as specified by USACE. Reseeded areas will be covered with a biodegradable erosion control fabric to prevent erosion and downstream sedimentation. The project engineer will determine the specifications needed for erosion control fabric (e.g., sheer strength) based on anticipated maximum flow velocities and soil types.

ix. The City shall purchase mitigation credits at a USACE-approved mitigation bank for placement of fill in the Sacramento River, as required by the 404 permit. Alternatively, the City could contribute to the USACE in-lieu fee program.

Mitigation Measure 3.6-4(b) (TP): After the location of the potable water transmission pipelines are known, and prior to commencement of construction (e.g. ground disturbing activities, materials staging, demolition activities), a survey will be conducted to map wetlands and waters potentially subject to USACE and State jurisdiction along the pipeline alignment. If no wetlands and waters potentially subject to USACE and State jurisdiction are found, no further measures will be required. If wetlands and waters potentially subject to USACE and State jurisdiction are found, Mitigation Measure 3.6-4a would be implemented.

Significance After Mitigation: Mitigation Measure 3.6-4(a) and 3.6-4(b) would reduce the potential for significant impacts on potential waters of the U.S. by preventing encroachment into unpermitted areas, restoring temporarily disturbed habitat, preventing soil and water contamination, and compensating for permanently impacted aquatic resources. Therefore, this impact would be reduced to **less-than-significant with mitigation**.

Impact 3.6-8: Operation and maintenance of the proposed project could result in net reduction of waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, there would be additional maintenance activities and the operation of new equipment at the water treatment plants and new intake. O&M activities for all other project components would be completed under existing maintenance programs. The Sacramento River is a traditionally navigable water within the project area of the proposed new intake and is therefore considered a water of the U.S. under the jurisdiction of the USACE. There are no waters of the U.S. or State jurisdictional waters within the SRWTP, FWTP, or existing utility upgrade locations. Potential waters of the U.S. or State jurisdictional waters in the proposed transmission pipelines project area would be determined after their alignment is finalized. After completion of construction, no additional excavation, structure construction, or dewatering would occur within waters of the U.S. or State jurisdictional waters. O&M activities would not substantially increase above existing activities and thus would not increase impacts to waters of the U.S. or State jurisdictional waters. This would be a **less than significant impact**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.6-9: Construction of the proposed project could conflict with local policies protecting trees.

All Project Components

Trees protected by the City tree ordinance occur throughout the FWTP and SRWTP project areas. Construction of the proposed project could result in the removal of trees protected by the City tree ordinance in order to improve the water treatment facilities, upgrade existing utilities, construct the new water intake at the Sacramento River, and provide construction access. Additionally, construction activities could harm retained protected trees by impacting tree limbs, trunk, or roots though grading or compacting within the root zone. This would be a potentially **significant impact**.

Mitigation Measures

Mitigation Measure 3.6-5 (ALL): Implement Mitigation Measure 3.6-3(a).

Significance After Mitigation: Mitigation Measure 3.6-5 would ensure that the project avoids or mitigates impacts to trees protected by the City tree ordinance through compliance with the City's established requirements to avoid or mitigate for the loss of protected trees. Therefore, this impact would be reduced to **less-than-significant with mitigation**.

Impact 3.6-10: Operation and maintenance of the proposed project could conflict with local policies protecting trees.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, there would be additional maintenance activities and the operation of new equipment at the water treatment plants and new intake. O&M activities for all other project components would be completed under existing maintenance programs. Trees protected by the City tree ordinance occur throughout the project areas. Existing O&M activities include landscaping and vehicle and pedestrian travel around trees protected by the City tree ordinance and within the root zone of protected trees. No excavation, trenching, building construction, or paving activities which could impact protected trees are part of post-construction O&M activities. O&M activities would not substantially increase above existing activities and thus would not increase impacts to trees protected by the City tree ordinance. This would be a **less than significant impact**.

Mitigation Measures

Mitigation Measures (ALL): None required.

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3.7 Cultural Resources

3.7.1 Introduction

This section identifies and evaluates issues related to cultural resources, including historic-era architectural resources, historic-era and pre-contact archaeological resources, and human remains, in the context of the proposed project and alternatives. It includes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment.

Comments addressing cultural resources were received in response to the NOP. The City received scoping comments from the Native American Heritage Commission (NAHC) that recommended, pursuant to Public Resources Code (PRC) Section 21080.3 (Assembly Bill [AB] 52), that the City conduct consultation with tribes that are culturally affiliated with the proposed project areas. The NAHC also recommended that the City conduct a cultural resources records search of the California Historical Resources Information System (CHRIS) and that an archaeological inventory survey report be prepared along with a search of the NAHC's Sacred Lands File (SLF). See Appendix A for NOP comment letters.

3.7.2 Environmental Setting

This section provides an overview of the ethnographic, pre-contact archaeological, and historic-era setting of the proposed project areas.

Pre-Contact Setting

Categorizing the pre-contact period into broad cultural stages allows researchers to describe a broad range of archaeological resources with similar cultural patterns and components during a given time frame, thereby creating a regional chronology. This section provides a brief discussion of the pre-contact chronology for the proposed project.

Rosenthal et al. (2007) provide a framework for the interpretation of the Central Valley prehistoric record and have divided human history in the region into three basic periods: *Paleo-Indian* (13,550 to 10,550 Before Present [BP]), *Archaic* (10,550 to 900 BP), and *Emergent* (900 to 300 BP). The Archaic period is subdivided into three sub-periods: *Lower Archaic* (10,550 to 7550 BP), *Middle Archaic* (7,550 to 2,550 BP), and *Upper Archaic* (2,550 to 900 BP) (Rosenthal et al. 2007). Economic patterns, stylistic aspects, and regional phases further subdivide cultural patterns into shorter phases. This scheme uses economic and technological types, socio-politics, trade networks, population density, and variations of artifact types to differentiate between cultural periods. The following summary of the region's prehistory is derived principally from Rosenthal et al. (2007) and Moratto (2004).

Paleo-Indian Period (13,550 to 10,550 BP)

Humans first entered the Central Valley sometime prior to 13,000 years ago. At that time Pleistocene glaciers had receded to the mountain crests leaving conifer forests on the mid and upper elevations of the Sierra Nevada and a nearly contiguous confer forest on the Coast Ranges.

The Central Valley was covered with extensive grasslands and riparian forests. The central California Delta system had not yet developed. The Central Valley was home to a diverse community of large mammals, which soon became extinct. People were likely focused on large game hunting, although evidence remains scant, as does understanding of lifeways during this period.

Lower Archaic Period (10,550 to 7,550 BP)

Climate change during the Lower Archaic led to the rapid expanse of oak woodland and grassland prairies across the Central Valley. After 10,550 BP, a significant period of soil deposition ensued in the Valley, capping older Pleistocene formation. This was followed around 7,000 BP by a second period of substantial soil deposition in the Valley.

It was during this period that the first evidence of milling stone technology appears, indicating an increased reliance on processing plants for food. Milling stones include hand stones and milling slabs and are frequently associated with a diverse tool assemblage including cobble-based pounding, chopping, and scraping tools. Milling tools were used for processing seeds and nuts. The Lower Archaic also saw the development of well-made bifaces used for projectile points and cutting tools, commonly formed from meta-volcanic greenstone and volcanic basalts.

Middle Archaic Period (7,550 to 2,550 BP)

After about 7,550 BP, California was marked by a change in climate with warmer and drier conditions throughout the region. Oak woodland expanded upslope in the Coast Ranges and conifer forest moved into the alpine zone in the Sierra Nevada. Rising sea levels led to the formation of the Sacramento-San Joaquin Delta and associated marshlands. An initial period of upland erosion and lowland deposition was followed by a long period of stabilization of landforms. Scant evidence of human occupation from this period has been found in the Sacramento Valley or the adjacent Coast Ranges. Most evidence comes from the Sierra Foothills in Calaveras and Tuolumne counties.

Upper Archaic Period (2,550 to 900 BP)

Evidence for Upper Archaic human occupation in the Central Valley is much more extensive than for earlier periods. The development of the Holocene landscape buried older deposits, resulting in the identification of more sites from the Upper Archaic than from older periods of development. Alluvial deposition was partially interrupted by two consecutive droughts known as the Medieval Climatic anomaly.

Two fundamental adaptations developed side-by-side during the Upper Archaic period, evidenced by a diversification in settlements patterns. Populations in the Valley tended towards large, high-density, permanent settlements. These villages were used as hubs from which the populace roamed to collect resources, utilizing a wide range of technologies. The populations in the foothills and mountains lived in less dense settlements, moving with the seasons to maximize resource returns. Tools tended to be expedient and multipurpose for use in a wide variety of activities. Village sites show extended occupation as evidenced by well-developed midden, frequently containing hundreds of burials, storage pits, structural remains, hearths, ash dumps, and extensive floral and faunal remains.

Emergent Period (900 to 300 BP)

A major shift in material culture occurred around 900 BP, marking the beginning of the Emergent Period. Particularly notable was the introduction of the bow and arrow. The adoption of the bow occurred at slightly different times in various parts of the Sacramento Valley, but by 750 BP it was in use in the Delta region. The bow was accompanied by the Stockton Serrated point, a seemingly indigenous invention, distinctive from point types used in other parts of the State. Another key element of material culture from this period includes big-head effigy ornaments thought to be associated with the Kuksu religious movement. In areas where stone was scarce, baked clay balls are found, presumably for cooking in baskets. Other diagnostic items from this period are bone tubes, stone pipes, and ear spools. Along rivers, villages are frequently associated with fish weirs, with fishing taking on an increasing level of importance in the diet of the local populace.

Ethnographic Setting

Nisenan/Southern Maidu

The proposed project is within the lands occupied and used by the Nisenan, or Southern Maidu. The language of the Nisenan, which includes several dialects, is classified in the Maiduan family of the Penutian linguistic stock (Kroeber, 1925, and Shipley, 1978). The western boundary of Nisenan territory was the western bank of the Sacramento River. The eastern boundary was "the line in the Sierra Nevada mountains where the snow lay on the ground all winter" (Littlejohn, 1928).

Nisenan settlement locations depended primarily on elevation, exposure, and proximity to water and other resources. Permanent villages usually were located on low rises along major watercourses. Village size ranged from three houses up to 50. Houses were domed structures covered with earth and tule or grass and measured approximately 10 to 15 feet (~3.0 to 4.6 meters) in diameter. Brush shelters were used in summer and at temporary camps during food-gathering rounds. Larger villages often had semi-subterranean dance houses that were covered in earth and tule or brush, with a central smoke hole at the top and an east-facing entrance. Another common village structure was a granary used for storing acorns (Wilson and Towne, 1978).

The Nisenan occupied permanent settlements from which specific task groups set out to harvest the seasonal bounty of flora and fauna that the rich valley environment provided. The Valley Nisenan economy involved riparian resources—in contrast to the Hill Nisenan, whose resource base consisted primarily of acorn and game procurement. The only domestic plant was native tobacco (*Nicotiana* sp.), but many wild species were closely husbanded. The acorn crop from the blue oak (*Quercus douglasii*) and black oak (*Q. kelloggii*) was so carefully managed that this activity served as the equivalent of agriculture. Acorns could be stored in anticipation of winter shortfalls in resource abundance. Deer, rabbit, and salmon were the chief sources of animal protein in the aboriginal diet, but many other insect and animal species were taken when available (Wilson and Towne, 1978).

Religion played an important role in Nisenan life. The Nisenan believe that all natural objects were endowed with supernatural powers. Two kinds of shamans existed: curing shamans and religious shamans. Curing shamans had limited contact with the spirit world and diagnosed and healed illnesses. Religious shamans gained control over the spirits through dreams and esoteric experiences (Wilson and Towne, 1978). The usual mode of burial was cremation (Faye, 1923).

As with other California Native American groups, the gold rush of 1849 had a devastating effect on the Valley Nisenan. The flood of miners that came to the area in search of gold brought diseases with them that decimated the Nisenan population. Those who survived were subjected to violence and prejudice at the hands of the miners, and the Nisenan eventually were pushed out of their ancestral territory. Although this contact with settlers had a profound negative impact on the Nisenan population through disease and violent actions, the Nisenan people survived and maintained strong communities and action-oriented organizations (Castillo, 1978).

Historic-era Setting

Sacramento Area

Europeans entered the Sacramento area in 1808, when Gabriel Moraga's expedition reached the junction of the Sacramento and American rivers. By the late 1820s, English, American, and French fur trappers, attracted by the valley's abundance of animal life, began operations throughout the Sacramento Valley. Native Americans still predominantly occupied the region, with only the occasional Spanish expedition into the interior to search for mission sites or escaped neophytes (i.e., Native Americans who had entered the mission system) (Hoover et al., 2002:302-304).

Permanent non-native settlement in the Sacramento Valley began in the 1830s when Spanish and Mexican governors issued large land grants to individuals, often in return for military or other services rendered to the government. Swiss immigrant John Augustus Sutter, Jr., upon receipt of a land grant from Mexican Governor Juan Alvarado, first settled the Sacramento area in 1839. Sutter established a fort away from the low-lying rivers area and Sutter's Fort served as an agricultural station and destination for immigrants into California until January 1848 (Jackson et al., 1983:1; Hoover et al., 2002:298-302; Bean, 1978:67-68; and Reps, 1975:195). The small riverside settlement quickly took on the role of bustling port as ocean going ships and riverboats used the Sacramento River to transport goods and gold-seeking passengers to the mine fields in the slopes of the Sierra Nevada after the discovery of gold in 1849. Sutter laid out a grid of streets extending from the waterfront and named the new town Sacramento, establishing numbered streets running north to south and lettered streets, east of Front Street along the Sacramento River, running east to west, with each block divided into eight 80-foot by 150-foot lots with four lots on either side of an east/west-oriented central alley.

The new town was centered on the embarcadero, or Front Street, and continued inland to the east along J Street (Warner, 1969; and Brienes et al., 1981:46-47). Downtown Sacramento developed rapidly after 1850. During the mid-1800s, the city faced severe flooding issues. The majority of flooding stemmed from the American River, where, during heavy rains, segments of the river north of I Street would experience severe flooding. As early as the 1850s levees were raised along the rivers in an effort to hold back the flood waters and to "reclaim" low lying areas. The earliest levees were built by hand and were not very effective in keeping the rivers in their channels, with events such as the flood of 1862, which left portions of the city under 20 feet of water. The cause of flood control was further hampered by the silting-in of riverbeds with soil washed down by hydraulic mining and subsidence of soils adjacent to levees. High and more massive levees were constructed, eventually with the help of dredges which could move large quantities of soil. The levee's protection of lands drew interest to the area and allowed for urban and suburban development in and around Sacramento.

Sacramento Water Treatment

The following is summarized from the 2006 Sacramento History Journal article *Turning Mud into Liquid Gold*, which provides an extensive history of the development of water supply and treatment in Sacramento from 1849 through 1924 (Carunchio, 2006).

The expansion of the City led to an increased need for public utilities, especially water. William P. Henry constructed Sacramento's first privately owned water supply system (a five-horsepower engine that pumped water from the Sacramento River at I Street into elevated wood tanks) and began operations in 1849. A city-wide fire in 1852 resulted in the City Council securing funding for the construction of a water system to serve the entire city. Using a loan of nearly $285,000 and a 0.075 percent direct tax, the City funded the construction of a two-story water works at I and Front Streets in 1854. Henry served as the first water superintendent, expanding the system of pipes and hydrants, and raising the water tower multiple times to improve water pressure. By 1870, however, the City realized that its expanded system was insufficient to meet the needs of the growing city. The City improved and expanded its waterworks multiple times through the end of the nineteenth century, but failed to address growing concerns over the water quality.

In 1909, the City hired University of California professor Charles Gilman Hyde to write a report including an estimate of costs and plans for a water filtration plant on the Sacramento River. Hyde recommended the installation of a rapid sand filtration plant on the Sacramento River just south of the American River. However, efforts to rally voters to fund the construction of the plant fell short, and plans for the water treatment plant were put off. In 1915, the City appointed Hyde and George Wilhelm to work with Frank Miller, the City Engineer, to investigate regional water supply solutions. The report considered transporting water from a mountain source, using groundwater wells, or using filtered Sacramento River water. Hyde, Wilhelm, and Miller recommended using filtered Sacramento River water to meet the City's future water needs. While the advent of World War I delayed implementation of the proposed water treatment plant, on June 26, 1919, voters passed a bond to pay for the project.

In May 1920, the City purchased 33.483 acres of land 1,500 feet below the mouth of the American River and 1,200 feet east of the Sacramento River, and construction began in January 1921. While initial plant designs were included in the 1915 Hyde and Wilhelm report, the final plant design was provided by Sacramento architects Dean & Dean in the Classical Revival/Beaux Arts style. The plant's dedication on December 31, 1923, included President Coolidge starting the pumps. The plant was noted as the first filtration plant constructed west of the Rockies, and was called one of the most modern, state-of-the-art facilities in the country at the time (Boghosian, 1997). Until the E. A. Fairbairn Water Treatment Plant (originally named American River Filtration Plant) went into operation in 1965, the Sacramento River Water Treatment Plant served reliably as the City's sole provider of water (Carunchio, 2006).

3.7.3 Regulatory Setting

Federal

National Register of Historic Places

The National Register of Historic Places (National Register) was established by the National Historic Preservation Act (NHPA), as "an authoritative guide to be used by federal, state, and local governments, private groups and citizens to identify the Nation's historic resources and to indicate what properties should be considered for protection from destruction or impairment" (36 CFR Section 60.2). The National Register recognizes both historical-period and pre-contact archaeological properties that are significant at the national, state, and local levels.

To be eligible for listing in the National Register, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must meet one or more of the following four established criteria, along with being at least 50 years old and possessing integrity to convey its significance (United States Department of the Interior, 1995):

A. Are associated with events that have made a significant contribution to the broad patterns of our history;
B. Are associated with the lives of persons significant in our past;
C. Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. Have yielded, or may be likely to yield, information important in prehistory or history.

Resources identified as eligible for or listed in the National Register are automatically considered eligible for listing in the California Register of Historical Resources (California Register).

State

California Register of Historical Resources

Created in 1992 and implemented in 1998, the California Register is "an authoritative guide in California to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change." A resource, either an individual property or a contributor to a historic district, may be listed in the California Register if the State Historical Resources Commission determines that it meets one or more of the following criteria, which are modeled on National Register criteria, and retains sufficient integrity to reflect its historical significance:

1. It is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. It is associated with the lives of persons important in our past.
3. It embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of an important creative individual; or possesses high artistic values.

4. It has yielded, or may be likely to yield, information important in history or prehistory.

Typically, an archaeological site in California is recommended eligible for listing in the California Register based on its potential to yield information important in prehistory or history (Criterion 4). Important information includes chronological markers such as projectile point styles or obsidian artifacts that can be subjected to dating methods or undisturbed deposits that retain their stratigraphic integrity. However, archaeological sites may also be recommended eligible under California Register Criteria 1, 2, and/or 3.

As with traditional cultural properties in the National Register, identification of tribal cultural resources for the California Register emphasizes a place or feature's value and significance to living communities. AB 52, summarized below, further clarified this designation process.

California Environmental Quality Act

Under CEQA (PRC Section 21084.1), a project has a significant effect on the environment if it causes a substantial adverse change in the significance of a historical resource. The CEQA Guidelines (California Code of Regulations [CCR] Title 14 Section 15064.4) recognize that a historical resource includes: (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register; (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record. The fact that a resource does not meet the three criteria outlined above does not preclude the lead agency from determining that the resource may be an historical resource as defined in PRC Section 5020.1(j) or 5024.1.

If a lead agency determines that an archaeological site is a historical resource, then the provisions of PRC Section 21084.1 and CEQA Guidelines Section 15064.4 apply. If a project may cause a *substantial adverse change* (defined as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired) in the significance of a historical resource, then the lead agency must identify potentially feasible measures to mitigate these effects (14 CCR Sections 15064.4[b][1], 15064.4[b][4]).

If an archaeological site does not meet the historical resource criteria contained in the CEQA Guidelines, then the site may be treated in accordance with CEQA Section 21083. As defined in PRC Section 21083.2, a *unique archaeological resource* is an archaeological artifact, object, or site, for which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;

- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or,
- Is directly associated with a scientifically recognized important pre-contact or historic event or person.

If an archaeological site meets the criteria for a unique archaeological resource as defined in CEQA Section 21083.2, then the site is to be treated in accordance with the provisions of Section 21083.2, which state that if the lead agency determines that a project would have a significant effect on unique archaeological resources, then the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place (PRC Section 21083.1[a]). If preservation in place is not feasible, mitigation measures shall be required.

If an archaeological resource is neither a unique archaeological nor a historical resource, then the effects of the project on those resources shall not be considered a significant effect on the environment (14 CCR Section 15064.4[c][4]).

Health and Safety Code, Sections 7052 and 7050.5

Section 7052 of the Health and Safety Code states that the disturbance of Native American cemeteries is a felony. Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If determined to be Native American, the coroner must contact the NAHC.

Other Relevant State Regulations

Sections of the Public Records Act (Government Code Sections 6254(r), 6254.10), Health and Safety Code (Section 7050.5), Penal Code (Section 622.5), and PRC (Section 622.5) provide guidance for protection of archaeological resources and human remains. These codes provide protection from unauthorized excavation, looting, or vandalism; guidance following discovery of human remains; penalty for injuring or destroying objects of historic or archaeological interest; and penalty for unauthorized disturbance or removal of archaeological or historical features.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies that are applicable to the evaluation of cultural resource effects of the proposed project are provided in **Table 3.7-1**.

TABLE 3.7-1
APPLICABLE ADOPTED GENERAL PLAN GOALS AND POLICIES – CULTURAL RESOURCES

Element	Goals and Policies
Historic and Cultural Resources	Goal HCR-1: Policies HCR-1.1, 1.2, 1.10, 1.14, 1.15, 1.18
SOURCE: City of Sacramento, 2024	

City of Sacramento Historic Preservation Program

The City of Sacramento's historic preservation program began in 1975 with the enactment of the City's first historic preservation ordinance. Amendments to the original preservation ordinance, Ordinance No. 2006-063, were enacted in October 2006, amending Chapter 17.134 of Title 17 of the Sacramento City Code. In 1996 the City of Sacramento earned its status as a Certified Local Government, a United States Department of the Interior designation for local preservation programs that meet federally and state criteria for effective preservation policies and procedures at the local level. On September 30, 2013, sections of the Code were included in a comprehensive update of Title 17, the Planning and Development Code (PDC). Under the new PDC, the substance of the preservation sections was not materially changed, and changes related to procedures were also relatively minor. Title 17, Section 17.604.210 relates to eligibility criteria for historic resources. Other preservation related matters are found under Chapter 17.604 or other sections of the PDC.

The City Code provides for the compilation of the ordinances, adopting designations and deletions of Landmarks, Contributing Resources, and Historic Districts into the Sacramento Register.

Landmark Eligibility Criteria (17.604.210(A))

A nominated resource shall be listed on the Sacramento Register as a landmark if the city council finds, after holding the hearing required by this chapter, that all of the requirements set forth below are satisfied:

1. Requirements.
    a. The nominated resource meets one or more of the following criteria:
        i. It is associated with events that have made a significant contribution to the broad patterns of the history of the city, the region, the state or the nation;
        ii. It is associated with the lives of persons significant in the city's past;
        iii. It embodies the distinctive characteristics of a type, period or method of construction;
        iv. It represents the work of an important creative individual or master;
        v. It possesses high artistic values; or
        vi. It has yielded, or may be likely to yield, information important in the prehistory or history of the city, the region, the state or the nation;
    b. The nominated resource has integrity of location, design, setting, materials, workmanship and association. Integrity shall be judged with reference to the particular criterion or criteria specified in subsection A.1.a of this section;
    c. The nominated resource has significant historic or architectural worth, and its designation as a landmark is reasonable, appropriate and necessary to promote, protect and further the goals and purposes of this chapter.
2. Factors to be considered. In determining whether to list a nominated resource on the Sacramento Register as a landmark, the factors below shall be considered.
    a. A structure removed from its original location is eligible if it is significant primarily for its architectural value or it is the most important surviving structure associated with a historic person or event.

b. A birthplace or grave is eligible if it is that of a historical figure of outstanding importance and there is no other appropriate site or structure directly associated with his or her productive life.

c. A reconstructed building is eligible if the reconstruction is historically accurate, if the structure is presented in a dignified manner as part of a restoration master plan, and if no other original structure survives that has the same association.

d. Properties that are primarily commemorative in intent are eligible if design, age, tradition, or symbolic value invests such properties with their own historical significance.

e. Properties achieving significance within the past 50 years are eligible if such properties are of exceptional importance.

3.7.4 Cultural Resources Identified within the Proposed Project Areas

For the purposes of this section, cultural resources are defined as physical evidence or a place of past human activity, including sites, objects, landscapes, or structures of significance to a group of people traditionally associated with it. Archaeological resources can be both pre-contact and historic-age and consist of cultural resources which are on the surface or in the subsurface. Historic architectural resources are historic-age (i.e., 45 years old or older) buildings or structures that have been determined eligible for or have been listed on the National Register, California Register, and/or the Sacramento Register.

ESA completed a records search at the North Central Information Center (NCIC) of the CHRIS on July 6, 2022 (File No. SAC-22-140). The review included the FWTP project area and the SRWTP project area, including the proposed new water intake site and a 0.5-mile buffer. Previous surveys, studies, and site records were accessed. Records were also reviewed in the Built Environment Resources Directory (BERD) for Sacramento County, which was last updated in September 2022 and contains information about places of recognized historical significance including those evaluated for listing on the National Register, the California Register, the California Inventory of Historical Resources, California Historical Landmarks, and California Points of Historical Interest. The purpose of the records search was to (1) determine whether known cultural resources have been recorded within the proposed project areas; (2) assess the likelihood for unrecorded cultural resources to be present based on historical references and the distribution of nearby sites; and (3) develop a context for the identification and preliminary evaluation of cultural resources.

Historic research was performed to understand the history of the components of the proposed project and surrounding areas. This research consisted of reviewing historic literature and newspaper articles, topographic and fire insurance maps, aerial imagery, historic photographs, building permits, and previous architectural surveys and historic context statements. NCIC records indicate that 17 previous technical studies have been completed within or intersecting portions of the proposed project areas.

The records search also indicated that six previously recorded cultural resources have been recorded in the proposed project areas, and 71 additional cultural resources have been previously recorded within the 0.5-mile buffer. There are no previously recorded pre-contact archaeological resources recorded within the proposed project areas.

Previously Recorded Resources

There are two historic-era archaeological resources recorded within the SRWTP project area. One resource is the recorded location of three quarried granite slabs within the SRWTP property, which may have been curb stones. The other is a small historic-era domestic debris scatter within the SRWTP property. In addition, the location of the remains of a mid-century yacht in the Sacramento River was identified by side scan sonar and photo-confirmed and is located within the vicinity of the proposed new water intake.

There are four previously recorded historic-era architectural resources recorded within or adjacent to the proposed project. The American River South Levee borders the northern edge of the FWTP. The Sacramento River East Levee, which is along the eastern bank of the Sacramento River where the proposed new water intake would be constructed. The National Register-listed Pacific Gas and Electric Company (PG&E) Powerhouse #4/Sacramento River Station B at 400 Jibboom Street (currently MOSAC) is located adjacent to the proposed transmission pipeline alignment. The SRWTP itself, including the original water intake located in the Sacramento River approximately 1,000 feet west of the facility, has also been documented.

Cultural Resources Survey

Methods

ESA archaeologist and architectural historians completed a pedestrian surface survey of accessible portions of the FWTP and SRWTP project areas, include the area around the proposed new water intake, on July 25, 2022. During the archaeological survey, intensive pedestrian methods were used, consisting of walking the ground surface in parallel transects no greater than 10 meters apart in accessible areas and inspecting the ground surface for evidence of archaeological material. Periodic boot scrapes were used to expose the soil surface. Notes on any identified cultural resources were collected to meet or exceed site recordation guidelines based on the Office of Historic Preservation’s (OHP’s) *Instructions for Recording Historical Resources* (OHP, 1995) and CHRIS recommendations. Digital photographs were taken to document ground conditions, and all observations were recorded in the field. All accessible areas of proposed ground disturbance were walked in narrow transects to provide an overall assessment of existing conditions. The portion of the proposed project area around Interstate 5 was not surveyed due to access and safety issues. The alignment of the proposed SMUD electrical line connection between the SRWTP and Station J was also not surveyed as the alignment of the lines are within paved roads and in previously disturbed areas. As no soil would be visible in the path of the alignment, an archaeological pedestrian survey would not be effective and therefore was not completed. Additionally, a review of aerial imagery of the alignment showed no buildings or structures that would be impacted by this component of the proposed project; therefore, no architectural resources survey was conducted.

Results

During the pedestrian survey ESA revisited the location of previously recorded cultural resources within the FWTP and SRWTP project areas. ESA was unable to locate the two previously recorded historic-era archaeological resources. The previously recorded isolated resource consisting of three quarried granite slabs was not relocated where it had been previously recorded and has likely been removed. A previously recorded submerged vessel was not visible from the bank of the Sacramento River at the proposed new water intake site as it was underwater at the time and a close inspection of the bank was not possible to conduct safely due to the large number of unhoused persons living along the bank in this area. The three historic-era architectural resources previously recorded within the proposed project areas were located and found to be in similar condition to their most recent recordings.

During the pedestrian archaeological survey, one historic-era artifact scatter was identified within the SRWTP property. One architectural resource, the FWTP, was recorded as a result of the architectural survey, but was determined to have been evaluated by the City of Sacramento in 2011 and found ineligible.

Cultural Resources in the Proposed Project Areas

As a result of the CHRIS records search and pedestrian surveys, eight cultural resources have been recorded and are presented in **Table 3.7-2** and described further below.

TABLE 3.7-2
PREVIOUSLY RECORDED CULTURAL RESOURCES WITHIN THE AREA OF POTENTIAL EFFECT

Name	Resource Description	Previous California Register Eligibility (OHP 2022)	Current California Register/ Sacramento Register Eligibility	Proposed Project Area
American River South Levee	Historic-era levee	Not evaluated	Not eligible	FWTP
E. A. Fairbairn Water Treatment Plant	Historic-era water treatment plant	Not eligible	Not eligible	FWTP
Sacramento River East Levee	Historic-era levee	Not eligible	Not eligible	SRWTP
Sacramento River Water Treatment Plant	Historic-era water treatment plant	Determined eligible	Determined eligible	SRWTP
Sacramento River Water Treatment Plant Isolate in Archaeological (ISO) #1	Historic-era isolated granite slabs	Not evaluated	Not eligible	SRWTP
PG&E Powerhouse #4/ Sacramento River Station B	400 Jibboom Street (currently the SMUD Museum of Science and Curiosity)	Determined eligible	Determined eligible	SRWTP
Submerged vessel	Historic-era underwater feature	Not evaluated	Not eligible	SRWTP
Parus-MS-2013	Historic-era trash deposit	Not evaluated	Not eligible	SRWTP
ESA-SRWTP-01	Historic-era artifact scatter	N/A	Not eligible	SRWTP

SOURCE: NCIC 2022, OHP 2022

FWTP Project Area

E.A. Fairbairn Water Treatment Plant – 7501 College Town Dr.

The FWTP was constructed in 1964 as the second water treatment plant in Sacramento, intended to address the growing need for additional water supply within the expanding city.

Evaluation

Evaluation of the plant in 2011 recommended the facility ineligible for listing in the National, California, or local Sacramento Registers (City of Sacramento, 2011). The current survey effort confirmed the previous findings, and the plant does not appear to qualify as a historical resource under national, state, or local criteria.

American River South Levee

Originally constructed in 1936, the American River South Levee is an earthen levee, approximately 33 feet wide and 20 feet high, with a paved maintenance path along the top of the levee. California Department of Parks and Recreation (DPR) 523 forms documenting the levee note previous survey efforts and evaluations completed in 1995, 1998 (including the section within the current project footprint), 2008, and 2012.

Evaluation

Previous surveys have determined that the levee does not appear eligible for listing in either the California or National Registers, nor does it possess sufficient integrity. The current survey effort confirmed the previous findings, and the levee does not appear to qualify as a historical resource under national, state, or local criteria.

SRWTP Project Area

Sacramento River East Levee

Originally constructed in 1940, the segment of the Sacramento River East Levee within the project area is an earthen levee measuring approximately 30 feet wide and 20 feet high, with a paved maintenance path along the levee crown. DPR 523 forms documenting the levee note previous survey efforts and evaluations completed in 1998 (including the section within the current project footprint), 2008, and 2016.

Evaluation

Previous surveys have determined that the levee does not appear eligible for listing in either the California or National Registers, nor does it possess sufficient integrity. The current survey effort confirmed the previous findings, and the levee does not appear to qualify as a historical resource under national, state, or local criteria.

Sacramento River Water Treatment Plant – 301 Water St.

The SRWTP was the first filtration system on the west coast. Designed by the Engineering Department of the City of Sacramento and built in 1921, the plant was constructed following the principles of the City Beautiful movement. The City Beautiful movement was inspired by the 1893 World's Columbian Exposition in Chicago. Many American cities afterwards believed that their cities could be functional for industrialization and planned for the first time. The classical revival style influenced the architecture of the pumping station, the administration building, and the filter building. The dedication ceremony included President Coolidge activating the pumps through an electrical impulse transported by telegraph from the White House. Between 1950 and 1960, a reservoir was added and a lime treatment facility. In 1987, the plant received a national American Water Works Association historical landmark. The original intake facility in the Sacramento River is considered a contributor to the SRWTP as a historical resource. The boundary of the SRWTP district includes the entire footprint of the SRWTP, however its contributors include predominantly resources on the southern end of the facility: Pump House, Head House, Coagulant Building, West Filter Building and Filters, Sedimentation Basin 1, the 5-million-gallon (MG) Clearwell, the Beaux Arts landscaping in the southwest portion of the property, and the ancillary original intake structure in the Sacramento River.

Evaluation

The SRWTP is eligible for listing in the National Register and the California Register. The SRWTP was listed in the Sacramento Register in 2011 as part of the River District Specific Plan.

PG&E Powerhouse #4/ Sacramento River Station B

The Sacramento River Station B at 400 Jibboom Street (currently the SMUD Museum of Science and Curiosity) was a two-story utility powerhouse located along the Sacramento River. The Classical Revival Style building was designed by Willis Polk, notable Bay Area architect, in 1912. The building was recommended eligible at the local level under National Register criterion A for its role in Sacramento’s transition from gas to electric power, and under criterion C as an excellent example of a Beaux Arts Classical Revival style utility building, designed by master architect Willis Polk. The building was converted to the SMUD Museum of Science and Curiosity, which opened in 2021.

Evaluation

The Sacramento River Station B was listed in the National Register, California Register, and Sacramento Register in 2009.

Sacramento River Water Treatment Plant ISO #1

The SRWTP ISO #1 was recorded in 2011 by Far Western Anthropological Research Group (Far Western) and was identified during a pedestrian survey of the SRWTP. The isolated resource consisted of three quarried and dressed granite slabs. Far Western postulated that the slabs were potentially curb stones associated with the former road that was along the historic eastern property line of the SRWTP.

Evaluation

During the current survey, ESA did not identify any material associated with this resource in the vicinity of its recorded location. The area where the resource was identified in 2013 has been significantly modified and the property line has been extended east to accommodate the construction of two gravity thickeners (No. 1 and No. 2) and a thickened sludge pump station. It is likely that the granite slabs were removed or destroyed during the construction of these structures.

Submerged Vessel

US403, is the submerged remains of a mid-twentieth century yacht that was approximately 25 feet long and probably motorized (Panamerican Consultants, 2009). It was identified using a side-scan sonar and then visually confirmed as part of the underwater archaeology effort undertaken for the U.S. Army Corps of Engineers Sacramento River Protection Project (Panamerican Consultants, 2010). Panamerican Consultants (2010) describe the resource as the lower hull, including floors, ceiling and outer hull planking, keel, part of the transom, and several longitudinal stringers for the engine bed.

ESA revisited the general recorded location of the vessel, but unhoused people living at the edge of the river prohibited safe inspection of the riverbank for the resource. Aerial imagery suggests that the resource is still present as of February 2022, although the condition from the aerial image is unclear.

Evaluation

Panamerican Consultants (2010) stated that the resource is unlikely to yield additional valuable information through further study and recommended that it does not meet any of the California Register or Sacramento Register criteria. ESA agrees with this recommendation and the submerged vessel is recommended not eligible for the California Register or the Sacramento Register.

Parus-MS-2013

Parus-MS-2013 was recorded in 2013 by Parus Consulting. The resource was identified during subsurface mechanical testing within one testing unit 20 inches below ground surface. This resource consists of a historic-era artifact scatter of glass, ceramic, charcoal, appliance parts, and some fabric and clothing pieces. During the current survey, ESA did not identify any material associated with this resource. A large semi-underground storage tank (Gravity Thickener No. 1) has been constructed where the resource was identified, and it is likely the resource was destroyed during construction of this structure.

Evaluation

Parus-MS-2013 has not been formally evaluated for the California Register or the Sacramento Register. Parus recommended that this resource is not eligible for the California Register (Arrington, 2013; and Sikes, 2013). During the pedestrian survey for the current project, no evidence of the resource was identified. It is likely that the resource had been completely destroyed by construction of the storage tank.

ESA-SRWTP-01

A small scatter of historic-era artifacts was identified within the SRWTP during the pedestrian survey. The artifacts were likely unearthed during the removal of soil to place the concrete footing support for the camera pole. The scatter includes glass bottle, ceramic, and stoneware fragments as well as a few rusted metal pieces, one of which might be a knife, Two diagnostic pieces were identified including: a fragment of a clear glass bottle with “OLU” / “MAGNESIUM” / “CITRATE” / “U.S.P.” which was a medicinal bottle of magnesium citrate solution that dates to the first half of the 20th century and a clear glass drug or chemical bottle with a Owens Illinois diamond stamp on the bottom in their classic oblong shape that dates to the 1930s or 1940s

(Lindsey, 2021). Based on the artifact types and diagnostic artifacts this scatter is likely an early to mid-20th century artifact scatter.

Evaluation

As a newly identified resource, this resource has not been previously evaluated for the California Register or the Sacramento Register. The following is an evaluation of the eligibility of ESA-SRWTP-01 for inclusion in the California Register and the Sacramento Register.

Criterion 1. No association with a specific individual, group, or event could be definitively determined regarding the resource and therefore, no clear avenues of significance under California Register/Sacramento Register Criterion 1 were identified during the current study. Therefore, ESA-SRWTP-01 appears to not be eligible for the California Register/Sacramento Register under Criterion 1.

Criterion 2. No specific individuals could be definitively determined to be associated with this resource as such, the site does not have value under California Register/Sacramento Register Criterion 2. Therefore, ESA-SRWTP-01 appears to not be eligible for the California Register/Sacramento Register under Criterion 2.

Criterion 3. The resource represents an artifact scatter with materials of common type lacking unique diagnostic material and defining characteristics that convey significance associated with design and construction that would qualify it for California Register/Sacramento Register-eligibility under Criterion 3. Therefore, ESA-SRWTP-01 appears to not be eligible for the California Register/Sacramento Register under Criterion 3.

Criterion 4. The data potential of an early to mid-20th century artifact scatter which lacks unique diagnostic material and defining characteristics, is not significant enough to be eligible for inclusion in the California Register/Sacramento Register under Criterion 4. Furthermore, any data potential has been captured in its recording and historic documentation research and reporting herein.

Conclusions

ESA-SRWTP-01 does not meet any of the California Register or Sacramento Register criteria. Therefore, it is not eligible for the California Register or Sacramento Register and is not a historical resource.

Potential for Unknown Buried Cultural Resources

As part of an archaeological sensitivity analysis, ESA reviewed historic map and aerial photography, and geology and soils maps of the proposed project areas. This analysis found that the proposed project areas have historically experienced heavy urban development, including residential and commercial sprawls and infrastructure to accommodate a growing population and escalating settlement patterns.

Soils are dominated by very deep loams of the San Joaquin series in unpaved areas (USDA, 2022). In general, San Joaquin soils are estimated to be within 125,000 and 80,000 years old

(Arroues et al., 2020). The underlying geology are Quaternary Great Valley basin and fan deposits (Strand and Koenig, 1965).

Based on the age of the soils and bedrock, the potential for buried pre-contact archaeological deposits in undisturbed portions of the proposed project areas is low (Rosenthal et al., 2004). Archaeological sites in this geologic context would be at or very near to the existing ground surface. The proposed project areas intersect a few historical streams, creeks, and rivers (although most have since been channelized or moved with modern land reclamation) which does increase the sensitivity in these locations for pre-contact archaeological resources; however, the pedestrian survey did not identify any pre-contact archaeological resources. No pre-contact resources were identified within 0.25-mile of proposed project components; and therefore, the landform, proximity to water resources, and proximity to known archaeological resources, suggest that construction of proposed project components has a relatively low potential for the presence of buried pre-contact archaeological resources in undisturbed areas. Cultural resources that may qualify as tribal cultural resources are further discussed in Section 3.18, *Tribal Cultural Resources*.

3.7.5 Impacts and Mitigation Measures

Method of the Analysis

To evaluate the proposed project's potential impacts on significant cultural resources, a cultural resources characterization and evaluation of the proposed project areas was undertaken. This included a literature review, a Native American outreach effort, geoarchaeological review, archaeological and architecture survey of the proposed project areas. The purpose of these analyses was to identify any cultural resources that may be present within the proposed project areas and to determine if these resources would be significantly impacted by the proposed project.

Potential impacts on historical resources are assessed by identifying any activities (either during construction or operation) that could affect resources that have been identified as historical resources for the purposes of CEQA. Once a resource has been identified, it then must be determined whether the proposed project would "cause a substantial adverse change in the significance" of the resource, as described above. As such, per CEQA Guidelines Section 15064.5(b)(2), the following analysis considers the potential for the proposed project to materially impair the significance of a historical resource by causing direct or indirect changes to the physical characteristics of the resource that convey its historical significance. Mitigation for impacts on historical resources may involve avoidance of alterations to or demolition of the resource; revision of a project to minimize the effect; or, where avoidance or minimization is not feasible, documentation of the resource. However, documentation may not reduce impacts on a historical resource to a less-than-significant level.

Impacts on cultural resources could result from project-related ground-disturbing activities, including demolition, excavation, grading, trenching, vegetation clearance, the operation of heavy equipment, or other surface and sub-surface disturbance that could damage or destroy surficial or architectural resources, buried archaeological resources, including pre-contact and historic materials or human burials. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Cause a substantial adverse change in the significance of a historical resource pursuant to PRC Section 15064.5.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to PRC Section 15064.5.
- Disturb any human remains, including those interred outside of formal cemeteries.

Impacts Not Further Evaluated

Cause a substantial adverse change in significance of a historical resource, archeological resource or disturbance of human remains due to operation and maintenance activities.

O&M activities at the FWTP and SRWTP would generally remain the same once construction is complete. The new intake would require an incremental amount of increased O&M. No new O&M is anticipated for the proposed potable water transmission pipelines because they would be maintained as part of the City's existing annual maintenance program. O&M activities would not result in any additional alterations of the facility structures, or potential ground disturbing impacts to historical resources, archaeological resources, or disturbance of human remains. Therefore, **no impact** would occur, and impacts associated with O&M activities are not further evaluated in the EIR.

Impacts and Mitigation Measures

Table 3.7-3 summarizes the impact conclusions presented in this section.

TABLE 3.7-3
SUMMARY OF IMPACT CONCLUSIONS – CULTURAL RESOURCES

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.7-1: Construction of the proposed project could cause a substantial adverse change in the significance of a historical resource.	NI (FWTP) SU (SRWTP)	NI (FWTP) LS (SRWTP)	LS (Existing/ New)	LSM
3.7-2: Construction of the proposed project could cause a substantial adverse change in the significance of an archaeological resource.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.7-3: Construction of the proposed project may disturb human remains, including those interred outside of designated cemeteries.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM

NI: No Impact
LS: Less than Significant
LSM: Less than Significant with Mitigation
SU: Significant and Unavoidable

Impact 3.7-1: Construction of the proposed project could cause a substantial adverse change in the significance of a historical resource.

CEQA Guidelines define a historical resource as any building, structure, site, or object listed in or determined to be eligible for listing in the California Register or determined by a lead agency to be significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, or cultural annals of California. The following discussion focuses on historic-age architectural and structural resources. Archaeological resources, including archaeological resources that are potentially historical resources according to CEQA Guidelines Section 15064.5, are addressed under Impact 3.7-2, below.

As established above, as a result of the CHRIS records search and pedestrian survey, there are no eligible built environment (historic) resources within the FWTP project area and there are two eligible historic resources within the SRWTP project area: the SRWTP and the Sacramento River Station B at 400 Jibboom Street (currently MOSAC).

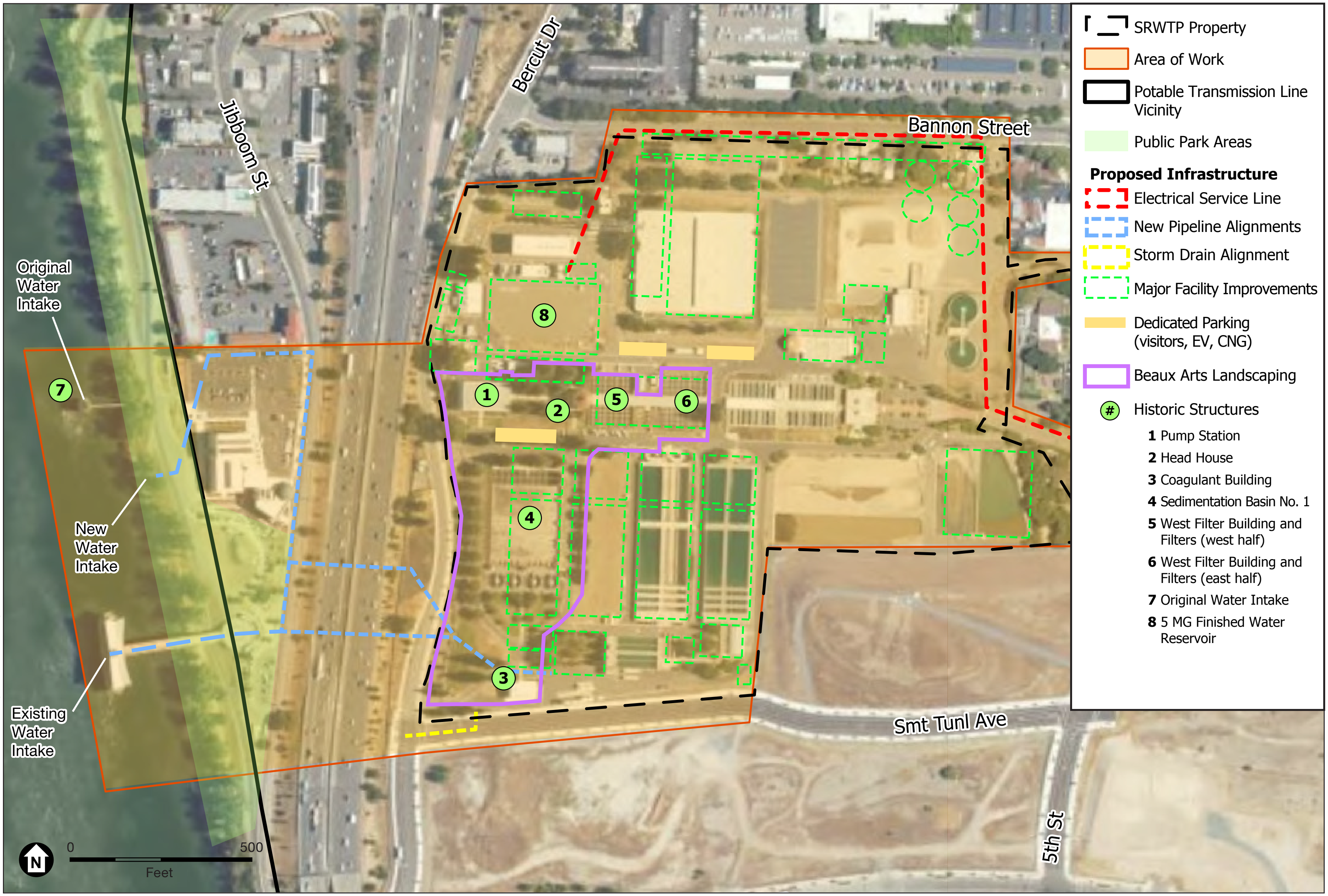
Treatment Plant Improvements at FWTP

No historical resources were identified within or adjacent to the FWTP. Therefore, the construction activities would not significantly impact a historical resource.

Treatment Plant Improvements at SRWTP

The SRWTP was previously evaluated and found to be eligible for the National and California Registers and listed in the local Sacramento Register. The historic-age contributors of the SRWTP consist of the Pump House, Head House, Coagulant Building, West Filter Building and Filters, Sedimentation Basin 1, the 5-MG Clearwell, and the ancillary original intake structure. The Pump House, Head House, Coagulant Building, West Filter Building and Filters, and Sedimentation Basin 1 reflect the Classical Revival/Beaux Arts/Spanish Revival architectural design and City Beautiful influences on the property including the Beaux Arts landscaping in the southwest portion of the property. Additionally, Sedimentation Basin No. 1, is distinctive for its engineering design innovations. The 5-MG Clearwell dates to the original period of construction and was added as a contributor to the historic district in 2024. The SRWTP has undergone numerous upgrades and modifications since its original construction, but the buildings have retained sufficient integrity to maintain their significance under Criterion C/3 (architecture).

The proposed project activities include new construction in or in the near vicinity of the Pump House, Head House, Coagulant Building, 5-MG Clearwell, and within the Beaux Arts landscaping elements in the southwestern portion of the property (**Figure 3.7-1**). The proposed new Administration Building and Maintenance Building, as well as the new filters and sedimentation basins are all located within 50 feet to the north of the Head House and Pump House buildings, directly impacting the site of the 5-MG Clearwell. Proposed construction activities could result in vibration levels that have the potential to damage fragile buildings and structures, including those identified as eligible for the California Register and therefore qualifying as historical resources. Ground-borne vibration can damage the foundations and exteriors of existing buildings. The FTA building damage threshold is typically 0.2 inches per second peak particle velocity (PPV) for historic buildings. As described in Section 3.14, *Noise and Vibration*, some construction equipment used for the project activities immediately adjacent to



SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 3.7-1
Historic Resources within the SRWTP Project Area

ESA

the contributing buildings could result in vibration at a level that could result in structural damage to buildings adjacent to the project area. Additionally, the proposed project includes plans for the demolition of the filters attached to the Head House, demolition of the 5-MG Clearwell, and modifications to non-contributing modern elements of the Coagulant Building at the south end of the property (see Figure 3.7-1), all of which contribute to the SRWTP as a historic resource.

The proposed new construction located adjacent to the Pump House, Coagulant Building, and Head House would add new structures within the immediate setting of the historical resources within the project area, as well as impact the designed Beaux Arts landscaping. The modifications to the SRWTP would alter the character of the SRWTP by replacing existing buildings with different, sometimes larger, buildings, as well as construction of new buildings in current unoccupied spaces near historic buildings. Changes to the setting immediately adjacent to the contributing Pump House, Coagulant Building, and Head House buildings could potentially diminish the buildings' ability to convey significance. The modification of non-contributing modern elements at the Coagulant Building would not result in the demolition of the building as a contributing resource, however significant additions to the structure could result in an impact to the building's ability to convey its significance.

Sacramento River Water Intakes

The original SRWTP intake structure was previously subject to Historic American Engineering Record (HAER) recordation in 2003 as a result of the decommissioning of the structure and construction of the current intake facility. The proposed project activities include new construction in the near vicinity of the original intake structure in the Sacramento River, the new intake facility is located approximately 100 feet south of the original structure and is anticipated to be far enough distant to not be impacted by vibration related to project construction.

Conveyance pipelines are proposed to be installed adjacent to Sacramento River Station B. However, construction activities would not occur in such close proximity as to result in vibration related impacts to the building, and installation of the pipelines would not result in permanent changes to the physical setting of the building. Therefore, installation of the conveyance pipelines would not directly or indirectly impact the building as a historical resource.

Existing Utility Upgrades

The proposed project includes upgrades to existing utilities at both water treatment plants (e.g., storm drainage and electrical service). Upgrades to the existing storm drainage collection system would occur along the perimeter of FWTP, along College Town Drive from State University Avenue to Howe Avenue. As noted above, there are no eligible historic resources within the FWTP project area that could be adversely affected by proposed utility upgrades at the FWTP. The SRWTP was previously evaluated and found to be eligible for the National and California Registers and listed in the local Sacramento Register. Construction activities associated with installation of proposed storm drainage and electrical service upgrades at the SRWTP would not occur in such close proximity to SRWTP contributors as to result in vibration related impacts to the buildings, and installation of the upgraded equipment would not result in a change to the setting of the SRWTP in such a way that would impact its historic setting. Therefore, the proposed project activities would not result in any direct or indirect impacts to the SRWTP and its contributors as historical resources.

Potable Water Transmission Pipelines

The proposed project would also involve improvements of the City's potable water transmission pipelines in the vicinity of SRWTP, in an area defined on the north by the American River, on the east by 7th Street, on the south by the Union Pacific Railroad, and on the west by the Sacramento River (see Figures 2-3 and Figure 3.7-1). Approximately 4,000 feet of 78-inch-diameter pipe and 10,000 feet of 66-inch-diameter pipe would be installed from SRWTP to water users in the City's service area. While the exact location of the potable water transmission pipelines is not known at this time, construction would likely occur in previously disturbed areas and within existing rights-of-way. Further improvements needed for mitigating distribution needs, such as pipelines and reservoirs, outside of the project area would be addressed through subsequent environmental review once the improvements are proposed.

Impact Conclusion

Because no historic resources were identified in the FWTP project area, construction activities associated with proposed treatment plant improvements and existing utility upgrades would not affect the integrity of any historical resources and no impact would occur

Construction of treatment plant improvements as the SWRTP could result in **potentially significant** impacts to historic resources associated with the demolition of the 5-MG Clearwell and Head House filters, modification of the Coagulant Building, and potential indirect vibration and setting to the Pump House, Coagulant Building, and Head House buildings. In addition, because the exact location of the potable water transmission pipelines is not known at this time, construction activities could affect historic resources which could result in a **potentially significant** impact; however, installation would likely occur in previously disturbed areas and within existing rights-of-way.

Construction activities associated with the installation of proposed storm drainage and electrical service upgrades at the SRWTP would not occur in such close proximity to SRWTP contributors as to result in vibration related impacts to the buildings, and installation of the upgraded equipment would not result in a change to the setting of the SRWTP in such a way that would impact its historic setting. In addition, installation of conveyance pipelines adjacent to Sacramento River Station B would not occur in such close proximity as to result in vibration related impacts to the building or in permanent changes to the physical setting of the building. Therefore, construction of these project components would result in **less-than-significant** impacts to historic resources.

Mitigation Measures

Mitigation Measure 3.7-1(a) (TPI-SRWTP): Any proposed new project construction within 200 feet of contributing elements of the SRWTP (including the Pump House, Coagulant Building, or Head House buildings) shall be designed in compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties, specifically the standards for rehabilitation and new construction within a historic district. While the SRWTP is considered an individual historical resource and not a historic district, the discontiguous nature of the contributing buildings on the property makes it appropriate to treat them under these standards. Standards 9 and 10 for Rehabilitation state that:

- Standard 9. New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and shall be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.
- Standard 10. New additions and adjacent or related new construction shall be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

The new construction design shall be consistent with these standards. In addition to compliance with the above, the City shall ensure that any new construction involving the design of a new building shall not have a significant impact on the SRWTP's contributing resources or its features and characteristics. The City of Sacramento Preservation Director, or the Commission, as appropriate per Preservation Development Project Site Plan & Design Review requirements of Title 17 of the City Code, shall review any proposed project's site plan and design to ensure its compatibility with the Secretary of the Interior's Standards.

Mitigation Measure 3.7-1(b) (TPI-SRWTP): Vibration during construction could cause the physical destruction, damage, or alteration of susceptible historic properties. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration and is often used in monitoring of vibration because it is related to the stresses experienced by structures. The FTA building damage thresholds typically applied and described in the City of Sacramento 2035 General Plan Master Environmental Impact Report are 0.2 PPV for historic buildings and 0.5 PPV for non-historic buildings. To mitigate vibration related damage to historical resources, the proposed project shall include measures to limit exposure of historic buildings to less than 0.2 PPV to prevent building damage.

i. Pre-Construction:

   a. To assist with measures regarding impacts to historical resources, the City and construction contractor shall solicit input and review of plan components from a person(s) who meets the Secretary of the Interior's Professional Qualification Standards for Architectural History, and, as appropriate, an architect that meets the Secretary of the Interior's Professional Qualification Standard for Historic Architect. These qualification standards are defined in Title 36 Code of Federal Regulations Part 61.

   b. A conditions assessment report including photos and narrative descriptions of current conditions of the Pump House, Coagulant Building, and Head House shall be completed. This includes photos of existing damage and other material conditions present on or at the surveyed buildings. Images of interior conditions shall be included if possible. Photos in the report shall be labeled in detail and dated.

   c. The construction contractor shall determine the number and placement of vibration receptors at the affected historic buildings in consultation with the consulting architectural historian and/or architect. The number of units and their locations shall take into account proposed construction activities so that adequate measurements can be taken illustrating vibration levels during the course of the project, and if/when levels exceed the established threshold.

ii. During Demolition and Construction:

a. The construction contractor shall collect vibration data from receptors and report vibration levels to the City Preservation Director or their environmental staff on a monthly basis. The reports shall include annotations regarding project activities as necessary to explain changes in vibration levels, along with proposed corrective actions to avoid vibration levels approaching or exceeding the established threshold.

b. With regards to historic structures, if vibration levels exceed the threshold and monitoring or inspection indicates that the project is damaging the building, the historic building shall be provided additional protection or stabilization. If necessary, the construction contractor shall install temporary shoring or stabilization to help avoid permanent impacts. Stabilization may involve structural reinforcement or corrections for deterioration that would minimize or avoid potential structural failures or avoid accelerating damage to the historic structure. Stabilization shall be conducted following the Secretary of the Interior's Standards Treatment of Preservation. This treatment shall ensure retention of the historical resource's character-defining features. Stabilization may temporarily impair the historic integrity of the building's design, material, or setting, and as such, the stabilization must be conducted in a manner that will not permanently impair a building's ability to convey its significance. Measures to shore or stabilize the building shall be installed in a manner that when they are removed, the historic integrity of the building remains, including integrity of material.

iii. Post-Construction:

a. Following completion of planned construction activities within 100 feet of the contributing elements of the SRWTP, the applicant (and its construction contractor) shall provide a report to the City Preservation Director or their environmental staff regarding vibration monitoring conducted during demolition and construction. In addition to a narrative summary of the monitoring activities and their findings, this report shall include photographs illustrating the post-construction state of material conditions that were presented in the pre-construction assessment report, along with images of other relevant conditions showing the impact, or lack of impact, of project activities. The photographs shall sufficiently illustrate damage, if any, caused by the project and/or show how the project did not cause physical damage to the historic and non-historic buildings. The report shall include annotated analysis of vibration data related to project activities, as well as summarize efforts undertaken to avoid vibration impacts.

b. The project applicant (and its construction contractor) shall be responsible for repairs from damage to historic buildings if damage is caused by vibration during the demolition and/or construction activities. Repairs may be necessary to address, for example, physical damage visible in post-construction assessment, or holes or connection points that were needed for shoring or stabilization. Repairs shall be directly related to project impacts and will not apply to general rehabilitation or restoration activities of the buildings. Repairs on historic structures shall be conducted in compliance with the Secretary of the Interior Standards Treatment of Historic Properties. The project applicant shall provide the City Preservation Director or their environmental staff for review and comment both a work plan for the repairs and a completion report to ensure compliance with the Secretary of the Interior's Standards.

Mitigation Measure 3.7-1(c) (TPI-SRWTP): Prior to demolition and construction, the project applicant shall prepare a Historic American Buildings Survey (HABS)-like recordation package for the SRWTP to be filed with the City's Preservation Office and Center for Sacramento History. The HABS-like document shall be prepared by a qualified architectural historian, historic architect, or historic preservation professional who satisfies the Secretary of the Interior's Professional Qualification Standards for History, Architectural History, or Architecture, pursuant to 36 CFR 61. This document shall record the history of the SRWTP, its contributing architecture, and detail the important events or other significant contributions to the patterns and trends of history with which the property is associated, as appropriate. The SRWTP physical condition, both historic and current, shall be documented through design plans; historic maps and photographs; large format photographs; and written data. SRWTP's contributing elements and character-defining features, specifically the Pump House, Head House, Coagulant Building, West Filter Building and Filters, Sedimentation Basin 1, the 5-MG Clearwell, as well as the property Beaux Arts setting and contextual views shall be documented. The completed HABS-like documents shall be sent to the City as well as tote the Center for Sacramento History. The original intake facility has already been subject to HAER recordation in 2003, which can be appended or incorporated into the current HABS package and does not need to be redocumented as part of this mitigation.

Mitigation Measure 3.7-1(d) (TPI-SRWTP): Following completion of Mitigation Measure 3.7-1(c), the City or its qualified contractor, shall create and install an interpretive exhibit discussing the historic significance of the SRWTP. This exhibit shall be publicly accessible, such as an informational kiosk or a website and installation of a temporary exhibit (in the Public Library or City Hall). The exhibit will be created using information previously compiled in the HABS-like recordation package, as well as information and materials compiled in consultation with the City's Preservation Commission in order to determine the ideal format, informational content, and installation location of the interpretive exhibit.

Mitigation Measure 3.7-1(e) (TP):

i. Following identification of the project footprint associated with the proposed potable water transmission pipelines and associated construction activities, the City shall engage a professional architectural historian meeting the U.S. Secretary of the Interior's Standards to review the proposed project for historical resources located adjacent to or intersecting the alignment or its associated elements. This will include a records search at the NCIC of the CHRIS, and initial reconnaissance survey for all project components that involve ground disturbance or alterations to buildings dating 50 years or older. If no resources previously determined eligible or unevaluated resources dating 50 years or older are identified, no further measures are needed.

ii. If the architectural historian determines that known historical resources or potentially eligible historic age buildings or structures may be impacted by project construction, the City shall re-route the pipeline alignment to avoid identified historic resources.

iii. If the alignment cannot be re-routed to avoid adversely effecting an identified historic resource, a Historic Resource Evaluation Report (HRER) shall be completed. This report shall include the results of an intensive survey, identification of known historical resources within or adjacent to the project footprint, and recordation/ evaluation of all previously unrecorded potential historical resources within the study area. In the unlikely event that proposed project activities shall directly or indirectly impact historical resources identified in the HRER, additional mitigation measures such as project redesign, resource protection plans, or HABS/HAER recordation would be recommended and implemented as appropriate. The HRER detailing the results of the research and impact analysis shall be prepared and submitted for review by the City and a final draft shall be submitted to the NCIC.

Significance After Mitigation: Implementation of Mitigation Measures 3.7-1(a) through (d) would reduce the potential impacts to built historical resources at the SRWTP through pre-construction survey and evaluation, design review, and vibration monitoring and damage repair. However, the proposed project would still result in changes to the historical setting of the SRWTP due to the addition of new buildings and structures as well as the loss of the 5-MG Clearwell and filters. As a result, this impact would remain **significant and unavoidable**. Additionally, the installation of water transmission pipelines is a construction activity unlikely to result in significant direct or indirect impacts to historical resources, and implementation of Mitigation Measure 3.7-1(e), requiring avoidance or implementation of measures such as project redesign, resource protection plans, or HABS/HAER recordation, would reduce potential effects to **less-than-significant with mitigation**.

Impact 3.7-2: Construction of the proposed project could cause a substantial adverse change in the significance of an archaeological resource pursuant to Public Resources Code Section 15064.5.

Water Treatment Plant Improvements and Existing Utility Upgrades

Construction activities, including staging of materials and equipment, associated with treatment plant improvements at both FWTP and SRWTP would occur primarily within the City-owned property in previously disturbed areas.

FWTP

At FWTP, approximately 8 percent of the approximately 34-acre site would be disturbed with new structures and facilities. Storm drain upgrades to support upgrades at the FWTP would require excavation and installation of replacement pipeline via cut and cover trenching in previously disturbed surfaces. Construction activities, including staging of materials and equipment, would occur in previously disturbed areas within the existing street adjacent to FWTP. Once placed, the trenches would be filled and the ground surface finished with either native material (e.g., grass, rock, dirt) or pavement (e.g., asphalt concrete). Similarly, electrical service upgrades needed to support FWTP improvements would involve the installation of either overhead or below ground lines. If installed overhead, the existing poles would be demolished and replaced with larger poles, and if installed underground, trenches would be excavated within the existing public right-of-way or FWTP property, in previously disturbed areas.

SRWTP

At SRWTP, approximately 25 percent of the approximately 50-acre site would be disturbed with new structures and facilities. Storm drain upgrades to support upgrades at the SRWTP would require excavation and installation of replacement pipeline via cut and cover trenching in previously disturbed surfaces. Construction activities, including staging of materials and equipment, would occur in previously disturbed areas within the SRWTP property and in roadways adjacent to the SRWTP boundary. Once placed, the trenches would be filled and the ground surface finished with either native material (e.g., grass, rock, dirt) or pavement (e.g., asphalt concrete). Similarly, electrical service upgrades needed to support SRWTP improvements would involve the installation of either overhead or below ground lines. If installed overhead, the existing poles would be demolished and replaced with larger poles, and if installed underground, trenches would be excavated within the existing roadway, in previously disturbed areas.

Sacramento River Water Intakes

For construction activities at the Sacramento River water intakes, a staging area for materials and equipment would likely be created along the shoulder of Jibboom Street and within the paved areas of the MOSAC parking lot (see Figure 2-3).

As discussed in subsection 3.7-4, as a result of the CHRIS records search and pedestrian survey, there are no known archaeological resources that are significant pursuant to PRC Section 15064.5. While the potential for buried cultural resources is low, there remains the potential for previously undiscovered archaeological resources to be disturbed or destroyed during ground-disturbing activities.

Potable Water Transmission Pipelines

As discussed under Impact 3.7-1, the proposed project would also involve phased improvements of the potable water transmission pipelines in the vicinity of SRWTP. The routes of the transmission pipelines have not yet been determined. Even though installation of the proposed potable water transmission pipelines could occur within existing rights-of-way, there could be historic resources adjacent to the routes which could result in direct or indirect impacts to archeological resources.

Impact Conclusion

Therefore, impacts associated with potential disturbance or destruction of previously undiscovered archaeological resources for all project components would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.7-2(a) (ALL):

i. If pre-contact or historic-era archaeological resources are encountered during project construction and implementation, all construction activities within 100 feet shall halt and the City shall be notified. Pre-contact archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish food remains from precontact populations; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-age materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and archaeological deposits of metal, glass, and/or ceramic refuse indicating historic period refuse. An archaeologist meeting the U.S. Secretary of the Interior's Standards for Archeology shall inspect the findings within 24 hours of discovery.

ii. If the City determines that the resource qualifies as a historical resource or a unique archaeological resource (as defined pursuant to the CEQA Guidelines) and that the project has potential to damage or destroy the resource, mitigation shall be implemented in accordance with PRC Section 21083.2 and CEQA Guidelines Section 15126.4, with a preference for preservation in place.

iii. If avoidance is not feasible, the City shall consult with appropriate Native American tribes (if the resource is pre-contact), and other appropriate interested parties to determine treatment measures to avoid, minimize, or mitigate any potential impacts to the resource pursuant to PRC Section 21083.2, and CEQA Guidelines Section 15126.4. This shall include documentation of the resource and may include data recovery (according to PRC Section 21083.2), if deemed appropriate, or other actions such as treating the resource with culturally appropriate dignity and protecting the cultural character and integrity of the resource (according to PRC Section 21084.3).

Mitigation Measure 3.7-2(b) (ALL): Before any ground-disturbing and/or construction activities, an archaeologist meeting or under the supervision of an archaeologist meeting the Secretary of the Interior's Standards for Archeology shall conduct a training program for all construction and field personnel involved in ground disturbance. Native American tribal representative(s) associated with compliance with Mitigation Measures 3.18-1(a) through (c) will be invited to participate in the training program. On-site personnel shall attend mandatory pre-project training that shall outline the general archaeological sensitivity of the area and the procedures to follow in the event an archaeological resource and/or human remains are inadvertently discovered. A training program shall be established for new project personnel before they begin project work.

Mitigation Measure 3.7-2(c) (ALL):

i. Following 30 percent design of the underground utility installation plans, the City shall engage an archaeologist that meets the U.S. Secretary of the Interior's Standards for Archeology to conduct a records search at the NCIC of the CHRIS for all project components that require ground disturbance (i.e., excavation, trenching, grading, etc.) in areas that have not been reviewed as part of the project-level analysis.

ii. If the archaeologist determines that known cultural resources or potential archaeologically sensitive areas may be impacted by the project, a pedestrian survey must be conducted under the supervision of a qualified archaeologist of all accessible portions of the project area, if one has not been completed within the previous five years. A cultural report detailing the results of the research shall be prepared and submitted for review by the City and a final draft shall be submitted to the NCIC. Once the report has been approved by the City, the City may issue appropriate permits.

iii. Additional research, including subsurface testing or monitoring during construction may be required to identify, evaluate, and mitigate impacts to archaeological resources, as recommended by the qualified archaeologist. If avoidance is not feasible, the City shall consult with California Native American tribes identified by the NAHC to be affiliated with the proposed project area (if the resource is pre-contact or indigenous) and the tribal representative(s) associated with compliance with Mitigation Measure 3.18-1(a), to determine treatment measures to avoid, minimize, or mitigate any potential impacts to the resource pursuant to PRC Section 21083.2 and CEQA Guidelines Section 15126.4. This shall include documentation of the resource and may include data recovery (according to PRC Section 21083.2), if deemed appropriate, or other actions such as treating the resource with culturally appropriate dignity and protecting the cultural character and integrity of the resource (according to PRC Section 21084.3).

Significance After Mitigation: Implementation of Mitigation Measures 3.7-2(a) through (c) would reduce the potential impact to archaeological resources to **less-than-significant with mitigation** because all project components with ground-disturbance would be reviewed by a qualified archaeologist, all project personnel involved in ground disturbance would be trained on what to do in the event that an archaeological resource is identified, and any potential archaeological resources identified would be evaluated and treated appropriately, including via consulting with Native American tribes.

Impact 3.7-3: Construction of the proposed project may disturb human remains, including those interred outside of designated cemeteries.

All Project Components

Construction activities associated with the FWTP and SRWTP improvements would occur primarily within the footprint of each facility, disturbing a total of approximately 15.2 acres. Construction activities associated with storm drain improvements adjacent to the FWTP and SMUD overhead electrical service line replacements would also occur in previously disturbed areas within the existing footprint of the replaced features.

Construction activities would include establishment and use of staging areas; demolition of existing structures, facilities, and/or powerlines/poles; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs.

Based on the results of the records search, pedestrian survey, and geoarchaeological analysis, there is no indication that the proposed project areas have been used for human burial purposes in the recent or distant past. However, it is possible that previously unidentified human burials could be discovered during ground-disturbing activities associated with project component construction. Therefore, in the event that human remains are discovered, including those interred outside of formal cemeteries, the human remains could be inadvertently damaged, and this impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.7-3 (ALL): Procedures of conduct following the discovery of human remains have been mandated by Health and Safety Code Section 7050.5, PRC Section 5097.98 and the California Code of Regulations Section 15064.5 (CEQA). According to the provisions in CEQA, if human remains are encountered, the Project applicant shall ensure that all work in the immediate vicinity of the discovery shall cease and necessary steps are taken to ensure the integrity of the immediate area. The Sacramento County Coroner shall be notified immediately. The Coroner shall then determine whether the remains are Native American. If the Coroner determines the remains are Native American, the Coroner shall notify the NAHC within 24 hours, who will, in turn, notify the person the NAHC identifies as the Most Likely Descendant (MLD) of any human remains. Further actions shall be determined, in part, by the desires of the MLD. The MLD has 48 hours to make recommendations regarding the disposition of the remains following notification from the NAHC of the discovery. If the MLD does not make recommendations within 48 hours, the landowner shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance.

Significance After Mitigation: Implementation of Mitigation Measure 3.7-3 would reduce the potential impact to human remains to **less-than-significant with mitigation** because all laws and regulations regarding the inadvertent discovery of human remains would be complied with.

3.8 Energy

3.8.1 Introduction

This section of the Draft EIR addresses the impact of the proposed project on energy resources both in the region and throughout the state.

Existing federal, state, and local plans and policies relevant to energy that are applicable to the proposed project implementation are presented. Background information on California's energy profile (i.e., mix of energy resources and consumption characteristics) and the energy production and transmission profile of SMUD, the regional provider of electricity to the proposed project area is also provided. This regulatory setting identifies regulatory and policy frameworks that govern the production and consumption of energy resources and aim to increase energy efficiency while reducing reliance on fossil fuels. Lastly, the impact analysis examines the energy usage characteristics of the proposed project to determine whether it could result in any energy-related environmental impacts during its construction or O&M activities.

No comments specifically addressing energy resources were received in response to the NOP. See Appendix A for NOP comment letters.

3.8.2 Environmental Setting

Electricity

California's energy system includes electricity, natural gas, and petroleum fuels. According to the California Energy Commission (CEC), in 2022, California's energy system generated 52 percent of electricity, 48 percent of natural gas, and less than 1 percent of petroleum consumed or used in the state. The rest of the state's energy is imported and includes electricity from the Pacific Northwest and the Southwest; natural gas purchases from Canada, Rocky Mountain states, and the southwest; and petroleum imported from Alaska and foreign sources (CEC 2021a, 2022a, 2022b). The total amount of energy consumed in Sacramento County in 2022 from residential and non-residential sectors was 11,410 gigawatt-hours (GWh) (CEC, 2023).

Sacramento Municipal Utility District Power Grid

The SMUD is a community-owned electricity utility that serves Sacramento County and adjoining parts of Placer and Yolo counties. It provides a combination of mainly solar, wind, and hydroelectric power, with other renewables like biomass and geothermal power, and natural gas power (SMUD, 2023). SMUD owns the Upper American River Project, which is the cleanest, most economical, and most flexible power source of the mix. The Upper American River Project provides approximately 16 percent of SMUD's clean power needs (SMUD, 2021).

In 2022, SMUD's electricity sources included: large hydroelectric (25.4 percent), natural gas (45.6 percent), biomass and waste (1.6 percent), geothermal (3.8 percent), small hydroelectric (0.8 percent), solar (2.8 percent), wind (14.7 percent), nuclear (1.6 percent), and other (0.1 percent). Additionally, around 3.6 percent of SMUD's energy resources are from "unspecified sources of power," which means it was obtained through transactions and the specific generation source is not traceable (SMUD, 2022).

Pacific Gas & Electric Company Power Grid

Pacific Gas & Electric Company (PG&E) provides electrical and natural gas services to approximately 16 million people throughout its 70,000-square-mile service area in northern and central California, from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east (PG&E, 2023a). PG&E produces and purchases energy from a mix of conventional and renewable generating sources. The electricity it provides is generated by a diverse mix of sources, including renewable, natural gas, hydroelectric, and nuclear. It flows from the power plant where it is generated onto the electric grid through a transmission substation. In 2021, PG&E reported that their electric power mix as 50 percent renewable power, 39 percent nuclear power, 7 percent natural gas power, and 4 percent large hydroelectric power (PG&E, 2023b). PG&E provides natural gas services to the City of Sacramento.

Transportation Fuels

Gasoline is by far the largest transportation fuel by volume used in California. Nearly all the gasoline used in California is obtained through the retail market. In 2023, approximately 13.5 billion gallons of gasoline were sold in California's retail market (CDTFA, 2024a). Diesel fuel is the second largest transportation fuel by volume used in California behind gasoline. It is estimated that nearly 51 percent of all diesel sales are retail sales. In 2023, 2.9 billion gallons of diesel were sold in California (CDTFA, 2024b). According to the United States Department of Energy's Energy Information Administration, nearly all semi-trucks, delivery vehicles, buses, trains, ships, boats and barges, farm, construction, and military vehicles and equipment have diesel engines.

Regular unleaded gasoline is used primarily to fuel passenger cars and small trucks. Diesel fuel is used primarily in large trucks and construction equipment. Both fuels are used widely within Sacramento County. The CEC estimates that 535 million gallons of gasoline and approximately 51 million gallons of diesel were sold in 2022 in Sacramento County (CEC, 2023).

3.8.3 Regulatory Setting

Federal

Energy Policy Act of 1992

The Energy Policy Act of 1992 was enacted to reduce dependence on foreign petroleum and improve air quality. This law includes several provisions intended to build an inventory of alternative-fuel vehicles in large, centrally fueled fleets in metropolitan areas. The Energy Policy Act of 1992 requires that certain federal, state, and local government agencies and private entities purchase for their vehicle fleets a percentage of light-duty alternative-fuel vehicles capable of running on alternative fuels each year. Financial incentives are also included in the form of federal tax deductions allowed for businesses and individuals to cover the incremental cost of alternative-fuel vehicles. The Energy Policy Act of 1992 also requires states to consider a variety of incentive programs to help promote alternative fuel vehicles.

Influence of Federal Agencies on Transportation Energy

At the federal level, the United States Department of Transportation, United States Department of Energy, and United States Environmental Protection Agency (EPA) have substantial influence over energy policies related to fuel consumption in transportation. Generally, federal agencies influence transportation energy consumption by establishing and enforcing fuel economy standards for automobiles and light trucks, and by funding projects for energy-related research and development for transportation infrastructure.

In 1975, Congress enacted the Energy Policy and Conservation Act, which established the first fuel economy standards for on-road motor vehicles in the United States. Pursuant to this law, United States EPA and the National Highway Traffic Safety Administration (NHTSA) are responsible for establishing additional vehicle standards. In August 2012, standards were adopted for model years 2017 through 2025 for passenger cars and light-duty trucks. According to United States EPA, a model year 2025 vehicle would emit half the greenhouse gas (GHG) emissions of a model year 2010 vehicle (USEPA, 2012). Notably, the State of California harmonized its vehicle efficiency standards through 2025 with the federal standards at the time.

In August 2018, United States EPA and the NHTSA proposed maintaining the 2020 corporate average fuel economy and CO_2 standards for model years 2021 through 2026. The estimated corporate average fuel economy and CO_2 standards for model year 2020 vehicles are 43.7 miles per gallon (mpg) and 204 grams of CO_2 per mile for passenger cars and 31.3 mpg and 284 grams of CO_2 per mile for light trucks, projecting an overall industry average of 37 mpg, as compared to 46.7 mpg under the standards issued in 2012 (USEPA, 2022a). In September 2019, United States EPA finalized the Safer Affordable Fuel-Efficient Vehicles Rule Part One: One National Program and announced its decision to withdraw the Clean Air Act preemption waiver granted to the State of California in 2013 (USEPA and NHTSA, 2019). However, on March 9, 2022, United States EPA reinstated California's authority under the Clean Air Act to implement its own GHG emissions standards and mandate for zero-emission vehicle sales (USEPA, 2022b).

State

State of California Energy Action Plan

The CEC and the California Public Utilities Commission (CPUC) approved the first State of California Energy Action Plan in 2003. The plan established shared goals and specific actions to ensure that adequate, reliable, and reasonably priced electrical power and natural gas supplies are provided. It also identified policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers.

In 2005, the CEC and CPUC adopted a second Energy Action Plan to reflect various policy changes and actions from the prior two years. At the beginning of 2008, the agencies determined that it would not be necessary or productive to prepare a new energy action plan. This determination was based in part on a finding that the state's energy policies have been significantly influenced by the passage of AB 32, the California Global Warming Solutions Act of 2006 (discussed below). Rather than produce a new energy action plan, the CEC and CPUC prepared an update that examines the state's ongoing actions in the context of global climate change.

California Global Warming Solutions Act of 2006

In 2006, Governor Arnold Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006 (California Health and Safety Code, division 25.5), which focused on reducing GHG emissions in California to 1990 levels by 2020. Under Health and Safety Code division 25.5, the California Air Resources Board (CARB) has the primary responsibility for reducing GHG emissions in California; however, AB 32 also tasked the CEC and CPUC with providing information, analysis, and recommendations to CARB regarding strategies to reduce GHG emissions in the energy sector.

In 2016, Governor Edmund G. Brown Jr. signed Senate Bill (SB) 32 and its companion bill, AB 197. SB 32 and AB 197 amended Health and Safety Code division 25.5 and established a new climate pollution reduction target of 40 percent below 1990 levels by 2030, with provisions to ensure that the benefits of state climate policies reach disadvantaged communities.

California Integrated Energy Policy

In 2002, the Legislature passed SB 1389, which required the CEC to develop an integrated energy plan every 2 years for electricity, natural gas, and transportation fuels, for the California Energy Policy Report. The plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for zero emission vehicles and their infrastructure needs, and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

The CEC has adopted the 2019 Integrated Energy Policy Report, which assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources, protect the environment, ensure reliable, secure, and diverse energy supplies, enhance the state's economy, and protect public health and safety. The 2019 Integrated Energy Policy Report covers a broad range of topics, including energy efficiency, building energy efficiency standards, achieving 60 percent renewables by 2030, and the California Energy Demand Forecast (CEC, 2021b).

Title 24 – California Energy Efficiency Standards

The Energy Efficiency Standards for residential and nonresidential buildings specified in Title 24, Part 6 of the California Code of Regulations were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated approximately every three years to allow for consideration and possible incorporation of new energy-efficiency technologies and methods. The current standards became effective on January 1, 2023.

California Green Building Standards Code (CALGreen, or Title 24 Part 11)

The California Green Building Standards Code (CALGreen Code), codified at CCR Title 24, Part 11, is the first-in-the-nation mandatory green building standards code. In 2007, the California Building Standards Commission developed green building standards in an effort to meet the goals of California's landmark initiative AB 32. The CALGreen Code is intended to encourage more sustainable and environmentally friendly building practices, require low-pollution-emitting substances that cause less harm to the environment, conserve natural resources, and promote the use of energy-efficient materials and equipment. The CALGreen Code covers a number of fields, with regulations encompassing energy efficiency, water conservation, sustainable building materials, site design, and air quality. Since 2011, the CALGreen Code has been mandatory for all new residential and non-residential buildings constructed in the state. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design, and overall environmental quality. The CALGreen Code was most recently updated in 2022, and new measures took effect on January 1, 2023.

Off-Road Equipment Regulation

In 2007 CARB promulgated emissions standards for off-road diesel construction equipment of greater than 25 horsepower such as bulldozers, loaders, backhoes, and forklifts, as well as many other self-propelled off-road diesel vehicles. The In-Use Off-Road Diesel-Fueled Fleets regulation aims to reduce emissions by restricting the addition of older engines to fleets, and by requiring fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies such as diesel soot filters and other exhaust retrofits (13 CCR Section 2449). The compliance schedule requires full implementation by 2023 of all equipment for large and medium fleets and by 2028 for small fleets.

This program helps increase energy conservation with fleet turnover as newer vehicles and equipment are more energy efficient than older ones.

California Air Resources Board Advanced Clean Car Program

The Advanced Clean Cars emissions-control program, approved by CARB in 2012, is closely associated with the Pavley regulations (CARB, 2022). The program requires the production of a greater number of zero-emissions vehicle models for years 2015 through 2025, to control smog, soot, and GHG emissions. This program includes the Low-Emissions Vehicle regulations, intended to reduce emissions of criteria air pollutants and GHGs from light- and medium-duty vehicles; and the Zero-Emissions Vehicle regulations, which require manufacturers to produce an increasing number of pure zero-emissions vehicles (battery and fuel cell electric vehicles) and include the provision to produce plug-in hybrid electric vehicles between 2018 and 2025. The increase in low- and zero-emissions vehicles will result in a decrease in the consumption of non-renewable fuels such as gasoline and diesel.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies that are applicable to the evaluation of energy effects of the proposed project are provided in **Table 3.8-1**. It is important to note that the City's Climate Action and Adaptation Plan, originally adopted in 2012, was developed to replace the existing climate action plan policies included in the City of Sacramento 2035 General Plan (see Section 3.10, *Greenhouse Gas Emissions)*.

TABLE 3.8-1
APPLICABLE ADOPTED GENERAL PLAN GOALS AND POLICIES – ENERGY

Element	Goals and Policies
Land Use and Placemaking	Goal LUP-10: Policies 10.1, 10.2; Goal LUP-11: Policies 11.1; LUP-A.9
Environmental Resources and Constraints	Goal ERC-5: Policies 5.4, 5.6; Policies ERC-8.4, ERC-9.3

SOURCES: City of Sacramento, 2024

Sacramento Municipal Utility District 2030 Zero Carbon Plan

The SMUD adopted the 2030 Zero Carbon Plan in April of 2021, which lays out a map to achieve zero carbon while also ensuring that customers and communities reap the benefits of the decarbonization. The 2030 Zero Carbon Plan includes building on existing energy efficient infrastructure and utilizing emerging technologies and strategic business models (SMUD, 2021).

3.8.4 Impacts and Mitigation Measures

Method of the Analysis

The analysis in this section focuses on the nature and magnitude of the change in energy resources due to the construction and O&M of the proposed project components. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

This analysis considers the CEQA Guidelines Appendix F thresholds, as described in this section, in determining whether the proposed project would result in the inefficient, wasteful, or unnecessary use of energy. The evaluation involved reviewing regulations and determining their application to the proposed project. As discussed previously, there are several federal, state, and local plans and policies that are intended to increase energy conservation and the use of renewable energy. Consistency of the proposed project with these regulations would also ensure that the proposed project would not result in inefficient, wasteful, or unnecessary use of energy.

Construction Impacts

As presented in Table 2-7 in Chapter 2, *Project Description*, construction activities in the FWTP project area (improvements at the FWTP and existing utility upgrades) would occur over a total period of approximately 5 years (July 2026 through July 2031). Construction activities in the SRWTP project area (improvements at the SRWTP, existing utility upgrades, Sacramento River water intakes, and potable water transmission pipelines) would occur in two phases. The initial phase would occur over a total period of approximately 10 years (January 2027 through July 2037), and the buildout phase would occur over approximately 10 years (2040 through 2050).

For each project component, there would be a period of intensive construction, using heavy equipment, followed by several years of minimal activity to reach anticipated completion. For a conservative estimate of emissions, the most intensive construction years were modeled, and these periods are also presented in **Table 2-7**. Construction at the FWTP and the SRWTP would be sequenced in a manner that would minimize facility shutdowns, maintain the integrity of the treatment process, and ensure water demands in the system will continue to be met. Therefore, the level of activity and equipment use would not be continuous for the duration of construction at each site. Emissions from construction activities associated with each project component were estimated for each year of intensive construction activity. Construction of FWTP improvements and existing utility upgrades would occur over an approximately 2-year period between July 2026 through July 2028. Initial phase construction of SRWTP improvements and existing utility upgrades would occur over an approximately 4-year period (January 2027 through January 2031). Initial phase construction at the Sacramento River intakes would occur over an approximately 4.5-year period (January 2031 through July 2035). Initial phase construction activities associated with the installation of the potable water transmission mains would occur over an approximately 3-year period (July 2032 through July 2035). The buildout phase of additional improvements to the SRWTP and new water intake pump station would occur intermittently over an approximately 10-year period (2040 through 2050) with intensive construction anticipated to occur over the first 2.5 years.

Project-specific inputs to the California Emissions Estimator Model (CalEEMod 2022.1.1) including proposed project area, demolition area, infill and off haul volumes, and starting year and duration of construction were used to calculate pollutant emissions which were then used to calculate associated construction fuel usage for the energy analysis. The types, quantities, and hours used for construction equipment, and number of worker, vendor, and haul trips were presented in Tables 2-3 through 2-6 in Chapter 2, *Project Description*. Diesel fuel estimates were provided for the FWTP improvements and SRWTP improvements. The new water intake diesel fuel usage was estimated using information provided by the City. Gasoline fuel usage was also estimated using information provided by the City.

Operation and Maintenance Impacts

O&M activities would include routine maintenance involving a few light-duty pickup trucks and the application of herbicides for invasive plant control. Energy demand from these would be minimal and would decrease in frequency and intensity as the sites become more self-sustaining over time. As there would be minimal activity in the operational lifetime of the project, energy demand resulting from operation of the project components was not quantified.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Impacts and Mitigation Measures

Table 3.8-2 summarizes the impact conclusions presented in this section.

TABLE 3.8-2
SUMMARY OF IMPACT CONCLUSIONS – ENERGY

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.8-1: Implementation of the proposed project could result in wasteful, inefficient, or unnecessary consumption of energy resources during construction or operation.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.8-2: Implementation of the proposed project could conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.8-1: Implementation of the proposed project could result in wasteful, inefficient, or unnecessary consumption of energy resources during construction or operation.

Treatment Plant Improvements and Existing Utility Upgrades

Construction

Construction of the FWTP and SRWTP treatment plant improvements, in addition to existing utility upgrades at both treatment plants, would result in the consumption of energy in the form of transportation fuels (i.e., diesel and gasoline fuel) from a variety of sources, including off-road construction equipment and on-road workers, vendors, and hauling vehicles. The level of energy consumption would fluctuate depending on the type of construction activities underway during any particular time period. Energy use would be higher during the period of construction involving the initial site clearance and above earth-moving/grading, where the largest and most powerful equipment would be required to excavate, lift, and transport large volumes of soil and demolished materials (such as concrete, asphalt, and service poles) from the site. Gasoline and diesel fuel would be the primary energy source for vehicles driven by construction crews and to power the large trucks used to deliver and remove construction equipment, materials, and debris.

Based on the estimated equipment use and duration of activities associated with intensive construction of the facility and treatment process improvements at the FWTP and upgrades to utilities needed to serve the FWTP, the estimated consumption of an average of approximately 71,632 gallons of diesel fuel per year, and an average of approximately 3,458 gallons of gasoline per year, would occur over the approximate 2-year intensive construction period. Although construction energy use is presented as an annual average, some construction years would be more or less energy intensive depending on the phasing of activities. The proposed activity's estimated annual average diesel and gasoline use are equivalent to approximately 0.14 percent of the diesel and a very small fraction (less than 0.001 percent) of the gasoline sold in Sacramento County annually (CEC, 2023).

Based on the estimated equipment use and duration of activities associated with construction of the initial phase facility and treatment process improvements at the SRWTP and upgrades to utilities needed to serve the SRWTP, the estimated consumption of an average of approximately 117,060 gallons of diesel fuel per year, and an average of approximately 3,921 gallons of gasoline per year, would occur over the approximate 4-year intensive construction period. The proposed project's estimated annual average diesel and gasoline use are equivalent to approximately 0.23 percent of the diesel and a very small fraction (less than 0.001 percent) of the gasoline sold in Sacramento County annually (CEC, 2023).

Based the estimated equipment use and duration of activities associated with construction of the build out phase facility and treatment process improvements at the SRWTP and upgrades to utilities needed to serve the SRWTP, the estimated consumption of an average of approximately 51,658 gallons of diesel fuel per year, and an average of approximately 3,207 gallons of gasoline per year, would occur over the 2.5-year intensive construction period. Although construction energy use is presented as an annual average, some construction years would be more or less energy intensive depending on the phasing of activities. The proposed project's estimated annual average diesel and gasoline use are equivalent to approximately 0.10 percent of the diesel and a very small fraction (less than 0.001 percent) of the gasoline sold in Sacramento County annually (CEC, 2023).

Construction activities are temporary and would not result in a long-term increase in demand for fuel and would not be of sufficient magnitude to require new infrastructure to be constructed to supply construction activities.

Operation and Maintenance

Operational consumption of electricity was conservatively estimated using CalEEMod under full buildout operation for the FWTP and SRWTP. The project proposes to construct several facility buildings as noted in Chapter 2: *Project Description*, Table 2-2. The annual energy use requirements estimated for buildout operation of the FWTP and SRWTP are expected to be 89,910 kilowatt hours (kWh) per year and 512,484 kWh per year, respectively. Electricity serving the entire project area would be served by SMUD. The proposed project's estimated annual electricity use is equivalent to approximately 0.01 percent of energy consumed in Sacramento County annually (CEC, 2023).

Once improvements are completed at the FWTP and SRWTP, O&M activities would generally be similar to existing activities. However, the ozone generation and treatment system improvements at both water treatment plants would require some additional maintenance, including the use of additional emergency generators (up to 2 at the FWTP and up to 4 at the SRWTP) to support screen cleaning and inspection activities. Electrical demand due to the ozone process would represent double the total plant electrical demand at FWTP and SRWTP respectively. In addition, additional electricity would be needed to operate the intermediate pump station at the FWTP, new intake at the Sacramento River, and the new high lift pump station at the SRWTP. As mentioned previously, electricity demand would be served by the new SMUD service lines at the SRWTP and would be served by four new and upgraded transformers at the FWTP. Consumption of energy resources from vehicle trips would come from additional full-time employees needed at both water treatment plants (2 at FWTP and 10 at SRWTP). In addition, there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions).

Once constructed, O&M of the existing utility upgrades to serve both the FWTP and SRWTP would remain the same as existing conditions. The proposed new upgraded storm drain pipelines would be operated and maintained the same as the existing storm drain pipelines. Similarly, the replacement electrical service lines would also be operated and maintained as the existing service lines are under SMUD's maintenance program.

Sacramento River Water Intakes

Construction

Construction of the Sacramento River intakes would involve similar earth-moving activities (e.g., soil excavation, trenching, dewatering) and equipment types as the water treatment improvements of the FWTP and SRWTP. Based on the Sacramento River intake's estimated equipment use and construction duration, the construction of the proposed new intake is estimated to result in the consumption of an average of approximately 68,148 gallons of diesel fuel per year, and an average of approximately 11,649 gallons of gasoline per year, over the approximate 4.5-year intensive construction period. Although construction energy use is presented as an annual average, some construction years would be more or less energy intensive depending on the phasing of activities. The proposed project's estimated annual average diesel and gasoline use are equivalent to approximately 0.13 percent of the diesel and a very small fraction (less than 0.001 percent) of the gasoline sold in Sacramento County annually (CEC, 2023).

Operation and Maintenance

Operation of the Sacramento River intakes would generate an incremental amount of increased O&M. Periodic cleaning of the water intake's tee screens would be done with on-site equipment located within the pump stations. SRWTP employees would inspect and maintain the existing water intake, new water intake, pump stations, and conveyance pipelines. As maintenance trips already occur for the existing intake, additional truck trips for maintenance of the new intake are not anticipated. No additional emergency generators are required for O&M activities at either the existing or proposed new intake. However, portable generators may be used by divers during routine maintenance. The vehicle trips would occur locally and would have minimal energy use.

Potable Water Transmission Pipelines

Construction

Installation of potable water transmission pipelines in the vicinity of the SRWTP would involve many of the same earth-disturbing activities (e.g., soil excavation, trenching, dewatering) and equipment types as for the FWTP and SRWTP improvements. The type of construction activities for installing them would be similar to other ground disturbing activities associated with other project components and would result in consumption of energy in the form of transportation fuels. Construction would likely occur in previously disturbed areas, and depending on the location of the pipeline, minor vegetation and/or tree removal may be required. Based on the potable water transmission pipeline's estimated equipment use and construction duration, the construction activities are estimated to result in the consumption of an average of approximately 12,619 gallons of diesel fuel per year, and an average of approximately 2,532 gallons of gasoline per year, over the approximate 3-year intensive construction period. Although construction energy use is presented as an annual average, some construction years would be more or less energy intensive depending on the phasing of activities. The proposed project's estimated annual average diesel and gasoline use are equivalent to approximately 0.02 percent of the diesel and a very small fraction (less than 0.001 percent) of the gasoline sold in Sacramento County annually (CEC, 2023).

Operation and Maintenance

O&M for the proposed potable water transmission pipelines would be performed as part of ongoing City programs and would remain the same as existing conditions. It is anticipated that construction of the proposed transmission pipelines and associated O&M activities would result in similar energy use as other project components.

Impact Conclusion

Estimated annual average diesel and gasoline use associated with proposed project construction activities were estimated to be a very small fraction (less than 0.001 percent) of the gasoline sold in Sacramento County annually. O&M activities would generally remain the same at the FWTP and SRWTP, except for additional O&M required for the new ozone treatment. Consumption of O&M energy resources would come from employee vehicle trips to and from the treatment plants for intermittent O&M activities. The vehicle trips would occur locally and would have minimal energy use. Additional truck and employee trips anticipated to operate the new water intake would occur locally and would have minimal energy use. It is anticipated that construction of the proposed transmission pipelines and associated O&M activities would result in similar energy use as other project components. Therefore, implementation of the proposed project would not result in inefficient consumption of energy and would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.8-2: Implementation of the proposed project could conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

All Project Components

During construction of all the proposed project components, construction activities would comply with State and local requirements designed to minimize idling and associated emissions, which also minimizes fuel use. Construction equipment used would be subject to CARB's In-Use Off-Road Diesel-Fueled Fleets regulation, which applies to certain off-road diesel engines, or equipment greater than 25 horsepower. The regulation (1) imposes limits on idling, requires a written idling policy, and requires a disclosure when selling vehicles; (2) requires that all vehicles be reported to CARB (using the Diesel Off-Road Online Reporting System) and labeled; (3) restricts the addition of older vehicles into fleets after January 1, 2014; and (4) requires that fleets reduce their emissions by retiring, replacing, or repowering older engines or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits).

Construction activities would use fuel-efficient equipment and on-road vehicles consistent with federal and state regulations, such as the fuel efficiency regulations in CARB's Pavley Phase II standards for light-duty vehicles like worker commute and vendor vehicles; the anti-idling regulation in 13 CCR Section 2485; and fuel requirements for stationary equipment in 17 CCR Section 93115 (concerning the Airborne Toxic Control Measures). In accordance with 13 CCR Sections 2485 and 2449, idling by commercial vehicles heavier than 10,000 pounds and off-road equipment greater than 25 horsepower would be limited to a maximum of 5 minutes. The intent of these regulations is to reduce construction emissions; however, compliance with the anti-idling and emissions reduction regulations would also result in fuel savings from the more efficient use of equipment.

Sacramento's 2040 General Plan Policy LUP-10 encourages and promotes the design of sustainable buildings and "green" design practices. The project would be required to comply with the California Green Building Standards Code (CALGreen) and target LEED™ certification rating of Silver or equivalent standard. In addition, the use of emergency generators would be subject to Sacramento Metropolitan Air Quality Management District's applicable rules and regulations which would include, but would not be limited to, the following:

- Rule 201: General Permit Requirements

All relevant provisions that are designed to conserve and reduce energy consumption would be implemented. Overall, energy use during construction and O&M activities associated with the proposed project would not be considerable, nor would any sources or activities conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

3.9 Geology, Soils, Paleontological Resources, and Mineral Resources

3.9.1 Introduction

This section of the Draft EIR addresses potential impacts to geology, soils, paleontological resources, and mineral resources associated with implementation of the proposed project.

No comments specifically addressing geology, soils, paleontological resources, or mineral resources were received in response to the NOP. See Appendix A for NOP comment letters.

3.9.2 Environmental Setting

Geologic Setting

The proposed project areas are located in the Sacramento Valley, which is part of the Great Valley geomorphic province of California, a relatively flat alluvial plain composed of a deep sequence of sediments in a bedrock trough. The Sacramento Valley forms the northern third of the Great Valley, which fills a northwest-trending structural depression bounded on the west by the Great Valley Fault Zone and the northern Coast Range, and to the east by the northern Sierra Nevada and the Foothills Fault Zone. Most of the surface of the Great Valley is covered with Holocene and Pleistocene-age alluvium, primarily composed of sediments from the Sierra Nevada and the Coast Ranges, which were carried by water and deposited on the valley floor lakes. Today, the Great Valley is drained by the Sacramento River from the north and the San Joaquin River from the south. Geographically and topographically, the Great Valley has been shaped by the Sacramento River and its tributaries (including the American River). The Sacramento and San Joaquin Rivers meet approximately 35 miles south of Sacramento and discharge through the Sacramento – San Joaquin Delta into the San Francisco Bay and the Pacific Ocean.

Siltstone, claystone, and sandstone are the primary types of sedimentary deposits. Older Tertiary deposits underlie the Quaternary alluvium (City of Sacramento, 2015a). The basement rock underlying the Great Valley is a complex of metamorphosed Paleozoic (at least 245 million years old) and Mesozoic (at least 66 million years old) sediments, volcanics, and granites extending west from the Sierra Nevada Mountains. Overlying the basement rock is a sequence of siltstone, claystone, and sandstone about 60,000 feet thick and predominantly of marine origin. Overlying the sedimentary rock layer is approximately 3,000 feet of fluvial-deposited sediments eroded from the mountains to the north and east.

In the City of Sacramento, the two uppermost sequences of these fluvial sediments are named the Victor and Laguna Formations. The Victor Formation forms the natural ground surface and consists of channel sands and gravels, and overbank deposits of silt and clay extending to as much as 100 feet below the ground surface. The Victor formation overlies the Laguna formation, which is up to 200 to 300 feet thick and consists of silt, clay, and sand with lenses (layers) of gravel (California Geological Survey, 1966).

Geologic Hazards

The California Geologic Survey (CGS) maps were reviewed to identify geologic hazards (e.g., earthquake faults, seismic ground shaking, liquefaction, earthquake-induced settlement, landslides and subsidence) in the proposed project area (California Geological Survey, 2022). The proposed project areas are not located in a Seismic Hazard Zone but could be exposed to geologic hazards as a result of seismic activity in the vicinity. Each hazard is discussed in more detail below.

Earthquake Faults

California is in the circum-Pacific earthquake zone, which is the result of the process of plate tectonics and is the most seismically active area in the United States. The theory of plate tectonics describes the earth's crust as at least a dozen large and small rigid slabs (plates) of solid rock that move relative to each other atop the hotter, more mobile rock of the earth’s mantle. The San Andreas Fault System is an elongated zone of fracturing, about 40 miles wide at the junction of two such plates. The Pacific Plate, west side of the zone San Andres Fault System, is moving north relative to the North American Plate, east side of the zone. One of the results of this movement is the regional rock deformation that creates the general northwest-southeast trend of valleys and ridges in the Coast Ranges, as well as the shape of the Great Valley.

No known active faults are located in or adjacent to the proposed project areas. The proposed project areas are also not located in an Alquist-Priolo Earthquake Zone. The closest known potentially active fault to the project areas mapped by the CGS is the Dunnigan Hills fault (possible Holocene activity, defined by the CGS as within the last 11,000 years and by the United States Geological Survey (USGS) as within the last 15,000 years), about 19 miles northwest of Sacramento. The closest branches of the seismically active San Andreas Fault System (historic activity, which is within the last 200 years) are the Green Valley-Concord Faults (45 miles southwest). The main trace of the San Andreas Fault is approximately 80 miles to the southwest. Other major faults within 100 miles of the proposed project areas are included in **Table 3.9-1**.

Seismic Ground Shaking

During the past 150 years, there has been no documented movement on faults mapped in Sacramento County. Nonetheless, the region has experienced numerous instances of ground shaking originating from faults in the San Andreas Fault Zone, located approximately 80 miles to the west of the project areas, and the Foothills Fault System, located approximately 30 miles to the east of the project areas (USGS, 2023).

Even though there are no active faults in Sacramento County, the proposed project areas could experience seismic activity and ground shaking due to an earthquake. Such an event would cause alarm and moderate structural damage could be expected. People and property on the site could be subject to seismic hazards, such as ground shaking, liquefaction, and settlement, which could result in damage or failure of components of the proposed project. This seismic activity could disrupt utility service due to damage or destruction of infrastructure, resulting in unsanitary or unhealthful conditions or possible fires or explosions from damaged natural gas lines.

TABLE 3.9-1
ACTIVE FAULTS WITHIN 100 MILES OF THE PROPOSED PROJECT AREAS

Fault	Distance from Sacramento (miles)	Age	Slip Rate (millimeters/year)	Characteristic Earthquake (Moment Magnitude)
West Valley Faults				
Dunnigan Hills	19	<15,000	Unknown	6.6
Foothill Fault System				
Bear Mountain	22	Unknown	Unknown	6.0
New Melones	40	Unknown	Unknown	6.0
San Andreas Fault System				
Vaca	28	<130,000	Unknown	6.1
Greenville	43	<1,600,000	1.0 – 5.0	6.6
Concord	45	<150	1.0 – 5.0	6.2
Green Valley	42	<15,000	1.0 – 5.0	6.2
Healdsburg/Rogers Creek	56	<15,000	>5.0	7.1
Hayward	66	<15,000	>5.0	6.9 – 7.1
Calaveras	66	<15,000	>5.0	7.5
San Andreas	80	<150	>5.0	7.9

SOURCES: California Department of Conservation, 2023a; USGS, 2023; Wesnousky, 1986.

Liquefaction

Liquefaction is a transformation of soil from a solid to a liquefied state during which saturated soil temporarily loses strength resulting from the buildup of excess pore water pressure, especially during earthquake-induced cyclic loading. Soil susceptible to liquefaction includes loose to medium dense sand and gravel, low-plasticity silt, and some low-plasticity clay deposits. Four kinds of ground failure commonly result from liquefaction: lateral spread, flow failure, ground oscillation, and loss of bearing strength; each are described in more detail below.

- **Lateral spreading** is the horizontal displacement of surficial blocks of sediments resulting from liquefaction in a subsurface layer that occurs on slopes ranging between 0.3 and 3 percent and commonly displaces the surface by several meters to tens of meters.
- **Flow failures** occur on slopes greater than 3 percent and are primarily liquefied soil or blocks of intact material riding on a liquefied subsurface zone.
- **Ground oscillation** occurs on gentle slopes when liquefaction occurs at depth and no lateral displacement takes place. Soil units that are not liquefied may pull apart from each other and oscillate on the liquefied zone.
- The **loss of bearing strength** can occur beneath a structure when the underlying soil loses strength and liquefies. When this occurs, the structure can settle, tip, or even become buoyant and “float” upwards.

Estimating the potential for liquefaction takes into account soil types, soil density, and groundwater tables, and the duration and intensity of ground shaking. Liquefaction generally occurs below the water table but can move upward through soils after it has developed. Liquefaction susceptibility decreases with the depth of the water table (i.e., the greater the depth to the water table, the lower the risk of liquefaction during seismic events) and the age, cementation, and compactness of the sediments. Liquefaction is most likely to occur within 50 feet below the ground surface in saturated uniformly fine-grained poorly consolidated sediments. Liquefaction and associated failures could damage foundations of structures, roads, underground cables, and pipelines and disrupt utility service. The proposed project areas are underlain with natural levee and channel deposits (alluvium) containing silt and sand on which fill of a variety of materials has been placed. The water table fluctuates corresponding mainly to stage elevations in the Sacramento and American Rivers. For example, near the Sacramento River, water table elevations can be as low as 3 feet below ground surface (bgs) and as high as 18 feet bgs or more depending on river conditions.

Soils present in the proposed project areas have various depths to the water table and therefore present a range of liquefaction risk. The majority of soil types present in the proposed project areas have a depth to the water table that is over 6.5 feet bgs. However, the Columbia-Urban Land complex present at the SRWTP has a depth to water table of "0", which suggests that the water table is present just below the surface, that flooding often occurs, and that there is a higher risk of liquefaction (NRCS, 2023). Soils are further discussed below.

While the proposed project areas are not located in a currently established Seismic Hazard Zone for liquefaction, based on the locally high-water table and the types of soil (discussed in more detail below), the proposed project areas are susceptible to liquefaction hazards, typically induced by a seismic event (California Geological Survey, 2022; City of Sacramento, 2015a).

Earthquake-Induced Settlement

Seismic settlement is the compaction of soil materials caused by ground shaking or the extraction of underground fluids (water, oil, gas). Settlement can be caused by liquefaction or densification of silts and loose sands (such as those that underlie the proposed project areas) as a result of seismic loading. Such settlement may range from a few inches to several feet and be controlled in part by bedrock surfaces (which prevent settlement) and old lake, slough, swamp, or stream beds which settle readily. Static settlement can occur through increased loading of the surface or subsurface materials, such as that imposed by foundations for structures.

Settlement of the ground surface can also be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid compaction and settling of subsurface materials (particularly loose, uncompacted, and variable sandy sediments above the water table) due to the rearrangement of soil particles during prolonged ground shaking. Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different amounts). Areas underlain by artificial fill are generally more susceptible to this type of settlement.

Dewatering for excavation and foundation construction could cause settlement of the drying subsurface materials if the water formed part of the support for the surface soils. Landfill areas undergo settlement primarily through decomposition of organic landfill material that occurs over a long period of time without additional loads. In general, settlement of organic landfill is an order of magnitude greater than settlement of most natural soil.

Landslides and Subsidence

Due to the relatively flat topography of the city, landslides are not considered to be major threats to any areas within the city, including the proposed project areas. However, in 2018, a medium-sized mudslide occurred near the SRWTP at 201-225 Bercut Drive in Sacramento. A rain damaged drain near Bercut Drive and I-5 resulted in a mudslide covering the road with nearly a foot of mud. The blockage in the drain occurred overnight, and the burst occurred during the morning commuting time. The burst pipe was tested earlier in the week, and the engineers are still unsure as to what added the pressure that burst the drain (USGS, 2019).

Subsidence occurs over large areas with substantial withdrawal of oil, natural gas, or groundwater. There are no active oil or natural gas production operations near the project areas or the city as a whole. Therefore, subsidence resulting from such activities would not occur within the city, including the proposed project areas (California Department of Conservation, 2023b). However, there are groundwater withdrawal activities located in the proposed project area and within the city and subsidence has been observed, specifically in downtown Sacramento near I-5 as a result of the withdrawal of water from the alluvial soils in the area adjacent to the highway (City of Sacramento, 2015b).

Soils

The Natural Resources Conservation Service (NRCS; formerly the Soil Conservation Service) mapped Sacramento County's soils most recently in 1993. The soil behavior characteristics described by the NRCS include permeability, available water capacity, runoff, erosion, and shrink-swell potential (NRCS, 1993). Each of these characteristics is described below.

- **Permeability -** the ability of a soil to transmit water or air. Permeability is considered in the design and construction of soil drainage systems, where the rate of water movement under saturated conditions affects behavior.
- **Available water capacity -** the quantity of water that the soil is capable of storing for use by plants.
- **Runoff -** the amount of water that runs off the surface of the land.
- **Erosion -** the susceptibility of soil to water and/or wind erosion.
- **Shrink-swell potential -** the potential for volume change in a soil with a loss or gain in moisture. If the shrink-swell potential is rated moderate to high, damage to buildings, roads, and other structures can occur.

Soil characteristics affect suitability for accommodating uses such as shallow excavations, dwellings with basements, small buildings, roads and streets, and lawns and landscaping. Soil limitations can include slow or very slow permeability, limited ability to support a load, high shrink-swell potential, moderate depth to hardpan, low depth to rock, and frequent flooding. The level of limitation is classified as slight, moderate, or severe:

- **Slight** if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome.
- **Moderate** if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or reduce the limitations.
- **Severe** if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are necessary.

Table 3.9-2 details the soil types and characteristics found within the proposed project areas. The FWTP project area lies near a prominent bend in the river. Soils of the Americanos-Urban Land complex are mapped at the surface in the southwest part of the FWTP project area, and those of the Rossmoor-Urban Land complex are mapped to the north and east. Both are associated with alluvial deposits. The two soils differ greatly in their degree of soil development, as the Americanos soils are well-developed, while the Rossmoor soils have no subsurface horizons evident. Based on stratigraphic and radiocarbon evidence, the Americanos soils in the southwest area are estimated to be between 25,000 and 11,500 years old, or Late Pleistocene in age (much too old to have buried archaeological deposits), while Rossmoor soils in the northeast are estimated to be between 1,000 and 150 years old, or recent Holocene in age (Leach-Palm, 2012).

The SRWTP project area lies about 0.25 miles south of the confluence of the American and Sacramento Rivers. It lies just north of the pre-1867 channel of the American River, within a lowland delta comprised of numerous distributary channels and oxbow lakes. This area was likely subjected to regular flooding, as well as repeated episodes of sediment deposition and removal by channel erosion. The SRWTP project area has Orthents-Urban Land complex soils mapped across the entire surface, except for a small zone in the northeast corner where soils of the Columbia-Urban Land complex are mapped. The Orthent soils are associated with artificial fill deposits in this area. The Columbia soils are very weakly developed and typically found on the surface of the lowest floodplain in drainages whose upper reaches were hydraulically mined, as was the case with the American River and Sacramento River (Leach-Palm, 2012).

Soil Erosion

Erosion is the wearing away of soil and rock by processes such as mechanical or chemical weathering, mass wasting, and the action of waves, wind, and underground water. Excessive soil erosion can eventually lead to damage of building foundations and roadways. Areas that are susceptible to erosion are often those that become exposed during the construction phase of development when existing cover is removed, or earthwork activities disturb sub-grade areas. Typically, the soil erosion potential is reduced once disturbed areas are graded and covered with landscaping, structures, concrete, asphalt, or slope protection materials.

TABLE 3.9-2
SOIL TYPES FOUND IN THE PROPOSED PROJECT AREAS

Map Unit	Soil Composition	Typical Soil Profile	Drainage and Flooding
FWTP Project Area			
205: Rossmoor-Urban Land complex, 0 to 2 percent slopes	• Rossmoor and similar soils: 55 percent • Urban Land: 30 percent • Minor components: 15 percent Columbia, Americanos, Unnamed	• H1 – 0 to 6 inches: fine sandy loam • H2 – 6 to 62 inches: fine sandy loam	Drainage class: Well drained Frequency of flooding: Rare Moderate Risk of Erosion Low Risk of Shrink-Swell High infiltration rate (low runoff potential) when thoroughly wet.
102: Americanos-Urban Land complex, 0 to 2 percent slopes	• Americanos and similar soils: 65 percent • Urban Land: 30 percent • Minor components: 5 percent Natomas, Unnamed and Rossmoor <u>Description of Americanos</u> Typical profile:	• H1 - 0 to 8 inches: silt loam • H2 - 8 to 36 inches: silt loam • H3 - 36 to 54 inches: silt loam • H4 - 54 to 62 inches: sandy loam	Drainage class: Well drained Frequency of flooding: None Moderate to Low risk of Erosion Low Risk of Shrink-Swell Moderate infiltration rate when thoroughly wet. Moderate rate of water transmission.
242: Xerofluvents, 0 to 2 percent slopes, flooded	• Xerofluvents and similar soils: 90 percent • Minor components: 10 percent Riverwash, Rossmoor, Xerorthents	• H1 – 0 to 60 inches, variable	Drainage class: Somewhat excessively drained Frequency of flooding: Occasional
240—Xerarents-Urban Land-San Joaquin complex, 0 to 5 percent slopes	• Xerarents and similar soils: 45 percent • Urban Land: 25 percent • San Joaquin and similar soils: 15 percent • Minor components: 15 percent	• H1 - 0 to 13 inches: fine sandy loam • H2 - 13 to 30 inches: loam • H3 - 30 to 35 inches: clay loam • H4 - 35 to 60 inches: indurated • H5 - 60 to 67 inches: stratified loamy coarse sand to loam	*Slope:* 0 to 3 percent *Depth to restrictive feature:* More than 80 inches; 35 to 60 inches to duripan *Drainage class:* Moderately well drained *Runoff class:* High *Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 to 0.00 in/hr) *Depth to water table:* More than 80 inches Moderate Risk of Shrink-Swell Low risk of Erosion
SRWTP Project Area			
186: Orthents-Urban Land complex, 0 to 2 percent slopes	• Orthents and similar soils: 50 percent • Urban Land: 35 percent • Minor components: 15 percent Columbia, Laugenour, and Sailboat	• H1 – 0 to 60 inches: variable • Depth to restrictive feature: More than 80 inches	Drainage class: Well drained Frequency of flooding: Rare Moderate Risk of Erosion
124: Columbia-Urban Land complex, 0 to 2 percent slopes	• Columbia and similar soils: 60 percent • Urban Land: 30 percent • Minor components: 10 percent Cosumnes, Sailboat, Rossmoor, and Unnamed	• H1 – 0 to 11 inches: sandy loam • H2 – 11 to 43 inches: stratified loamy sand to silt loam (shrink-swell potential) • H3 – 43 to 64 inches: clay loam	Drainage class: Somewhat poorly drained Frequency of flooding: Rare Moderate Risk of Erosion Moderate to High Risk of Shrink-Swell A mix of high infiltration and slow infiltration rates (both a high and low runoff potential) when thoroughly wet.

TABLE 3.9-2
SOIL TYPES FOUND IN THE PROPOSED PROJECT AREAS

Map Unit	Soil Composition	Typical Soil Profile	Drainage and Flooding
170—Laugenour-Urban Land complex, partially drained, 0 to 2 percent slopes	• Laugenour and similar soils: 55 percent • Urban Land: 30 percent • Minor components: 15 percent	• H1 - 0 to 16 inches: loam • H2 - 16 to 39 inches: fine sandy loam • H3 - 39 to 60 inches: stratified very fine sandy loam to loam	Depth to restrictive feature: More than 80 inches Drainage class: Poorly drained Runoff class: Low Low to moderate risk of erosion Low Risk of shrink-swell

SOURCES: NRCS, 2023.

The Wind Erodibility Group (WEG) is rated from 1 to 8, where a rating of 8 indicates the least susceptibility to erosion and 1 is the most susceptible. Erosion factor “K” indicates the susceptibility of soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69, with a higher value indicating greater water erosion potential. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Soils in the FWTP project area, including the length of the storm drainage upgrades on College Town Drive, are moderately susceptible to erosion and are composed of primarily Rossmoor-Urban Land complex, the Americanos-Urban Land complex, and the Xerarents-Urban Land-San Joaquin complex. Soils in the SRWTP project area are also moderately susceptible to erosion. The Columbia-Urban Land complex soil that is present along the northeastern corner of the site as well as near portions of the existing water intake has a moderate susceptibility to wind erosion, whereas the Laugenour-Urban Land complex has a low susceptibility to erosion.

Expansive Soils

Expansive soils are characterized by their potential “shrink-swell” behavior. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in certain fine-grained clay sediments from the process of wetting and drying. Clay minerals such as smectite, bentonite, montmorillonite, beidellite, vermiculite and others are known to expand with changes in moisture content. The higher the percentage of expansive minerals present in near-surface soils, the higher the potential for significant expansion. The greatest effects occur when there are significant or repeated moisture content changes. Expansions of 10 percent or more in volume are not uncommon. This change in volume can exert enough force on a building or other structure to cause cracked foundations, floors and basement walls. Structural damage typically occurs over a long period of time, usually the result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils.

Table 18-1-B of the Uniform Building Code (1997) defines expansive soil as soil having an expansive index greater than 20. Expansive soils generally have high levels of clay. Of the land complex soil types present in the proposed project areas, only the Columbia-Urban Land complex soil present in the SRWTP project area is susceptible to shrink-swell, which is due to higher levels of clay present in soils in the complex. While other soils in the proposed project areas contain clay, these soils are not susceptible to shrink-swell.

Permeability

The permeability of an area depends on soil type. Both the Rossmoor-Urban Land complex and the Columbia-Urban Land complex found in the proposed project areas are highly drained soils with a high infiltration rate and a low runoff potential. The Americanos-Urban Land complex has a moderate infiltration rate. Laugenour-Urban Land complex has a high infiltration rate.

Paleontological Resources

Paleontological resources include fossil remains, fossil localities, and formations that have produced fossil material in other nearby areas. These resources are limited, nonrenewable, sensitive scientific and educational resources protected by federal environmental laws and regulations. The Society of Vertebrate Paleontology (SVP) has established guidelines for the identification, assessment, and mitigation of adverse impacts on nonrenewable paleontological resources. The SVP has helped define the value of paleontological resources and, in particular, indicates the following:

- Vertebrate fossils and fossiliferous (fossil-containing) deposits are considered significant nonrenewable paleontological resources and are afforded protection by federal, state, and local environmental laws and guidelines.
- A paleontological resource is considered to be older than recorded history, or 5,000 years before present, and is not to be confused with an archaeological resource.
- Invertebrate fossils are not significant paleontological resources unless they are present within an assemblage of vertebrate fossils or they provide undiscovered information on the origin and character of the plant species, past climatic conditions, or the age of the rock unit itself.
- A project paleontologist, special interest group, lead agency, or local government can designate certain plant or invertebrate fossils as significant.

In accordance with these principles, the SVP outlined criteria for screening the paleontological potential of rock units and established assessment and mitigation procedures tailored to such potential. **Table 3.9-3** lists the criteria for high-potential, undetermined, and low-potential rock units.

The City is not highly sensitive for paleontological resources present in fossil-bearing soils and rock formations (City of Sacramento, 2023). Most of the proposed project areas have been previously excavated and filled. Although not discussed in the SVP standards, artificial fills, surface soils, and high-grade metamorphic rocks do not contain paleontological resources. While such materials were originally derived from rocks, they have been altered, weathered, or reworked such that the discovery of intact fossils would be rare. Therefore, there is little potential for the project area to contain paleontological resources.

TABLE 3.9-3
CRITERIA FOR DETERMINING PALEONTOLOGICAL RESOURCES

Paleontological Potential	Description
High	Geologic units from which vertebrate or significant invertebrate or plant fossils have been recovered. Only invertebrate fossils that provide new information on existing flora or fauna or on the age of a rock unit would be considered significant.
Undetermined	Geologic units for which little to no information is available.
Low	Geologic units that are not known to have produced a substantial body of significant paleontological material.

SOURCE: SVP 1995; 1996.

In 2012, the Far Western Anthropological Research Group conducted an Archaeological Survey Report for the Sacramento River and E.A. Fairbairn Water Treatment Plants Rehabilitation Project. As indicated by the survey, most Pleistocene-age landforms (more than 13,000 years old) have little potential to contain buried archaeological remains, because they formed prior to the arrival of humans in North America. Conversely, most Holocene-age landforms have some potential to contain buried remains, because they formed during or after people first occupied the region. The occurrence of buried soils in Holocene-age alluvial and colluvial landforms is significant because they represent formerly stable ground surfaces that were available for human occupation in the past. Regional evidence indicates a strong correlation between Holocene-age landforms, buried soils, and buried archaeological remains. Previous studies have shown that prehistoric sites tend to be located within 200 meters (656 feet) or less of a known stream or other water source. Thus, Holocene-age deposits located within 200 meters of an historic-era stream are considered to have an elevated (i.e., high) potential to contain buried sites (Leach-Palm, 2012).

The potential for buried prehistoric archaeological sites in the project areas was estimated based on the age and distribution of surface sediments combined with the proximity to historic-era stream channels (i.e., distance to water), and the results of previous geoarchaeological studies. Holocene-age Rossmoor soils are within 200 meters of the American River (near the FWTP project area), which meets the criteria for high buried site sensitivity. Since the Rossmoor soils appear to have been deposited over part of the Late Pleistocene-age floodplain marked by Americanos soils, there is a high potential for prehistoric archaeological materials and deposits to be buried at relatively shallow depths (e.g., 3 to 6 feet) in that portion of the project area.

The criteria for high buried site sensitivity are also met in the southern part of the new water intake area (within the SRWTP project area) where Historic-era and modern deposits of artificial fill (i.e., Orthents) are within 200 meters of the former American River channel. Although there is a small possibility that a few isolated and/or reworked archaeological materials might be present with the underlying alluvium that was deposited within a prehistoric channel, given the history of erosion, deposition, and reworking, any intact deposit is unlikely (Leach-Palm, 2012).

Mineral Resources

Minerals are naturally occurring chemical elements or compounds, or groups of elements or compounds that were not formed by organisms. Naturally occurring concentrations of minerals in the earth's crust are known as mineral deposits. Mineral resources are mineral deposits from which the economic extraction of a commodity (such as gold or copper) is currently potentially feasible. In addition to metallic minerals, materials used for construction (e.g., sand and aggregate), industrial and chemical processes (e.g., salt), and fuel (e.g., crude oil) are considered mineral resources in California.

In accordance with California's Surface Mining and Reclamation Act of 1975, the state geologist, through the California Department of Conservation, CGS; formerly known as the California Division of Mines and Geology, is responsible for identifying and mapping the non-fuel mineral resources of the state. Economically significant mineral deposits are classified based on the known and inferred mineral resource potential of the land using the California Mineral Land Classification System, which includes the following four mineral resource zones (MRZs).

- **MRZ-1**. Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- **MRZ-2**. Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.
- **MRZ-3**. Areas containing mineral deposits, the significance of which cannot be evaluated.
- **MRZ-4**. Areas where available information is inadequate for assignment to any other zone.

Of the four mineral classifications, the MRZ-2 classification is recognized in land use planning because the likelihood for occurrence of significant mineral deposits is high, and the classification may be a factor in the discovery and development of mineral deposits that would tend to be economically beneficial to society. The City is required to develop policies that address mineral resource recovery areas mapped as MRZ-2 (significant existing or likely mineral deposits) (City of Sacramento, 2023); no policies address areas mapped as MRZ-1 or MRZ-3.

The proposed project areas are located within an area that has been designated as MRZ-1 and MRZ-3 by the California Department of Conservation (O'Neal and Gius, 2018). Specifically, the SRWTP project area is located in an area designated as MRZ-1 (areas of no mineral resource significance). The FWTP project area is located in an area designated as MRZ-3 (areas of underdetermined mineral resource significance). There are no oil and gas wells in the vicinity of the project areas (California Department of Conservation, 2023b).

3.9.3 Regulatory Setting

Federal

U.S. Geological Survey Quaternary Faults

The USGS maintains a database of Quaternary fault and fold parameters. The database is periodically updated to reflect the latest data available and current understanding of fault behaviors. These fault parameters were used to develop the National Seismic Hazard Maps.

U.S. Geological Survey National Seismic Hazard Maps

USGS provides probabilistic seismic hazard maps for the 48 conterminous states. These maps depict contour plots of peak ground acceleration and spectral accelerations at selected frequencies for various ground motion return periods. As noted previously, the maps were developed for a reference site condition with an average shear-wave velocity of about 2,500 feet per second in the top 100 feet of ground surface. The USGS National Seismic Hazard Maps are updated periodically and have been adopted by many building and highway codes as the minimum design requirements.

National Earthquake Hazards Reduction Act (U.S. Code Title 42 Section 7704)

In 1977, the U.S. Congress enacted the Earthquake Hazards Reduction Act of 1977 (Public Law 95−124) to “reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards and reduction program.” The National Earthquake Hazards Reduction Program was also enacted in 1977, to accomplish the goals of the act. The Earthquake Hazards Reduction Act and National Earthquake Hazards Reduction Program were amended in 1990 to refine the description of agencies’ responsibilities, program goals, and objectives. The Earthquake Hazards Reduction Act was amended as the National Earthquake Hazards Reduction Program Act. The four general goals of the National Earthquake Hazards Reduction Program are:

- Develop effective practices and policies to reduce losses of life and property from earthquakes and accelerate their implementation.
- Improve techniques for reducing seismic vulnerabilities of facilities and systems.
- Improve earthquake hazards identification and risk assessment methods, and their use.
- Improve the understanding of earthquakes and their effects.

The National Earthquake Hazards Reduction Program Act designates the Federal Emergency Management Agency as the program’s lead agency. Other supporting agencies include the National Institutes of Standards and Technology, the National Science Foundation, and USGS.

State

California Building Code

The California Building Code (CBC), which is codified in Title 24 of the California Code of Regulations, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, means of egress to facilities (entering and exiting), and general stability of buildings. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or they are not enforceable. The provisions of the CBC apply to the construction, alteration, movement, replacement, location, and demolition of every building or structure, or any appurtenances connected or attached to such buildings or structures throughout California.

The 2022 edition of the CBC is based on the 2021 International Building Code (IBC) published by the International Code Council, which replaced the Uniform Building Code (UBC). The code is updated triennially, and the 2022 edition of the CBC was published by the California Building Standards Commission on July 1, 2021, and took effect starting January 1, 2022. The 2022 CBC contains California amendments based on the American Society of Civil Engineers Minimum Design Standard ASCE/SEI 7-16, Minimum Design Loads for Buildings and Other Structures, provides requirements for general structural design and includes means for determining earthquake loads[1] as well as other loads (such as wind loads) for inclusion into building codes. Seismic design provisions of the building code generally prescribe minimum lateral forces applied statically to the structure, combined with the gravity forces of the dead and live loads of the structure, which the structure then must be designed to withstand. The prescribed lateral forces are generally smaller than the actual peak forces that would be associated with a major earthquake. Consequently, structures should be able to (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage but with some nonstructural damage; and (3) resist major earthquakes without collapse, but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a structure designed in accordance with the seismic requirements of the CBC should not collapse in a major earthquake.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, all of which are used to determine a seismic design category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site; SDC ranges from A (very small seismic vulnerability) to E/F (very high seismic vulnerability and near a major fault). Seismic design specifications are determined according to the SDC in accordance with CBC Chapter 16. CBC Chapter 18 covers the requirements of geotechnical investigations (Section 1803), excavation, grading, and fills (Section 1804), load bearing of soils (Section 1806), as well as foundations (Section 1808), shallow foundations (Section 1809), and deep foundations (Section 1810). For Seismic Design Categories D, E, and F, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading, plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also addresses measures to be considered in structural design, which may include ground stabilization, selecting appropriate foundation type and depths, selecting appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions.

Requirements for geotechnical investigations are included in Appendix J, CBC Section J104, Engineered Grading Requirements. As outlined in Section J104, applications for a grading permit are required to be accompanied by plans, specifications, and supporting data consisting of a soils

1 A load is the overall force to which a structure is subjected in supporting a weight or mass, or in resisting externally applied forces. Excess load or overloading may cause structural failure.

engineering report and engineering geology report. Additional requirements for subdivisions requiring tentative and final maps and for other specified types of structures are in California Health and Safety Code Sections 17953 to 17955 and in 2022 CBC Section 1802. Testing of samples from subsurface investigations is required, such as from bores or test pits. Studies must be done as needed to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on load-bearing capacity, compressibility, liquefaction, differential settlement, and expansiveness.

All development under the proposed project would be required to comply with CBC requirements, which would ensure the proposed plan is consistent with the CBC.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (Public Resources Code, Chapter 7.8, Section 2690-2699.6) was adopted to reduce the threat to public safety and to minimize the loss of life and property by identifying and mitigating ground failure caused by strong earthquakes, namely liquefaction and slope failure. The Seismic Hazards Mapping Act requires the State Geologist to delineate seismic hazard zones, also known as “zones of required investigation,” where regional (that is, not site-specific) information suggests that the probability of a hazard requiring mitigation is adequate to warrant a site-specific investigation. The proposed project areas are not located in an area deemed a zone of required investigation.

All development under the proposed project would be required to comply with CBC requirements, which would ensure the proposed plan is consistent with the CBC.

California Occupational Safety and Health Administration Regulations

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. In California, the California Division of Occupational Safety and Health (Cal/OSHA) and the federal OSHA are the agencies responsible for ensuring worker safety in the workplace. The OSHA Excavation and Trenching standard (29 CFR 1926.650), described above in Federal Regulations, covers requirements for excavation and trenching operations, which are among the most hazardous construction activities. OSHA requires that all excavations in which employees could potentially be exposed to cave-ins be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area. Cal/OSHA is the implementing agency for both state and federal OSHA standards.

California Excavation Notification Requirements

California Code of Regulations Section 4216 requires that construction contractors report a project that involves excavation 48-hours prior to breaking ground. This program allows owners of buried installations to identify and mark the location of its facilities before any nearby excavation projects commence. Adherence to this law by project contractors reduces the potential of inadvertent pipeline or utility damage or leaks. Adherence to this law also includes the proper maintenance of delineations. "Delineation" includes the physical identification of the area to be excavated using alternative marking methods, including, but not limited to, flags, stakes, whiskers, or a combination of these methods.

National Pollutant Discharge Elimination System Construction General Permit

Construction associated with the Project would disturb more than one acre of land surface affecting the quality of stormwater discharges into waters of the U.S. The Project would therefore be subject to the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order WQ 2022-0057-DWQ, NPDES No. CAS000002), also referred to as the CGP. The CGP regulates discharges of pollutants in stormwater associated with construction activity to waters of the U.S. from construction sites that disturb one acre or more of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface. The CGP requires the development and implementation of a SWPPP that includes specific construction best BMPs designed to prevent sediment and pollutants from contacting stormwater from moving offsite into receiving waters. The BMPs fall into several categories—erosion control, sediment control, waste management, and good housekeeping—and are intended to protect surface water quality by preventing the offsite migration of eroded soil and construction-related pollutants from the construction area. Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply,* for a detailed description of NPDES permits.

Dewatering Permit

Where groundwater levels tend to be shallow, dewatering during construction is sometimes necessary to keep trenches or excavations free of standing water when improvements or foundations/footings are installed. Dewatering discharges are typically considered a low or limited threat to water quality. Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply*, for a description of permits associated with construction and groundwater dewatering.

Public Resources Code Section 5097.5 and Section 30244

State requirements for management of paleontological resources are included in Public Resources Code Section 5097.5 and Section 30244. These statutes prohibit the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts on paleontological resources from developments on public (state, county, city, district) lands.

Surface Mining and Reclamation Act (SMARA)

The Surface Mining and Reclamation Act (Public Resources Code, Sections 2710−2796) provides a comprehensive surface mining and reclamation policy with the regulation of surface mining operations to assure that adverse environmental impacts are minimized and mined lands are reclaimed to a usable condition. This act mandated the initiation by the State Geologist of mineral land classification (MRZs) in order to help identify and protect mineral resources in areas within the state subject to urban expansion or other irreversible land uses which would preclude mineral extraction.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies that are applicable to the evaluation of geology, soils, paleontological resources, and mineral resources effects of the proposed project are provided in **Table 3.9-4**.

TABLE 3.9-4
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – GEOLOGY, SOILS, PALEONTOLOGICAL RESOURCES AND MINERAL RESOURCES

Element	Goals and Policies
Historic and Cultural Resources	Goal HCR-1: Policy HCR-1.1
Public Facilities and Safety	Goal PFS-2: Policies PFS-2.1, 2.2, 2.3
Environmental Resources and Constraints	Goal ERC-1: Policies ERC-1.3, 1.4; Goal ERC-7: Policies ERC-7.1, 7.2

SOURCE: City of Sacramento, 2024

Sacramento City Code

The City of Sacramento adopted the updated CBC in 2016, with amendments, per Chapter 15.20 of the Municipal Code. This chapter also mandates compliance with the CBC and all amendments adopted by the code. All new construction and modifications to existing structures within the city are subject to the requirements of the code, in addition to State requirements.

Grading, Erosion, and Sediment Control (City Code Section 15.88)

City Code Section 15.88 regulates land disturbances, soil storage, pollution, and erosion and sedimentation resulting from construction activities within the City. All projects are required to prepare erosion and sediment control plans which apply during and post construction. The plans include erosion control measures such as straw mulch, sediment controls such as fiber rolls, inlet protection, and housekeeping practices such as concrete management and spill prevention.

The City of Sacramento has a grading ordinance (Chapter 15.88 of the Sacramento Municipal Code) that regulates grading on property within the City limits 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 NPDES permit 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 adopted 2040 General Plan, other adopted specific plans, and all applicable City ordinances and regulations. The most current permit (R5-2021-0019) for the SRWTP was adopted in April 2021. The most current permit for the FWTP (R5-2007-0087) was adopted in 2007. The grading ordinance is intended to control all aspects of grading operations within the City.

Department of Utilities

The City of Sacramento Department of Utilities maintains policies, guidelines, and regulations regarding grading, erosion control, stormwater drainage design, inspection, and permitting. This department is responsible for issuing and oversight of several types of development permits, including grading and building permits. A grading permit must be approved prior to grading activities. An applicant must submit, for City review and approval, Improvement and/or Grading Plans along with project-specific erosion and sedimentation control plans.

Site-Specific Geotechnical Investigation

As required by the CBC and City codes, prior to the commencement of any earthwork at a construction site, a geotechnical investigation must be prepared for that site. The geotechnical investigation must include soil borings to collect samples and laboratory testing to determine the appropriate design parameters for use for structural fill, roadbed fill, and landscaping fill, along with the fill placement requirements. The various soils may also be tested for corrosivity to allow for proper infrastructure and foundation design.

3.9.4 Impacts and Mitigation Measures

Method of the Analysis

To evaluate whether implementation of the proposed project would result in impacts on geology, soils, paleontological resources, and mineral resources, the analysis considers how construction (short-term, temporary) and O&M (long-term, permanent) activities would result in changes to existing conditions. Potential impacts were analyzed using available data from site-specific investigations, and existing publications and maps completed by state and federal agencies, including the USGS, NRCS and CGS. The proposed project would be regulated by the laws, regulations, plans, and policies summarized in subsection 3.9.3, *Regulatory Setting.* Therefore, the impact analysis assumes that the proposed project would comply with existing applicable regulatory and permitting requirements. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42.
  - Strong seismic ground shaking.
  - Seismic-related ground failure, including liquefaction.
  - Landslides.

- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
- Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state.
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

Impacts Not Further Evaluated

Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. Neither septic tanks nor alternative wastewater disposal systems would be constructed or operated as part of the proposed project. Therefore, **no impact** would occur and concern over soils having inadequate capacity to support septic tanks or alternative wastewater disposal systems is not further evaluated in the EIR.

Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state.

As described in subsection 3.9.2, *Environmental Setting*, the SRWTP project area is located in an area identified as MRZ-1 (areas of no mineral resource significance). The FWTP project area is located in an area identified as MRZ-3 (areas of undetermined mineral significance). These areas are within the urbanized area of the City of Sacramento, and unlikely to be available in the long-term for mineral extraction. Furthermore, the City is required to develop policies that address mineral resource recovery areas mapped as MRZ-2 (significant existing or likely mineral deposits) (City of Sacramento, 2023); no policies address areas mapped as MRZ-1 or MRZ-3. Given that the project area is located in areas that are classified as MRZ-1 and MRZ-3, implementation of the proposed project would not result in a loss of availability of a known mineral resource compared to existing conditions. Therefore, **no impact** would occur and loss of availability of a known mineral resource that would be of value to the region and residents of the state is not further evaluated in the EIR.

Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

As stated above, the proposed project areas are located within areas identified as either MRZ-1 or MRZ-3. Of the four mineral classifications, only MRZ-2 classification is recognized in land use planning because the likelihood for occurrence of significant mineral deposits is high, and the classification may be a factor in the discovery and development of mineral deposits that would tend to be economically beneficial to society. Implementation of the proposed project would occur in areas that are already developed and therefore would not result in a loss of availability of a known mineral resource compared to existing conditions. These areas are not designated as mines or otherwise in City's 2040 General Plan or other land use plans. Therefore, **no impact** would occur and the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan is not further evaluated in the EIR.

Impacts and Mitigation Measures

Table 3.9-5 summarizes the impact conclusions presented in this section.

TABLE 3.9-5
SUMMARY OF IMPACT CONCLUSIONS –
GEOLOGY, SOILS, AND PALEONTOLOGICAL RESOURCES AND MINERAL RESOURCES

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.9-1: Implementation of the proposed project could directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death due to fault rupture, strong seismic ground shaking, seismic-related ground failure or landslides.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.9-2: Implementation of the proposed project could result in substantial soil erosion or the loss of topsoil.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.9-3: Implementation of the proposed project could be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.9-4: Implementation of the proposed project would be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.9-5: Implementation of the proposed project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.9-1: Implementation of the proposed project could directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death due to fault rupture, strong seismic ground shaking, seismic-related ground failure or landslides.

All Project Components

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area.

Construction

Construction activities associated with the proposed project would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs. As described in subsection 3.9.2, *Environmental Setting,* the proposed project areas are not located in an area designated as an Alquist-Priolo Earthquake Fault Zone, and there are no active faults that intersect or are within close proximity of the City. Therefore, fault ruptures within the proposed project areas are highly unlikely and construction of the proposed project would not result in loss, injury or death. In addition, due to the relatively flat topography, landslides are not considered to be major threat in the proposed project areas.

However, the proposed project areas may be subject to other seismic hazards, including minor ground shaking and seismic-related ground failure caused by major seismic events in the vicinity of the proposed project areas (e.g., the San Andreas, Green Valley, Greenville, or Hunting Creek-Berryessa faults). The resulting effects of a seismic event could potentially cause damage to buildings, roads, and infrastructure (primary effects), and could cause ground failures such as liquefaction or settlement in loose alluvium and/or poorly compacted fill (secondary effects).

As described in subsection 3.9.2, *Environmental Setting,* the proposed project areas are underlain by artificial fill and thick alluvial deposits that, in their present states, could become unstable during seismic ground motion. To reduce the primary and secondary risks associated with seismically induced ground shaking, City and state mandated building codes include requirements for a geotechnical investigation to determine the subsurface materials and geotechnical hazards that may be present. In the City, commercial, institutional, and large residential buildings and associated infrastructure are required to reduce the exposure to potentially damaging seismic vibrations through seismic resistant design, in conformance with the most recent version of the CBC and any local amendments included within Chapter 15.20 of the City Code. In addition, the City's 2040 General Plan policies related to hazards risk reductions (i.e., Policy ERC-7.1: Expansive Soils and Liquefaction and Policy ERC-7.2: Seismic Stability), requires that the City regulates structures to ensure structural stability from seismic-related events.

Operation and Maintenance

Once construction is completed, O&M activities associated with the proposed project would generally remain similar to existing activities. Long-term O&M activities for several project components (e.g., existing utility upgrades, Sacramento River water intakes, potable water transmission pipelines) would be completed under existing maintenance programs. O&M activities would therefore not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death due to fault rupture, strong seismic ground shaking, seismic-related ground failure or landslides as compared to existing conditions.

Impact Conclusion

Given compliance with existing regulations and policies that address seismic-related safety issues (2040 General Plan Policy ERC-7.1: Expansive Soils and Liquefaction, and Policy ERC-7.2: Seismic Stability), and required adherence to requirements of the CBC and City design standards, implementation of the proposed project would not directly or indirectly cause potential substantial adverse effects due to fault rupture, seismic ground shaking, seismic related ground failure or landslides. Therefore, the impact would be **less than significant**.

Impact 3.9-2: Implementation of the proposed project could result in substantial soil erosion or the loss of topsoil.

All Project Components

Construction

As discussed in subsection 3.9.2, *Environmental Setting*, the proposed project areas comprise soil that have wind and water erosion. Construction activities associated with the proposed project components would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs. Construction would occur in previously disturbed areas. However, earth-disturbing activities (e.g., excavation, trenching, grading) have the potential to result in temporary soil erosion and/or the loss of topsoil.

As discussed in Impact 3.12-1 of Section 3.12, *Hydrology, Water Quality, and Water Supply,* the City would obtain coverage under the NPDES CGP and require contractors to comply with the permit's conditions that would mandate the development and implementation of a SWPPP. The SWPPP would be prepared by a Qualified SWPPP Developer (QSD), and submitted to the State Water Board before ground disturbing activities and would include standard BMPs required for all projects and any additional measures determined necessary by the QSD to control stormwater run-on/run-off and sediment which would include implementation of measures to reduce temporary increased erosion during construction activities.

For projects that would disturb more than 50 cubic yards of soil, construction activities would be required to adhere to the City's Grading Ordinance that regulates site operations and conditions in accordance with the City's NPDES requirements. Contractors would be required to implement construction BMPs to reduce adverse effects on receiving water quality and prepare an erosion and sediment control plan to control erosion. An erosion control professional, landscape architect, or civil engineer specializing in erosion control must prepare the Erosion and Sediment Control Plan and during the installation of erosion and sediment control measures be on the project areas to supervise implementation of the installation and maintenance of such projects throughout the site clearing, grading and construction periods.

Operation and Maintenance

Once construction is completed, O&M activities associated with the proposed project would generally remain similar to existing activities. Long-term O&M activities for several project components (e.g., existing utility upgrades, Sacramento River water intakes, potable water transmission pipelines) would be completed under existing maintenance programs. O&M activities therefore would not result in any additional alterations of the facility structures, or potential ground disturbing activities (e.g., excavation, trenching, grading) that could result in substantial soil erosion, or the loss of topsoil as compared to existing conditions.

Impact Conclusion

Given compliance with existing regulations (e.g., NPDES CGP and City ordinances), implementation of the proposed project would not result in substantial soil erosion or the loss of topsoil. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.9-3: Implementation of the proposed project could be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

All Project Components

Construction

As detailed in subsection 3.9.2, Environmental Setting, and discussed in Impact 3.9-1, the proposed project areas are underlain by artificial fill and thick alluvial deposits. These alluvial deposits contain silt and sand on which fill of a variety of materials has been placed. In general, the water table fluctuates with the seasons corresponding mainly to stage elevations in the Sacramento and American rivers. Soils underlying the SRWTP project area are characterized as moderately expansive; no expansive soils are present underlying the FWTP project area. While fault ruptures within the proposed project areas are highly unlikely, they may be subject to other seismic hazards, including minor ground shaking and seismic-related ground failure, caused by major seismic events in the vicinity. The resulting effects of a seismic event could potentially cause damage to buildings, roads, and infrastructure (primary effects), and could cause ground failures such as liquefaction or settlement in loose alluvium and/or poorly compacted fill (secondary effects). The proposed project areas are relatively flat, and therefore not susceptible to landslides.

While the proposed project areas are not located in a Seismic Hazard Zone, the locally high-water table and the types of soil referenced in Table 3.9-2, such as the Columbia-Urban Land complex, underlying the proposed project areas would be susceptible to liquefaction, typically induced by a seismic event. Artificial fill areas that have not been properly engineered or that have steep, unstable banks, or unsupported walls may also be susceptible to other hazards such as lateral spreading is likely to occur in areas of high-water table.

Construction of the proposed project would require activities (e.g., excavation, trenching, grading, etc.) and the use of heavy equipment that could negatively impact soil stability in the project areas. These activities could pose geotechnical hazards on site through the movement of soil on site. Furthermore, dewatering activities associated with project components (e.g., treatment plant improvements, existing utility upgrades, potable water transmission pipelines) lead to the instability of the ground and soil, creating risks of sinkholes and other geologic hazards.

Liquefaction hazards can be mitigated to protect City residents and structures through the adherence to soil and foundation support parameters in CBC Chapters 16 and 18; the grading requirements in CBC, Chapters 18 and 33; and the CBC Chapter 33 Appendix CBC to reduce the primary and secondary risks associated with seismically induced ground shaking. In addition, the City's 2040 General Plan policies related to hazards risk reductions (i.e., Policy ERC-7.1: Expansive Soils and Liquefaction and Policy ERC-7.2: Seismic Stability), requires that the City regulates structures to ensure structural stability from seismic-related events. As discussed in Impact 3.9-1, preparation of site-specific geotechnical analyses would be required for projects within the City and would include recommendations to address geotechnical hazards that are present.

Operation and Maintenance

Once construction is completed, O&M activities associated with the proposed project would generally remain similar to existing activities. Long-term O&M activities for several project components (e.g., existing utility upgrades, Sacramento River water intakes, potable water transmission pipelines) would be completed under existing maintenance programs. Therefore, O&M activities would not result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse as compared to existing conditions.

Impact Conclusion

Given compliance with existing regulations and policies that address seismic-related safety issues (i.e., 2040 General Plan Policy ERC-7.1: Expansive Soils and Liquefaction, and Policy ERC-7.2: Seismic Stability), and required adherence to requirements of the CBC and City design standards, implementation of the proposed project would not result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. Therefore, the impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.9-4: Implementation of the proposed project could be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.

All Project Components

Construction

As described in subsection 3.9.2, *Environmental Setting,* Table 18-1-B of the Uniform Building Code (1994) defines expansive soil as soil having an expansive index greater than 20. Expansive soils generally have high levels of clay. While all soils present at the proposed project areas have some clay components, only soils present in the SRWTP project area have been identified as expansive; there are no expansive soils present in the FWTP project area.

Portions of the SRWTP project area, including the location of the Sacramento River water intakes and the proposed potable water transmission pipelines in the vicinity of the SRWTP, are composed of Columbia-Urban Land complex and similar soils. The second horizon is composed of soils that have a high shrink-swell potential, characteristic of expansive soil. Earth-disturbing construction activities associated with the proposed project (e.g., excavation, trenching) that reach soils below 11 inches would encounter expansive soils that could create substantial direct or indirect risks to people (i.e., employees) and/or property.

In areas of expansive soil (i.e., the SRWTP project area), the CBC and City require that project proponents submit a geotechnical investigation report prior to the commencement of any earth-disturbing construction activities. The geotechnical investigation must include soil borings to collect samples and laboratory testing to determine the appropriate design parameters for use for structural fill, roadbed fill, and landscaping fill, along with the fill placement requirements. The various soils may be tested for corrosivity to allow for proper infrastructure and foundation design to ensure protection of life and property.

Operation and Maintenance

Once construction is completed, O&M activities associated with the proposed project would generally remain similar to existing activities. Long-term O&M activities for several project components (e.g., existing utility upgrades, Sacramento River water intakes, potable water transmission pipelines) would be completed under existing maintenance programs. Therefore, in areas of expansive soil, O&M activities associated with the proposed project would not create substantial direct or indirect risks to life or property as compared to the existing conditions.

Impact Conclusion

Given compliance with existing regulations (e.g., the CBC and the City's requirement for geotechnical investigation), implementation of the proposed project would not result in substantial direct or indirect risk to life or property due to potential effects of expansive soils on such occupancies. Therefore, the impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.9-5: Implementation of the proposed project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

All Project Components

Construction

Construction activities associated with the proposed project components would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs. Construction at both the FWTP and SRWTP would include excavation that could reach a maximum depth of 25 feet bgs at the FWTP (related to installation of the Intermediate Pump Station), and a maximum depth of 60 feet bgs at the SRWTP (related to installation of the High Service Pump Station). In addition, construction would also require in-water work in the Sacramento River to construct the tee screen intake and pump station. Construction would require installation of a sheet piling cofferdam in the riverbed and on the riverside of the levee to create a dewatered area for construction to occur. Earth-disturbing construction activities (e.g., excavation, trenching) and dewatering could expose a unique paleontological resource.

As described in subsection 3.9.2, *Environmental Setting,* the proposed project area is characterized by a largely developed urban area that is located on the alluvial plain of the Sacramento Valley. The City is not highly sensitive for paleontological resources that would be present in fossil-bearing soils and rock formations. There are no unique or unusual landforms that would be considered a unique geologic feature nor are there any known unique paleontological resources. Furthermore, most of the proposed project areas have been previously excavated and filled. Although not discussed in the SVP standards, artificial fills, surface soils, and high-grade metamorphic rocks do not contain paleontological resources. While such materials were originally derived from rocks, they have been altered, weathered, or reworked such that the discovery of intact fossils would be rare. Therefore, there is little potential for the project area to contain paleontological resources.

Section 5097.5 of the California Public Resources Code protects vertebrate paleontological sites and other paleontological resources that are situated on land owned by, or in the jurisdiction of any city. In addition, General Plan policy HCR-1.1 (Preservation of Historic and Cultural Resources Site Features and Landscaping) requires the City to preserve cultural resources which also includes paleontological resources and requires that proper protocols are adhered to if paleontological resources are discovered during excavation or construction. Specifically, these procedures include protocols and criteria for qualifications of personnel, and for survey, research, testing, training, monitoring, cessation and resumption of construction, identification, evaluation, and reporting, as well as compliance with recommendations to address any significant adverse effects that were determined by the City to be feasible.

Operation and Maintenance

O&M activities associated with the proposed project would generally remain similar to existing activities. Long-term O&M activities for several project components (e.g., existing utility upgrades, Sacramento River water intakes, potable water transmission pipelines) would be completed under existing maintenance programs. Therefore, O&M activities are not anticipated to result in additional alterations of the facility structures, or potential ground disturbing activities (e.g., excavation and trenching) that would impact a unique paleontological resource site or unique geologic feature. As described above, compliance with General Plan Policy HCR-1.1, Preservation of Historic and Cultural Resources, Landscapes, and Site Features, requires the City to preserve cultural resources, including paleontological resources and requires that proper protocols are adhered to if paleontological resources are discovered during excavation or construction (i.e., that may be required for maintenance).

Impact Conclusion

Given compliance with existing regulations and City policies (e.g., Section 5097.2, 2040 General Plan Policy HCR-1.1, Preservation of Historic and Cultural Resources Site Features and Landscaping), implementation of the proposed project would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

3.10 Greenhouse Gas Emissions

3.10.1 Introduction

This section of the Draft EIR addresses the federal, State, and local regulations and policies pertaining to climate goals and GHG emissions and includes an analysis of the potential impacts related to the construction and operation of the proposed project.

Air emissions are addressed in Section 3.4, *Air Quality*, and energy use is addressed in Section 3.8, *Energy*. No comments specifically addressing GHG emissions were received in response to the NOP. See Appendix A for NOP comment letters.

3.10.2 Environmental Setting

Climate Science

"Global warming" and "climate change" are common terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century. Natural processes and human actions have been identified as affecting the climate. The Intergovernmental Panel on Climate Change (IPCC) has concluded that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward.

However, increasing GHG concentrations in the atmosphere resulting from human activity since the 19th century, such as fossil fuel combustion, deforestation, and other activities, have unequivocally caused anthropogenic climate change (IPCC, 2021). GHGs in the atmosphere naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space—a phenomenon referred to as the "greenhouse effect." Some GHGs occur naturally and are necessary for keeping the Earth's surface habitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have trapped solar radiation and decreased the amount that is reflected into space, intensifying the natural greenhouse effect, and resulting in the increase of global average temperature.

Carbon dioxide (CO_2), methane (CH_4), N_2O, sulfur hexafluoride (SF_6), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs) are the principal GHGs. When concentrations of these gases exceed historical concentrations in the atmosphere, the greenhouse effect is intensified. CO_2, methane, and nitrous oxide occur naturally and are also generated through human activity. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas methane results from off-gassing, natural gas leaks from pipelines and industrial processes, and incomplete combustion associated with agricultural practices, landfills, energy providers, and other industrial facilities. Nitrous oxide emissions are also largely attributable to agricultural practices and soil management. CO_2 sinks include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution, and are two of the largest reservoirs of CO_2 sequestration. Other human-generated GHGs include fluorinated gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, which have much higher heat-absorption potential than CO_2 and are byproducts of certain industrial processes.

CO_2 is the reference gas for climate change, as it is the GHG emitted in the highest volume. The effect that each of the GHGs have on global warming is the product of the mass of their emissions and their global warming potential (GWP). GWP indicates how much a gas is predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO_2. For example, methane and nitrous oxide are substantially more potent GHGs than CO_2, with GWPs of 25 and 298 times that of CO_2 respectively, which has a GWP of 1 (CARB, 2022a).

In emissions inventories, GHG emissions are typically reported as metric tons of CO_2 equivalent ($MTCO_2e$). CO_2e is calculated as the product of the mass emitted of a given GHG and its specific GWP. While methane and nitrous oxide have much higher GWPs than CO_2, CO_2 is emitted in higher quantities and it accounts for the majority of GHG emissions in CO_2e, both from commercial developments and human activity in general.

Carbon Dioxide

Carbon dioxide is a naturally occurring gas that enters the atmosphere through natural as well as anthropogenic (human) sources. Key anthropogenic sources include the burning of fossil fuels (e.g., oil, natural gas, and coal), solid waste, trees, wood products, and other biomass, as well as industrially relevant chemical reactions such as those associated with manufacturing cement. CO_2 is removed from the atmosphere when it is absorbed by plants as part of the biological carbon cycle.

Methane

Methane is the main component of natural gas used in home and from naturally from decay of organic matter. Natural sources of CH_4 include wetlands, permafrost, oceans, and wildfires. Anthropogenic sources include fossil fuel production, biomass burning, animal husbandry (fermentation during manure management), and landfills.

Nitrous Oxide

Nitrous oxide is a colorless gas produced by microbial processes in soil and water, including those reactions that occur in nitrogen-rich fertilizers. In addition to agricultural sources, some industrial processes (i.e., nylon production, nitric acid production) also emit N_2O. During combustion, NO_X emissions composed of NO_2 and nitrogen oxide (NO) are produced, which are not the same as N_2O. Very small quantities of N_2O may be formed during fuel combustion by reaction of nitrogen and oxygen.

Effects of Global Climate Change

The scientific community's understanding of the fundamental processes responsible for global climate change has improved over the past decade, and its predictive capabilities are advancing. However, there remain scientific uncertainties in, for example, predictions of local effects of climate change, occurrence, frequency, and magnitude of extreme weather events, effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. Due to the complexity of and inability to adequately model the Earth's climate system in a resolution required for such information, the uncertainty surrounding climate change is dynamic and ever-changing with research. Nonetheless, the Intergovernmental Panel on

Climate Change's AR6 states that is extremely likely that the dominant cause of the observed warming since the mid-20th century is the anthropogenic increase in GHG concentrations mainly from the transportation and industrial sectors (IPCC, 2022). The National Academies of Science from 80 countries have issued statements endorsing the consensus position that humans are the dominant cause for global warming since the mid-20th century (Cook et al., 2016).

The Fourth California Climate Change Assessment (Fourth Assessment), published in 2018, found that the potential impacts in California due to global climate change include: loss in snow pack; sea-level rise; more extreme heat days per year; more high ozone days; more extreme forest fires; more severe droughts punctuated by extreme precipitation events; increased erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Deltas and associated levee systems; and increased pest infestation (California Office of Planning and Research [OPR], 2018; and California Energy Commission and California Natural Resources Agency [CNRA], 2018). The Fourth Assessment's findings are consistent with climate change studies published by the CNRA since 2009, starting with the *California Climate Adaptation Strategy* (CNRA, 2009) as a response to the Governor's Executive Order S-13-2008. In 2014, the CNRA rebranded the first update of the 2009 adaptation strategy as the *Safeguarding California Plan* (CNRA, 2014). The 2018 update to *Safeguarding California Plan* identifies hundreds of ongoing actions and next steps state agencies are taking to safeguard Californians from climate impacts within a framework of 81 policy principles and recommendations (CNRA, 2018).

In 2016, the CNRA released *Safeguarding California: Implementation Action Plans* in accordance with Executive Order B-30-15, identifying a lead agency to lead adaptation efforts in each sector (CNRA, 2016). In accordance with the 2009 *California Climate Adaptation Strategy*, the California Energy Commission was directed to develop a website on climate change scenarios and impacts that would be beneficial for local decision makers. The website, known as Cal-Adapt, became operational in 2011. The information provided on the Cal-Adapt website represents a projection of potential future climate scenarios comprised of local average values for temperature, sea-level rise, snowpack and other data representative of a variety of models and scenarios, including potential social and economic factors. Below is a summary of some of the potential effects that could be experienced in California as a result of global warming and climate change.

Temperature Increase

The primary effect of adding GHGs to the atmosphere has been a rise in the average global temperature. The impact of human activities on global temperature is readily apparent in the observational record. Since 1895, the contiguous United States has observed an average temperature increase of 1.5 degrees Fahrenheit (°F) per century (National Oceanic and Atmospheric Association [NOAA], 2019). The 5-year period from 2014–2018 was the warmest on record for the contiguous United States (NOAA, 2019); of the top 10 hottest years on record in the United States, seven have occurred since the year 2000, with the top six years all occurring since 2012 (Climate Central, 2022). According to the Cal-Adapt website, Sacramento County could experience an increase in annual average maximum temperature of approximately 5.0° to 8.2°F by 2070–2099, compared to the baseline period of 1961–1990 (Cal Adapt, 2022). The American River Basin Study, which the proposed project site is located within, evaluated future climate conditions and projects that maximum temperatures will increase by an average of 7.3°F by the end of the 21st century, with the most significant increase occurring during the summer months (Reclamation, 2022).

With climate change, extreme heat conditions and heat waves are predicted to impact larger areas, last longer, and have higher temperatures. Heat waves, defined as three or more days with temperatures above 90°F, are projected to occur more frequently by the end of the century. Extreme heat days and heat waves can negatively impact human health. Heat-related illnesses include a spectrum of illnesses ranging from heat cramps to severe heat exhaustion and life-threatening heat stroke (Singh et al., 2019).

Wildfires

The hotter and dryer conditions expected with climate change will make forests more susceptible to extreme wildfires. The Fourth Assessment found that if GHG emissions continue to rise, the frequency of extreme wildfires burning over approximately 25,000 acres would increase by nearly 50 percent, and the average area burned statewide each year would increase by 77 percent, by the year 2100. In the areas that have the highest fire risk, wildfire insurance is estimated to see costs rise by 18 percent by 2055 and the fraction of property insured would decrease (Westerling, 2018).

Air Quality

Higher temperatures, conducive to air pollution formation, could worsen air quality in California and make it more difficult to achieve air quality standards. Climate change may increase the concentration of ground-level ozone, which can cause breathing problems, aggravate lung diseases such as asthma, emphysema, chronic bronchitis, and cause chronic obstructive pulmonary disease, but the magnitude of the effect, and therefore, its indirect effects, are uncertain. Emissions from wildfires can lead to excessive levels of particulate matter, ozone, and volatile organic compounds (NOAA, 2022). Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state (Red Cross Red Crescent Climate Center, 2019).

Precipitation and Water Supply

There is a high degree of uncertainty with respect to the overall impact of global climate change on future water supplies in California. Studies indicate considerable variability in predicting precise impacts of climate change on California's hydrology and water resources. Increasing uncertainty in the timing and intensity of precipitation will challenge the operational flexibility of California's water management systems. The American River Basin Study determined that increasing temperatures would interact with other climate change impacts, such as changes in precipitation patterns and increased variability in water supplies (USBR, 2022). Leading to difficulty in managing water resources in the basin and more frequent and severe droughts or floods. Warmer and wetter winters would increase the amount of runoff available for groundwater recharge; however, this additional runoff would occur at a time when some basins are either being recharged at their maximum capacity or are already full. Conversely, reductions in spring runoff and higher evapotranspiration because of higher temperatures could reduce the amount of water available for recharge (CNRA, 2018).

Hydrology and Sea-Level Rise

As discussed above, climate changes could potentially affect: the amount of snowfall, rainfall and snowpack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea-level rise and coastal flooding; coastal erosion; and the potential for saltwater intrusion. Sea-level rise can be a product of global warming through two main processes: expansion of seawater as the oceans warm and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply. Sea level has risen 8 to 9 inches (21 to 24 centimeters) since 1880. In 2020, global sea level set a new record high of 3.6 inches (91.3 millimeters) above 1993 levels. The rate of sea level rise is accelerating; it has more than doubled from 0.06 inches (1.4 millimeters) per year throughout most of the twentieth century to 0.14 inches (3.6 millimeters) per year from 2006 to 2015. In many locations along the United States coastline, high-tide flooding is now 300 percent to more than 900 percent more frequent than it was 50 years ago. Sea level could rise as much as 8.2 feet (2.5 meters) above 2000 levels by 2100 (NOAA, 2021). Rising seas could impact transportation infrastructure, utilities, and regional industries.

Agriculture

California has a massive agricultural industry that represents over 13 percent of total United States agricultural revenue (California Department of Food and Agriculture [CDFA], 2020). Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, a changing climate presents significant risks to agriculture due to changes in maximum and minimum temperatures, reduction of winter chill hours, extreme heat leading to additional costs for livestock cooling and losses in production, and declines in water quality, groundwater security, soil health, and pollinator species, and increased pest pressures (CNRA, 2018).

Ecosystems and Wildlife

Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increased concentrations of GHGs are likely to accelerate the rate of climate change. As stated in the *Safeguarding California Plan*, "species and ecosystems in California are valued both for their intrinsic worth and for the services they provide to society. Air purification, water filtration, flood attenuation, food provision, recreational opportunities such as fishing, hunting, wildlife viewing, and more are all services provided by ecosystems. These services can only be maintained if ecosystems are healthy and robust and continue to function properly under the impacts of climate change. A recent study examined the vulnerability of all vegetation communities statewide in California and found that 16 of 29 were highly or nearly highly vulnerable to climate change, including Western North American freshwater marsh, Rocky Mountain subalpine and high montane conifer forest, North American Pacific coastal salt marsh, and more." Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. With climate change, ecosystems and wildlife will be challenged by the spread of invasive species, barriers to species migration or movement in response to changing climatic conditions, direct impacts to species health, and mismatches in timing between seasonal life-cycle events such as species migration and food availability (CNRA, 2018).

GHG Emissions Inventories

United States GHG Emissions

In 2020 the United States emitted about 5,981 million metric tons of carbon dioxide equivalents ($MMTCO_2e$), with 76 percent of those emissions coming from fossil fuel combustion for electricity, heat, and transportation. Of the major sectors nationwide, transportation accounts for the highest volume of GHG emissions (approximately 27 percent), followed by electricity (25 percent), industry (24 percent), commercial and residential (13 percent), and agriculture (11 percent). Between 1990 and 2020, total United States GHG emissions have decreased by 7.3 percent, with emissions generally decreasing since peaking in 2007 (USEPA, 2022).

State of California GHG Emissions

The California Air Resources Board (CARB) compiles GHG inventories for the State. Based on the 2020 GHG inventory data (i.e., the latest year for which data are available from CARB), emissions from GHG emitting activities statewide were 369.2 $MMTCO_2e$. From 2000 to 2020, the carbon intensity of California's economy decreased by 49 percent while the gross domestic product increased by 56 percent, and population grew by approximately 16 percent from 2000 levels (CARB, 2021). The decline in total emissions in 2020 is likely due in part to the COVID-19 pandemic, most notably from reduced vehicle activity (reductions in heavy- and light-duty travel).

Of the major sectors statewide, transportation accounts for the highest volume of GHG emissions (approximately 38 percent), followed by the industrial sector (approximately 23 percent), the electricity sector (approximately 16 percent), residential and commercial (approximately 14 percent), and agriculture (approximately 9 percent) (CARB, 2022a).

Sacramento County GHG Emissions

In June 2023, Sacramento County (County) released the public review draft of its 2021 GHG Inventory, which presents both a county operations inventory and an unincorporated community-wide inventory. Emission totals for Sacramento County Government Operations were 82,853 $MTCO_2e$, where sectors are as follows: County buildings & facilities (37 percent); employee commute (36.5 percent); County vehicle fleet (19 percent); water (6 percent); and streetlights & traffic signals (1.5 percent). In 2021, unincorporated Sacramento County Community GHG emissions totaled 4,026,910 $MTCO_2e$, with sectors emitting various percentages of the total emissions: on-road vehicles (43 percent); building energy (36 percent); high-GWP gases (8 percent); agriculture (6 percent); solid waste (4 percent); off-road vehicles (2.5 percent); and wastewater (0.5 percent) (County of Sacramento, 2023).

City of Sacramento GHG Emissions

In February 2024, the City adopted the Climate Action and Adaptation Plan (CAAP), discussed further in subsection 3.10.3. The CAAP includes a complete GHG inventory of community-wide emissions for the year 2016. In 2016, emission totals for the City were 3,424,729 $MTCO_2e$, with sectors emitting varying percentages of the total emissions: transportation (57 percent); industrial and commercial electricity (14 percent); residential natural gas (9 percent); residential electricity (9 percent); commercial natural gas (4 percent); generated waste (4 percent); waste-in-place

(1 percent); wastewater (1 percent); t natural gas (1 percent); and water (less than 1 percent) (City of Sacramento, 2024a).

3.10.3 Regulatory Setting

Federal

The United States Supreme Court held that the United States EPA must consider regulation of motor vehicle GHG emissions. In *Massachusetts v. Environmental Protection Agency* et al., twelve states and cities, including California, together with several environmental organizations sued the United States EPA to require the regulation of GHGs as pollutants under the Clean Air Act (127 S. Ct. 1438 [2007]). The Supreme Court ruled that GHGs fit within the Clean Air Act's definition of a pollutant and the United States EPA had the authority to regulate GHGs.

On December 7, 2009, the United States EPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The current and projected concentrations of the six key GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

These findings did not, by themselves, impose any requirements on industry or other entities. However, these actions were a prerequisite for implementing GHG emissions standards for vehicles.

State

A variety of statewide rules and regulations mandate the quantification and, if emissions exceed established thresholds, the reduction of GHGs. The CEQA requires lead agencies to evaluate project related GHG emissions and the potential for projects to contribute to climate change and to provide appropriate mitigation in cases where the lead agency determines that a project would result in a significant addition of GHGs to the atmosphere.

California Renewable Energy Programs

In 2002, California initially established its Renewable Portfolio Standard, with the goal of increasing the percentage of renewable energy in the state's electricity mix to 20 percent by 2017. State energy agencies recommended accelerating that goal, and California Executive Order S-14-08 (November 2008) required California utilities to reach the 33 percent renewable electricity goal by 2020, consistent with the AB 32 Scoping Plan. In April 2011, SB 2 of the First Extraordinary Session (SB X1-2) was signed into law. SB X1-2 expressly applied the new 33 percent Renewable Portfolio Standard by December 31, 2020, to all retail sellers of electricity and established renewable energy standards for interim years prior to 2020. In 2018, SB 100, the California Clean Energy Act of 2017, was signed into law. This bill established a target to supply the state with 100 percent renewable and zero-carbon energy resources by 2045.

SB 1020, signed on September 16, 2022, revises SB 100 to require that renewable energy resources and zero-carbon resources supply 90 percent of all retail sales of electricity to end-use customers by December 31, 2035; 95 percent of all retail sales to end users by December 31, 2040; 100 percent of all retail sales to end users by December 31, 2045; and 100 percent of electricity procured to serve all state agencies by December 31, 2035.

Assembly Bill 32

California AB 32, the Global Warming Solutions Act of 2006, required CARB to establish a statewide GHG emissions cap for 2020 based on 1990 emissions levels. AB 32 required CARB to adopt regulations that identify and require selected sectors or categories of emitters of GHGs to report and verify their statewide GHG emissions, and CARB is authorized to enforce compliance with the program. Under AB 32, CARB also was required to adopt a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990, which had to be achieved by 2020. CARB established this limit in December 2007 at 427 $MMTCO_2e$. This is approximately 30 percent below forecasted "business-as-usual" emissions of 596 $MMTCO_2e$ in 2020, and about 10 percent below average annual GHG emissions during the period 2002 through 2004 (CARB, 2008). In the interest of achieving the maximum technologically feasible and cost-effective GHG emission reductions, AB 32 permits the use of market-based compliance mechanisms and requires CARB to monitor compliance with and enforce any rule, regulation, order, emissions limitation, emissions reduction measure, or market-based compliance mechanism that it adopts.

Senate Bill 97

In 2007, the California Legislature passed SB 97, which required an amendment of the CEQA Guidelines to incorporate analysis and mitigation of GHG emissions from projects subject to CEQA. The amendments took effect March 18, 2010. The amendments added Section 15064.4 to the CEQA Guidelines, specifically addressing the potential significance of GHG emissions. Section 15064.4 calls for a "good faith effort" to "describe, calculate, or estimate" GHG emissions and indicates that the analysis of the significance of any GHG impacts should include consideration of the extent to which projects would:

- Increase or reduce GHG emissions;
- Exceed a locally applicable threshold of significance; or
- Comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions."

The CEQA Guidelines also state that a project may be found to have a less-than-significant impact related to GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (14 California Code of Regulations Section 15064(h)(3)). Importantly, however, the CEQA Guidelines do not require or recommend a specific analytical methodology or provide quantitative criteria for determining the significance of GHG emissions.

Climate Change Scoping Plan (AB 32 Scoping Plan)

In December 2008, CARB approved the AB 32 Scoping Plan, outlining the State of California's strategy to achieve the 2020 GHG emissions limit. The Scoping Plan estimates a reduction of 174 $MMTCO_2e$ (about 191 million tons) from the transportation, energy, agriculture, forestry, and high-climate-change-potential sectors, and proposes a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify California's energy sources, save energy, create new jobs, and enhance public health. The Scoping Plan must be updated every five years to evaluate the mix of AB 32 policies to ensure that California is on track to achieve the 2020 GHG reduction goal. Appendices C and E of the adopted 2008 AB 32 Scoping Plan include a list of 39 recommended action measures to reduce GHG emissions (CARB, 2008).

CARB released its first Scoping Plan Update in May 2014 (CARB, 2014) and subsequent updates in 2017 and 2022, as described below.

Executive Order B-30-15

In April 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Reaching this emission reduction target will make it possible for California to reach its ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, as identified in Executive Order S-3-05. Executive Order B-30-15 also specifically addresses the need for climate adaptation and directs State government to:

- Incorporate climate change impacts into the State's 5-Year Infrastructure Plan.
- Update the *Safeguarding California Plan*, the state climate adaption strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change.
- Factor climate change into State agencies' planning and investment decisions.
- Implement measures under existing agency and departmental authority to reduce GHG emissions (Office of the Governor, 2015).

Executive Order B-30-15 required CARB to update the AB 32 Climate Change Scoping Plan to incorporate the 2030 target. On September 8, 2016, Governor Brown signed Senate Bill 32 (SB 32), which codified the 2030 reduction target (i.e., 40% below 1990 levels) called for in Executive Order B-30-15. CARB's 2017 Scoping Plan update (discussed below) addresses the 2030 target.

2017 Scoping Plan Update

CARB approved the 2017 Climate Change Scoping Plan Update (2017 Scoping Plan Update) in December 2017. The 2017 Scoping Plan Update outlines the proposed framework of action for achieving the 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990 levels (CARB, 2017). Through a combination of data synthesis and modeling, CARB determined that the target statewide 2030 emissions limit is 260 $MMTCO_2e$, and that further commitments will need to be made to achieve an additional reduction of 50 $MMTCO_2e$ beyond current policies and programs. The cornerstone of the 2017 Scoping Plan Update is an expansion of the cap-and-trade program to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2030 limit and 2050 goal set forth by Executive Order B-30-15.

In the 2017 Scoping Plan Update, CARB recommends statewide targets of no more than 6 $MTCO_2e$ per capita by 2030 and no more than 2 $MTCO_2e$ per capita by 2050. CARB acknowledges that because the statewide per-capita targets are based on the statewide GHG emissions inventory that includes all emissions sectors in the state, it is appropriate for local jurisdictions to derive evidence-based local per-capita goals based on local emissions sectors and growth projections.

Assembly Bill 1279 (California Climate Crisis Act)

Signed into law in September of 2022, AB 1279 requires the State to achieve two things by 2045 or sooner: 1) net zero GHG emissions; and 2) a reduction in statewide anthropogenic GHG emissions of 85 percent below 1990 levels. AB 1279 requires CARB to ensure that the 2022 Scoping Plan, described further below, identifies and recommends measures to achieve carbon neutrality, and to identify and implement policies and strategies for CO_2 removal and carbon capture, utilization, and storage technologies.

2022 Scoping Plan for Achieving Carbon Neutrality

The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan), adopted by CARB in December 2022, expands on prior Scoping Plans and responds to AB 1279 by outlining a technologically feasible, cost-effective, and equity-focused path to achieve the State's climate target of reducing anthropogenic emissions to 85 percent below 1990 levels and achieving carbon neutrality by 2045 or earlier (CARB, 2022b). The actions and outcomes in the plan will achieve significant reductions in fossil fuel combustion by deploying clean technologies and fuels, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands to reduce emissions and sequester carbon, and the capture and storage of carbon.

The 2022 Scoping Plan also discusses the role of local governments in meeting the State's GHG emissions reduction goals because local governments have jurisdiction and land use authority related to community-scale planning and permitting processes, local codes and actions, outreach and education programs, and municipal operations. The efforts of local governments to reduce GHG emissions within their jurisdictions are critical to achieving the State's long-term climate goals. Furthermore, local governments make critical decisions on how and when to deploy transportation infrastructure and can choose to support transit, walking, bicycling, and neighborhoods that allow people to transition away from cars; they can adopt building ordinances that exceed statewide building code requirements; and they play a critical role in facilitating the rollout of Zero-Emission Vehicle infrastructure (CARB, 2022b). The 2022 Scoping Plan encourages local governments to take ambitious, coordinated climate actions at the community scale—actions that are consistent with and supportive of the State's climate goals (CARB, 2022b). These actions could include:

- Develop local Climate Action Plans and strategies consistent with the State's GHG emissions reduction goals.

- Incorporate state-level GHG emissions priorities into local governments' processes for approving land use and individual plans and individual projects.
- Implement CEQA mitigation, as needed, to reduce GHG emissions associated with new land use development projects.
- Leverage opportunities for regional collaboration.

Local

City of Sacramento Climate Action and Adaptation Plan

In February 2024, the City of Sacramento adopted the Climate Action and Adaptation Plan (CAAP). This plan is created as a comprehensive strategy to reduce community and municipal GHG emissions consistent with the State's greenhouse gas reduction goals in order to minimize global climate change and to mitigate the impacts of climate change in Sacramento. The CAAP establishes Sacramento's greenhouse gas reduction target for 2030, surpassing the statewide 2030 greenhouse gas reduction goals established by SB 32, and establishes a climate action goal of carbon neutrality by 2045. The CAAP also demonstrates the City's plan for substantial progress towards consistency with the State of California's statewide policy goals for GHG emission reductions, as enacted by AB1279 and CARB's 2022 Scoping Plan (CARB, 2022b) for Achieving Carbon Neutrality which sets a path to achieve carbon neutrality by 2045 with at least 85 percent reduction in GHG emissions from 1990 levels. The CAAP meets the requirements for a qualified GHG reduction plan as defined in Section 15183.5 of the CEQA Guidelines (City of Sacramento, 2024a). The City of Sacramento's 2030 climate action target is to reduce per capita GHG emissions to 3.63 MT CO2e per person by 2030, equal to 63 percent below 1990 levels.

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies application to the evaluation of greenhouse gas emission effects of the proposed project are provided in see **Table 3.10-1**.

TABLE 3.10-1
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – GREENHOUSE GAS EMISSIONS

Element	Goals and Policies
Environmental Resources and Constraints	Goal ERC-9: Policies ERC-9.1, 9.2, 9.4
SOURCE: City of Sacramento, 2024b	

3.10.4 Impacts and Mitigation Measures

Method of the Analysis

CEQA Guidelines Section 152064.4 gives lead agencies the discretion to determine whether to assess GHG emissions quantitatively or qualitatively. The *CEQA Guidelines* do not establish a bright-line quantitative threshold of significance; rather, lead agencies are granted discretion to establish significance thresholds for their respective jurisdictions, including looking to thresholds developed by other public agencies, or suggested by other experts, such as the California Air Pollution Control Officers Association, so long as any threshold chosen is supported by substantial evidence (refer to *CEQA Guidelines* Section 15064.7(c)).

Described above in the local regulatory setting discussion, the City's recently adopted CAAP fulfills the requirement under CEQA to be considered a "qualified" GHG reduction plan. The CAAP established a 2030 reduction target which exceeds SB 32 and is consistent with progress towards the statewide goals of the 2022 Scoping Plan (CARB, 2022b). Where applicable, the analysis of the proposed project will demonstrate consistency with the City's CAAP.

For the purposes of quantifying project-level construction impacts, this portion of the analysis draws from the 2020 adopted thresholds of the Sacramento Metropolitan Air Quality Management District (SMAQMD). The SMAQMD has developed and adopted thresholds of significance for GHG emissions during construction and operation of projects. The recommended SMAQMD significance threshold for the construction phase is 1,100 metric tons CO_2e per year. Should the project's construction emissions exceed 1,100 metric tons CO_2e in any year, there would be a significant impact and mitigation measures would be required. Construction emissions are generally short-lived in duration when compared to a project's overall operational lifetime (OPR, 2018). Various agencies, including the SMAQMD and the South Coast Air Quality Management District, have suggested amortizing short-term construction emissions over the expected life of a project (e.g., 30 years), to evaluate project-level impacts. Amortizing construction emissions over 30 years represents the estimated useful life of the proposed project, a methodology consistent with preliminary guidance developed by the South Coast Air Quality Management District and widely used as an industry standard. This approach is consistent with the California Office of Planning and Research's *CEQA and Climate Change Advisory Discussion Draft*. As stated therein, "when possible, lead agencies should quantify the project's construction and operational greenhouse gas emissions, using available data and tools, to determine the amount, types, and sources of greenhouse gas emissions resulting from the project" (OPR, 2018). Therefore, the total project construction emissions were amortized over 30 years before being compared to the construction significance threshold.

As presented in Table 2-7 in Chapter 2, *Project Description*, construction activities in the FWTP project area (improvements at the FWTP and existing utility upgrades) would occur over a total period of approximately 5 years (July 2026 through July 2031). Construction activities in the SRWTP project area (improvements at the SRWTP, existing utility upgrades, Sacramento River water intakes, and potable water transmission pipelines) would occur in two phases. The initial phase would occur over a total period of approximately 10 years (January 2027 through July 2037), and the buildout phase would occur over approximately 10 years (2040 through 2050).

For each project component, there would be a period of intensive construction, using heavy equipment, followed by several years of minimal activity to reach anticipated completion. For a conservative estimate of GHG, the most intensive construction years were modeled, and these periods are also presented in Table 2-7. Construction of FWTP improvements and existing utility upgrades would occur over an approximately 2-year period between July 2026 through July 2028. Initial phase construction of SRWTP improvements and existing utility upgrades would occur over an approximately 4-year period (January 2027 through January 2031). Initial phase construction at the Sacramento River intakes would occur over an approximately 4.5-year period (January 2031 through July 2035). Initial phase construction activities associated with the installation of the potable water transmission mains would occur over an approximately 3-year period (July 2032 through July 2035). The buildout phase of additional improvements to the SRWTP and new water intake pump station would occur intermittently over an approximately 10-year period (2040 through 2050), with intensive construction anticipated to occur over the first 2.5 years.

Construction at the FWTP and the SRWTP would be sequenced in a manner that would minimize facility shutdowns, maintain the integrity of the treatment process, and ensure water demands in the system would continue to be met. Therefore, the level of activity and equipment use would not be continuous for the duration of construction activities. Construction activities would generate criteria air pollutants primarily from the combustion of fuel in construction equipment and vehicle trips associated with worker commute, material delivery and hauling. Once each component is operational, emissions would result primarily from motor vehicle trips generated by worker trips to and from the various component sites. Construction GHG emissions were estimated using methodology consistent with the California Emissions Estimator Model (CalEEMod) version 2022.1.1 and Emission Factor model (EMFAC) 2021.

Operational activities would include routine maintenance that would generate light duty automobile vehicle trips for workers, but these would not occur daily. As there would be minimal activity in the operational lifetime of each project component, GHG emissions resulting from operations of the competed project components have not been quantified, except for the usage of back-up diesel emergency generators, which have a SMAQMD stationary source threshold of 10,000 $MTCO_2e$ per year.

See also Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.

Impacts and Mitigation Measures

Table 3.10-2 summarizes the impact conclusions presented in this section.

TABLE 3.10-2
SUMMARY OF IMPACT CONCLUSIONS – GREENHOUSE GAS EMISSIONS

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.10-1: Construction of the proposed project could generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.10-2: Operation and maintenance of the proposed project could generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.10-3: Construction of the proposed project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.10-4: Operation and maintenance of the proposed project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.10-1: Construction of the proposed project could generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

All Project Components

With respect to construction activities, projects are required to implement the SMAQMD's identified Basic Construction Emissions Control Practices (BCECPs), which are considered by the SMAQMD to be the applicable construction BMPs. The following BCECPs would be applicable to proposed project construction of the FWTP and SRWTP improvements, existing utility upgrades, Sacramento River water intakes, and potable water transmission pipelines for GHG emissions:

- Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes [California Code of Regulations, Title 13, Sections 2449(d)(3) and 2485]. Provide clear signage that posts this requirement for workers at the entrances to the site;[1]
- Provide current certificate(s) of compliance for CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation [California Code of Regulations, Title 13, sections 2449 and 2449.1];[2] and
- Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by a certified mechanic and determined to be running in proper condition before it is operated.

Based on the methods described above, the maximum annual construction GHG emissions were estimated for each year of heavy construction equipment use and include emission from any component constructed in that year, as shown in **Table 3.10-3**. The years without construction

[1] This BMP for dust control specifically applies to diesel-powered equipment. Non-diesel vehicles are not required to limit idling time.

[2] This BMP for dust control specifically applies to diesel-powered equipment.

GHG emissions are periods of light construction and do not involve any heavy construction equipment use.

TABLE 3.10-3
ANNUAL CONSTRUCTION GHG EMISSIONS ($MTCO_2E$ PER YEAR)

Construction Year	Project Construction GHG Emissions
2026	908
2027	6,008
2028	5,294
2029	4,625
2030	4,616
2031	1,216
2032	1,037
2033	1,167
2034	1,162
2035	550
2040	1,282
2041	1,280
2042	529
Total	29,675
Amortized (30 years)	989
SMAQMD Threshold	1,100
Exceeds Threshold?	No

SOURCE: ESA, 2024 (see Appendix B)

Based on the modeling of construction equipment and off-site vehicle activities, the estimated GHG emissions associated with construction would be approximately 29,675 $MTCO_2e$ for the entire 13-year heavy construction period. As shown in Table 3.10-3, estimated amortized construction emissions that would be associated with the project components are 989 $MTCO_2e$ per year, which would not exceed the construction significance threshold and impacts would be **less than significant**.

Impact Conclusion

As shown in Table 3.10-3, with implementation of the SMAQMD's identified BCECPs, which are considered by the SMAQMD to be the applicable construction BMPs, construction emissions associated with the water treatment plant improvements, existing utility upgrades, Sacramento River water intakes, and potable water transmission pipelines would not exceed the SMAQMD GHG significance threshold of 1,100 $MTCO_2e$. It is possible that the timeline of construction of the transmission pipelines would overlap with the construction of any other of the project components, but emissions would not exceed the SMAQMD GHG emissions threshold. In addition, project construction activities would be required to implement the SMAQMD's identified BCECPs, which are considered by the SMAQMD to be the applicable construction BMPs. Furthermore, although these emissions would not exceed the construction emissions significance threshold, City staff has determined that SMAQMD's *Guidance for Construction GHG Emission Reductions* measures, which are considered BMPs, should be implemented given that heavy construction would last approximately 13 years (SMAQMD, 2016). Therefore, construction of the proposed project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment and this impact is considered **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.10-2: Operation and maintenance of the proposed project could generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

Treatment Plant Improvements

Once improvements are completed at the FWTP and SRWTP, operation and maintenance (O&M) activities would generally be similar to existing O&M activities. However, the ozone generation and treatment system improvements at both water treatment plants would require some additional maintenance including use of portable generators (up to 2 generators at the FWTP and up to 4 generators at the SRWTP) to support screen cleaning and inspection activities. The SRWTP would also have three back-up diesel emergency generators. In absence of SMAQMD guidance, Bay Area Air Quality Management District limits emergency generator operation to 100 hours per year (BAAQMD, 2019). Annual GHG emissions from the back-up diesel emergency generators would result in 9.63 $MTCO_2e$ per year. This falls below the 10,000 $MTCO_2e$ threshold and, therefore, would not generate significant GHG emissions during operations.

To conduct additional maintenance activities, additional full-time employees would be needed at both water treatment plants (2 at FWTP and 10 at SRWTP). In addition, there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions). GHG emissions would primarily be generated from vehicle trips to and from the treatment plants for intermittent O&M activities and delivery. These trips would occur infrequently and would have negligible GHG emissions and would not generate significant GHG emissions during operations.

Sacramento River Water Intakes

Existing SRWTP employees who perform daily inspections and maintenance at the existing water intake would also inspect and maintain the new water intake, pump stations and conveyance pipelines. Therefore, no additional full-time employees or truck trips would be required. No additional emergency generators are required for O&M activities at either the existing or proposed new intake. Vehicle trips for inspections would occur infrequently and would have negligible GHG emissions that would not generate significant GHG emissions during operations.

Existing Utility Upgrades and Potable Water Transmission Pipelines

Once constructed, O&M of the existing utility upgrades to serve both the FWTP and SRWTP would remain the same as existing conditions. The proposed new upgraded storm drain pipelines would be operated and maintained the same as the existing storm drain pipelines. Similarly, the replacement electrical service lines would also be operated and maintained as the existing service lines are under SMUD's maintenance program. O&M for the proposed potable water transmission pipelines would be performed as part of ongoing City programs and would remain the same as existing conditions.

Impact Conclusion

Because of the negligible increase in GHG emissions associated with O&M activities, the proposed project would not be anticipated to generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment and impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.10-3: Construction of the proposed project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.

All Project Components

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area.

The applicable plan adopted for the purpose of reducing GHG emissions is CARB's 2022 Scoping Plan (CARB, 2022b). The 2022 Scoping Plan does not contain any actions or measures that address GHG emissions from construction, as the majority of typical land use development project GHG emissions come from the operational phase and therefore most plans target reducing operational GHG emissions. The applicable plan adopted for the purpose of reducing GHG emissions is the City's CAAP. The policies within the CAAP include Measure E-2: Eliminate Natural Gas in New Construction. The design of the proposed project would not include natural gas hook-ups within newly constructed buildings. Any electrical power required during construction would be supplied by SMUD, which is required to comply with SB 100 and the Renewable Portfolio Standards. SB 100 requires that the proportion of electricity from renewable sources be 60 percent by 2030 and 100 percent renewable power by 2045. The goals in SMUD's Zero Carbon Plan align with SB 100 energy requirements.

Additionally, the proposed project would be required to implement the SMAQMD's identified Basic Construction Emissions Control Practices, which are considered by the SMAQMD to be the applicable construction BMPs.

The construction of the proposed project would be consistent with 2022 Scoping Plan (CARB, 2022b), SMAQMD BMPs, SMUD's 2030 Zero Carbon Plan (SMUD, 2021) and would not obstruct the goals in the City's CAAP. As a result, construction of the proposed project would not conflict with any applicable GHG reduction plans and impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.10-4: Operation and maintenance of the proposed project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs.

All Project Components

The 2022 Scoping Plan recommends strategies for implementation at the statewide level to meet the SB 32 goal for 2030 and the AB 1279 goals for 2045. Specifically, the 2022 Scoping Plan includes actions intended to help reduce GHG emissions that include improving water quantity and quality and support water infrastructure (CARB, 2022b). The improvements made at the FWTP and SRWTP would help to provide treatment resiliency to changing water quality from both the American River and the Sacramento River and increase reliable water supplies to meet projected future water demands with the Sacramento River water intakes, pump station, and potable water transmission pipelines. The proposed project would not decrease SMUD's ability to produce hydropower generation any of its Upper American River Project facilities along the American River, and these facilities would continue producing carbon free energy. The proposed project would increase water supply to meet projected water demands that is within the planned growth outlined in the adopted General Plan and would not affect the amount of clean energy produced within the Upper American River Project. While the proposed project would result in a marginal increase in electricity demand, that demand would be provided by SMUD which is tasked to reach its percentage of carbon free electricity and would not obstruct the goals in the SMUD 2030 Zero Carbon Plan. In addition, the proposed project's consistency with the SMUD 2030 Zero Carbon Plan aligns the following CAAP measure designate for water treatment and distribution facilities to procure 100 percent carbon free electricity by 2030:

- **Water and Wastewater (WW-1):** Reduce water utility emissions (in megatons of CO2e per million gallons) by 100 percent by 2030 and maintain that through 2045.

Once construction is completed, O&M activities would generally remain the same, with the exception of additional O&M needed for the new ozone treatment. Emissions would primarily come from employee vehicle trips to and from the treatment plants for intermittent O&M activities. These trips would occur very infrequently and would have negligible GHG emissions. Due to this, operations and maintenance of the FWTP and SRWTP improvements would not conflict with an applicable GHG reduction plan.

There would be an incremental amount of increased O&M to operate the Sacramento River water intakes and pump station. Periodic cleaning would be accomplished with airburst equipment located within the pump station and annual inspection from divers. Pump station operation would largely remain the same as current operations. There could also be additional truck trips or employees associated with the operation of the improved water system. No new O&M activities are anticipated for the new raw water pipeline. Additionally, no additional emergency generators are required for O&M activities. Vehicle trips would occur very infrequently and would have negligible GHG emissions and would not conflict with an applicable GHG reduction plan.

No new O&M is anticipated for the proposed potable water transmission pipelines because they would be maintained as part of the City's existing annual maintenance program. Given that no additional activities are anticipated, operations and maintenance would not result in negligible GHG emissions.

The operations of the proposed project would be consistent with the 2022 Scoping Plan, SMUD 2030 Zero Carbon Plan and would not obstruct the goals in the City's CAAP. As a result, O&M of the proposed project would not conflict with any applicable GHG reduction plans and impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

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3.11 Hazards and Hazardous Materials

3.11.1 Introduction

This section of the Draft EIR addresses hazards and hazardous materials impacts associated with implementation of the proposed project. Refer to Section 3.12, *Hydrology, Water Quality*, *and Water Supply,* for further discussion of potential water quality effects associated with the proposed project. Refer to Section 3.20, *Wildfire*, for further discussion of wildfire risks associated with proposed project implementation.

No comments specifically addressing hazards and hazardous materials were received in response to the NOP. See Appendix A for NOP comment letters.

3.11.2 Environmental Setting

Definition of Hazardous Materials and Hazardous Waste

A material may be considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency, or if it has characteristics defined as hazardous by such an agency. Factors that influence the health effects of exposure to hazardous materials include the dose to which the person is exposed, the frequency of exposure, the exposure pathway, and individual susceptibility.

The CCR defines a hazardous material as a substance that, because of physical or chemical properties, quantity, concentration, or other characteristics, may either: (1) cause an increase in mortality or an increase in serious, irreversible, or incapacitating, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of, or otherwise managed (CCR, Title 22, Division 4.5, Chapter 10, Article 2, Section 66260.10).

Hazardous waste is defined in a similar manner. Hazardous waste are hazardous materials that no longer have practical use, such as substances that have been discarded, discharged, spilled, contaminated, or are being stored prior to proper disposal. Hazardous materials and hazardous wastes are classified according to four properties: toxicity, ignitability, corrosivity, and reactivity (CCR, Title 22, Chapter 11, Article 3), which are defined in the CCR, Title 22, Sections 66261.20−66261.24.

Hazardous Materials Sites

In California, regulatory databases listing hazardous materials sites provided by numerous federal, state, and local agencies are consolidated in the “Cortese List” pursuant to Government Code Section 65962.5, effective in 1992. The provisions in Government Code Section 65962.5 require the Department of Toxic Substances Control (DTSC) to compile and maintain a list of hazardous waste and substances sites, including the State Water Resources Control Board (State Water Board) list of Leaking Underground Storage Tank (LUST) sites, active cease-and-desist orders and cleanup and abatement orders, and certain solid waste disposal sites and hazardous waste facilities (generally referred to in this section as “clean-up sites”). However, subsequent changes in web-based information availability since that time have made a consolidation of this list no longer necessary and the databases are maintained on an individual basis by the following responsible agencies:

- List of Hazardous Waste and Substances sites from the DTSC EnviroStor database.
- List of LUST sites by County and Fiscal Year from the State Water Board's GeoTracker database.
- List of solid waste disposal sites identified by the State Water Board with waste constituents above hazardous waste levels outside the waste management unit.
- List of "active" Cease and Desist Order and Cleanup and Abatement Order from the State Water Board.
- List of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by the DTSC and listed on their EnviroStor database.

The five databases cited above identify sites with suspected and confirmed releases of hazardous materials to the subsurface soil and/or groundwater. The DTSC EnviroStor database includes federal and state response sites; voluntary, school, and military cleanups and corrective actions; and permitted sites. The State Water Board's GeoTracker database includes LUSTs, permitted underground storage tanks (USTs), Department of Defense sites, and Cleanup Program sites. The reporting and statuses of these sites change as identification, monitoring, and clean-up of hazardous materials sites progress. Typically, a listed site is considered no longer to be of concern once it has been demonstrated that existing site uses combined with the levels of identified contamination present no significant risk to human health or the environment and the case is closed by the overseeing agency. The databases are cross-connected and can be viewed through either the GeoTracker (State Water Resources Control Board, 2024) or the EnviroStor (DTSC, 2024a) websites.

FWTP Project Area

As presented in **Table 3.11-1**, there are two active/open clean-up site within 0.5 mile of the FWTP project area. There are six sites within 0.5 mile of the FWTP project area that have been closed and remediated to standards set by the DTSC and/or Sacramento County Environmental Management District (SCEMD). The closed status indicates that the overseeing regulatory agency(ies) concluded that the site has been cleaned up such that the site no longer poses a risk to people or the environment.

SRWTP Project Area

As presented in Table 3.11-1, there are 10 active/open clean-up sites within 0.5 mile of the SRWTP project area. The majority of these active clean-up sites are located south of the SRWTP project area within the Railyards, formerly known as Downtown Sacramento Union Pacific Railyards. Specifically, there are two active clean-up sites along North B Street to the intersection of North 7th Street near the location of the electrical service line upgrades: 1) the Union Pacific Bannon Street Parcel and 2) the North B Street Properties. Near the site of the Sacramento River water intakes conveyance pipelines, there are also active clean-up site (on Jibboom Street) which would be within 0.5 mile. In the vicinity of the SRWTP, where the proposed potable water

TABLE 3.11-1
OPEN HAZARDOUS MATERIALS CLEAN-UP SITES IN THE VICINITY OF THE PROPOSED PROJECT AREAS

Name	Location in Sacramento	Contaminant(s) of Concern	Site Status
FWTP Project Area			
Gonzales-Kimmel	6700 Folsom Boulevard	Total Petroleum Hydrocarbons	Open as of 7/1/2014
Dorris Lumber and Moulding Company	2601 Redding Avenue	Acrolein, Lead	Open as of 2019
SRWTP Project Area			
North B Street Properties	458/464/468 North B Street Properties	Arsenic, Cadmium and compounds, Lead, TPH-Motor Oil, TPH-Diesel	Open as of 9/13/2023
Matheson Fast Freight	455 Bannon St	Diesel	Open as of 12/29/2016
PG&E- Power Plant Building	240 Jibboom Street	Petroleum/Fuels/Oils	Open- Verification monitoring as of 8/19/1998
The Railyards (Northern Shop Bunker Fuel Cleanup)	501 Jibboom	Total Petroleum Hydrocarbons (TPH)	Open- Verification monitoring as of 11/20/2013
The Railyards (Manufactured Gas Plant)	501 Jibboom	1,1,1-Trichloroethane (TCA), Acetone, Arsenic, Benzene, Diesel, Gasoline, Lead, Polynuclear Aromatic Hydrocarbons (PAHS), Toluene, Waste/Oil/Motor/ Hydraulic/Lubricating, Xylene	Open- Assessment & Interim Remedial Action as of 1/1/2003
The Railyards (Ponds and Ditch Area)	501 Jibboom	Acetone, Arsenic, Benzene, Diesel, Gasoline, Lead, Polynuclear Aromatic Hydrocarbons (PAHS), Toluene, Waste/ Oil/Motor/Hydraulic/Lubricating, Xylene	Open- Remediation 5/7/2003
The Railyards (Central Shops)	501 Jibboom	1,4-Dioxane, Arsenic, Dichloroethane (DCA), Dichloroethane (DCE), Nickel, Tetrachloroethylene (PCE), Total Petroleum Hydrocarbons (TPH), Trichloroethylene (TCE), Vinyl Chloride	Open- Assessment & Interim Remedial Action as of 5/12/1995
The Railyards (Lagoon Study Area)	501 Jibboom	Arsenic, Diesel, Gasoline, Lead, Other Chlorinated Hydrocarbons, Polynuclear Aromatic Hydrocarbons (PAHS), Trichloroethylene (TCE), Vinyl Chloride Waste/Oil/Motor/Hydraulic/Lubricating	Open- Remediation as of 3/18/2013
The Railyards (Lagoon Groundwater Study Area)	501 Jibboom	1,1,1-Trichloroethane (TCA), Arsenic, Diesel, Gasoline, Lead, Other Chlorinated Hydrocarbons, Other Petroleum, Polynuclear Aromatic Hydrocarbons (PAHS), Trichloroethylene (TCE), Vinyl Chloride, Waste/Oil/Motor/Hydraulic/ Lubricating, Xylene	Open- Remediation as of 3/18/2023
The Railyards (Car Shop 9)	501 Jibboom	1,4-Dioxane, Arsenic, Dichloroethane (DCA), Dichloroethane (DCE), Other Chlorinated Hydrocarbons, Tetrachloroethylene (PCE), Trichloroethylene (TCE), Vinyl Chloride	Open- Remediation as of 4/15/2015

NOTES:
Open – Remediation: An approved remedy or remedies has/have been selected for the impacted media at the site and the responsible party (RP) is implementing one or more remedy under an approved cleanup plan for the site.
Open – Site Assessment: Site characterization, investigation, risk evaluation, and/or site conceptual model development are occurring at the site.
Open – Verification Monitoring: Remediation phases are essentially complete, and a monitoring/sampling program is occurring to confirm successful completion of cleanup at the Site.

SOURCE: DTSC, 2024a; State Water Resources Control Board, 2024 transmission pipelines would be constructed, there are also active clean-up sites within 0.5 mile, the majority of which are located at 501 Jibboom, or at the Railyards. Closed sites in the SRWTP project area and vicinity have also been remediated to standards set by the DTSC and the SCEMD.

Other Hazards

Airports

There are no airports within two miles of the proposed project areas. Airports within 10 miles of the proposed project areas include the Sacramento McClellan Airport, the Rio Linda Airport, the Sacramento Executive Airport, the Sacramento International Airport, and Mather Airport.

Wildfire

Wildfire risk is predominately associated with wildland urban interface areas, defined qualitatively as a place where humans and their development meet or intermix with wildland fuel (County of Sacramento, 2023). Areas within 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, along Garden Highway in the Natomas area, and along the Sacramento River from where Highway 80 crosses the river to the confluence with the American River. A wildland fire that originates along the American or Sacramento rivers could spread into nearby neighborhoods (City of Sacramento, 2023a). According to the City's Local Hazard Mitigation Plan, in 2007, these areas were classified by the California Department of Forestry and Fire Protection (CAL FIRE) to be within moderate Fire Hazard Severity Zones, and within low and moderate fire threat areas (County of Sacramento, 2021).

The proposed project areas are in flat, urbanized/developed areas with very limited fuel types (e.g., few trees and little to no brush occur on site). Despite being in the vicinity of areas susceptible to urban wildfire, risk in the proposed project areas is low. The FWTP project area is near the American River Parkway which, as described above, is fairly susceptible to an urban wildfire. The SRWTP project area, including the location of the Sacramento River water intakes, is not classified as being in a fire threat area. Refer to Section 3.20, *Wildfire*, for additional details of wildfire hazards present at the proposed project areas.

Emergency Planning and Response

The City, in conjunction with Sacramento County and other incorporated communities, has a variety of systems and procedures established to protect its residents from hazards, including wildfires. Sacramento County's Office of Emergency Services provides evacuation zone maps for unincorporated zones and cities in Sacramento County. The proposed project areas are located in Evacuation Zone 4 (SM4) (City of Sacramento, 2023b). Several plans establish emergency procedures for the City. The City's Emergency Operations Plan provides guidance for those with emergency management responsibilities within the City (City of Sacramento, 2018).

The Sacramento County 2021 Multi-Jurisdictional Local Hazard Mitigation Plan includes measures to address potential hazards (County of Sacramento, 2021). As described in the City's Local Hazard Mitigation Plan, the City has recommended evacuation routes in the event of a hazardous incident requiring evacuation in proximity of the project areas, including routes in the vicinity of the FWTP project area (La Riveria Drive and Howe Avenue) and in the vicinity of the SRWTP project area (B Street and Richards Boulevard) (County of Sacramento, 2021).

Hazardous Materials Incident Response

The City has two Type 1 Hazmat Teams (designated HMRT-7, and HMRT-30) that respond to hazardous materials incidents. The teams are located in the north and the south ends of the city. The teams are equipped with trucks and engines, and decontamination teams mobilize with the hazmat teams as needed to respond to a hazmat incident. The City's hazmat teams are also contracted to support the County of Sacramento (City of Sacramento, 2018).

3.11.3 Regulatory Setting

Federal

The primary federal agencies with responsibility for hazards and hazardous materials management include the U.S. EPA, OSHA, and the U.S. Department of Transportation. Federal laws, regulations, and responsible agencies are summarized in **Table 3.11-2**.

TABLE 3.11-2
FEDERAL LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Federal Law or Responsible Federal Agency	Description
Hazardous Waste Handling	Resource Conservation and Recovery Act of 1976 (RCRA)	Under RCRA, the U.S. EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave."
	Hazardous and Solid Waste Act	Amended RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
	Toxic Substances Control Act (TSCA)	Code of Federal Regulations Title 40 Chapter 1, Subchapter R – Toxic Substances Control Act – Part 761 Polychlorinated Biphenyls (PCBs) – covers the identification and sampling requirements for PCBs for disposal purposes.
Hazardous Materials Management	Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA)	Imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of and to prevent or mitigate injury to human health or the environment in the event that such materials are accidentally released.
Hazardous Materials Transportation	U.S. Department of Transportation (DOT)	DOT has the regulatory responsibility for the safe transportation of hazardous materials. The DOT regulations govern all means of transportation except packages shipped by mail (49 CFR).
	U.S. Postal Service (USPS)	USPS regulations govern the transportation of hazardous materials shipped by mail.
Occupational Safety	Occupational Safety and Health Act of 1970	OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries (29 CFR).
Structural and Building Components (Hazardous Building Materials [ACM, LBP, and PCBs])	Toxic Substances Control Act	Regulates the use and management of hazardous building materials and sets forth detailed safeguards to be followed during the disposal of such items.
	U.S. EPA	The U.S. EPA monitors and regulates hazardous materials used in structural and building components and their effects on human health.

State

The primary State agencies with responsibility for hazardous materials management in the region include the DTSC and the Regional Water Quality Control Boards (Regional Water Boards) within the California Environmental Protection Agency (Cal EPA), Cal/OSHA, California Department of Health Services, California Highway Patrol, and the California Department of Transportation. State laws, regulations, and responsible agencies are summarized in **Table 3.11-3**.

TABLE 3.11-3
STATE LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law and/or Responsible State Agency	Description
Hazardous Materials Management	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program); CUPA (Health and Safety Code Sections 25404 et seq.)	Cal EPA adopted regulations in January 1996 that implemented the Unified Program at the local level. The agency responsible for implementation of the Unified Program is called the Certified Unified Program Agency (CUPA). Sacramento County's Environmental Management Department (SCEMD) has been designated as the Sacramento region's CUPA by Cal EPA.
	California Fire Code, Title 24, Chapter 9, CCR and California Building Code, Part 2	The California Fire Code regulates the storage and handling of hazardous materials, including the requirement for secondary containment, separation of incompatible materials, and preparation of spill response procedures.
Hazardous Waste Handling	California Hazardous Materials Release Response Plan and Inventory Law of 1985; CUPA	The California Hazardous Materials Release Response Plan and Inventory Law of 1985 (Business Plan Act) requires that businesses that store hazardous materials onsite prepare a Hazardous Materials Business Plan and submit it to the local CUPA (i.e., SCEMD).
	California Hazardous Waste Control Act; California Health and Safety Code, Division 20, Chapter 6.5, Article 2, Section 25100, et seq.; DTSC	Under the California Hazardous Waste Control Act, DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste in California. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. DTSC is also the administering agency for the California Hazardous Substance Account Act. California Health and Safety Code, Division 20, Chapter 6.8, Sections 25300 et seq., also known as the State Superfund law, providing for the investigation and remediation of hazardous substances pursuant to State law. DTSC's Site Mitigation and Restoration Program is responsible for overseeing the evaluation and cleanup of contaminated properties throughout California.
	22 CCR Section 66273 Standards for Universal Waste Management	22 CCR Section 66273 Standards for Universal Waste Management, which regulate the management of universal wastes. These wastes are not fully regulated as hazardous waste in order to encourage their recycling. Batteries, electronic devices, mercury-containing equipment, lamps, cathode ray tubes and tube glass, and aerosol cans are considered universal wastes in California. A person or business who generates universal waste is required to follow the Management Requirements for Universal Waste Handlers (22 CCR Sections 66273.30−66273.39), which include storage, spill protection, and disposal rules designed to minimize risk of harm to public health and the environment.

Classification	Law and/or Responsible State Agency	Description
Hazardous Materials Transportation	Titles 13, 22, and 26 of the CCR	Regulates the transportation of hazardous waste originating in and passing through the state, including requirements for shipping, containers, and labeling.
	CHP and Caltrans, California Vehicle Code, Chapter 5, Sections 31303 - 31309	These two state agencies have the primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies.
Hazardous Materials Incidents	Emergency Response Plan; Office of Emergency Services	California has developed an emergency response plan to coordinate emergency services provided by federal, state, and local government and private agencies. Responding to hazardous materials incidents is one part of this plan. The plan is administered by the state Office of Emergency Services, which coordinates the responses of other agencies including Cal EPA, California Highway Patrol, California Department of Fish and Wildlife, the Regional Water Board, local environmental health departments, and local fire departments.
Occupational Safety	Cal/OSHA regulations (Title 8 CCR)	Cal/OSHA has primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations (CFR). Cal/OSHA standards are generally more stringent than federal regulations. Requires employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.
Construction Storm Water General Permit	Regional Water Boards	Dischargers whose project disturbs one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one of more acres, are required to obtain coverage under the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; Order 2022-00547-DWQ, NPDES No. CAS000002). Construction activity subject to this permit includes clearing, grading, grubbing, and other disturbances to the ground such as excavation and stockpiling but does not include regular maintenance activities performed to restore the original line, grade, or capacity of a facility. The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific Best Management Practices (BMPs) designed to prevent sediment and pollutants from contacting stormwater from moving offsite into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area.
Underground Infrastructure	CCR Section 4216−4216.9	Section 4216−4216.9 “Protection of Underground Infrastructure” requires an excavator to contact a regional notification center (e.g., Underground Services Alert or Dig Alert) at least two days prior to excavation of any subsurface installations. Any utility provider seeking to begin a project that could damage underground infrastructure can call Underground Service Alert, the regional notification center for northern California. Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the project. Representatives of the utilities are then notified and are required to mark the specific location of their facilities within the work area prior to the start of project activities in the area.
Dewatering Permit	Regional Water Boards	Discharges may also be required to obtain coverage under the NPDES Permit for Waste Discharge Requirements, Limited Threat Discharges to Surface Water (CAG995002 Order No. R5-2023-0015) The permit regulates the dewatering discharge during construction.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies that are applicable to the evaluation of hazards and hazardous materials effects of the proposed project are provided in **Table 3.11-4**.

TABLE 3.11-4
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – HAZARDS AND HAZARDOUS MATERIALS

Element	Goals and Policies
Land Use and Placemaking	Goal LUP-1: Policy LUP-1.13
Environmental Resources and Constraints	Goal ERC-10: Policies ERC-10.10, 10.11
Environmental Justice	Goal EJ-1: Policies EJ-1.6, 1.7, 1.8, 1.9
Public Facilities and Safety	Goal PFS-1: Policy PFS-1.8; Goal PFS-2: Policies PFS-2.1, 2.3

SOURCE: City of Sacramento, 2024

Sacramento County Environmental Management Department, Hazardous Materials Division

The Hazardous Materials Division of the SCEMD is the designated CUPA for the City of Sacramento and Sacramento County and is responsible for implementing six statewide environmental programs for Sacramento County. The CUPA program streamlines and provides consistent regulatory activities including inspections, permitting, and enforcement for the following specific environmental and emergency response areas:

- Underground storage of hazardous substances (USTs);
- Hazardous Materials Business Plan requirements;
- Hazardous Waste Generator requirements;
- California Accidental Release Prevention program;
- Uniform Fire Code hazardous materials management plan; and
- Above Ground Storage Tanks (Spill Prevention Control and Countermeasures Plan).

SCEMD's Site Assessment and Mitigation Program, also referred to as the Toxic Site Cleanup Program, provides managed regulatory oversight of the assessment and remediation of properties on which there has been a release of hazardous materials to soil and/or groundwater. SCEMD is responsible for overseeing corrective action and enforcement activities associated with unauthorized releases of petroleum products from underground storage tanks (SCEMD, 2024).

The Local Remediation Program provides technical regulatory oversight for corrective actions at hazardous materials release sites involving non-petroleum products (e.g., dry cleaners, metal plating shops). Because SCEMD's statutory authority to regulate non-petroleum release sites is limited, this is a voluntary site cleanup program where the responsible party has requested

SCEMD oversight. During the LRP site cleanup process, SCEMD regulators work closely with other State agencies (i.e., DTSC, Central Valley Regional Water Board) to agree on the scope of work necessary to assess site contamination and the degree of cleanup required to reach a finding of no further action (SCEMD, 2024). For example, SCEMD regulators may consult with DTSC's Site Mitigation and Restoration Program (see Table 3.11-3) (DTSC, 2024b).

Sacramento Air Quality Management District Rule 902

Sacramento Air Quality Management District enacted Rule 902 to implement EPA's National Emission Standard for Hazardous Air Pollutants for Asbestos and to limit the emission of asbestos to the atmosphere. The work practices and administrative requirements of Rule 902 apply to all renovations and demolitions where the amount of Regulated Asbestos-Containing Material (RACM) is greater than:

- 260 lineal feet of RACM on pipes, or
- 160 square feet of RACM on other facility components, or
- 35 cubic feet of RACM that could not be measured otherwise.

The administrative requirements of Rule 902 apply to any demolition of structures, regardless of the amount of RACM. Requirements of Rule 902 include regulations on the handling and disposal of asbestos found on-site. To determine the amount of RACM in a structure, Rule 902 requires that a survey be conducted prior to demolition or renovation unless:

- the structure is otherwise exempt from the rule, or
- any material that has a propensity to contain asbestos (so-called "suspect material") is treated as if it is RACM.

There are specific disposal requirements in Rule 902 for friable asbestos-containing material, including disposal at a licensed landfill. If the material is non-friable asbestos, any landfill willing to accept asbestos-containing material may be used to dispose of the material.

Sacramento County Multi-Jurisdictional Local Hazard Mitigation Plan

The Sacramento County 2021 Multi-Jurisdictional Local Hazard Mitigation Plan Update (County of Sacramento, 2021) seeks to reduce or eliminate long-term risk to people and property from hazards. Annex F details hazard mitigation planning elements specific to the City of Sacramento, with a focus on providing additional details on the risk assessment and mitigation strategy for the community (City of Sacramento, 2021).

3.11.4 Impacts and Mitigation Measures

Method of the Analysis

To evaluate whether implementation of the proposed project would result in hazards and hazardous materials impacts, the analysis considers how construction (short-term, temporary) and O&M (long-term, permanent) activities would result in changes to existing conditions. Potential impacts were analyzed based on the review of literature and databases, including the EnviroStor database and GeoTracker database. The proposed project would be regulated by the laws, regulations, plans, and policies summarized in subsection 3.11.3, *Regulatory Setting*. Therefore, the impact analysis assumes that the proposed project would comply with existing applicable regulatory and permitting requirements (i.e., handling, storage and transportation of hazardous materials, etc.). See Section 3.1, *Approach to the Analysis,* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous material.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment.
- For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, result in a safety hazard or excessive noise for people residing or working in the project area.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Expose people or structures, either directly or indirectly, to significant risk of loss, injury, or death involving wildland fires.

Impacts Not Further Evaluated

Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport.

As described in Section 3.11.2, *Environmental Setting*, the proposed project areas are not located within two miles of a public airport or public use airport and, as such, are not included in an airport land use plan. Therefore, implementation of the proposed project would not result in a safety hazard or excessive noise for people residing or working in the proposed project areas and **no impact** would occur. This issue will not be further evaluated in the EIR.

Impacts and Mitigation Measures

Table 3.11-5 summarizes the impact conclusions presented in this section.

TABLE 3.11-5
SUMMARY OF IMPACT CONCLUSIONS – HAZARDS AND HAZARDOUS MATERIALS

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.11-1: Construction of the proposed project could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.11-2: Operation and maintenance of the proposed project could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.11-3: Implementation of the proposed project could involve the handling of hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing school.	LS (FWTP) NI (SRWTP)	LS (FWTP) NI (SRWTP)	NI (Existing/ New)	LS
3.11-4: Construction of the proposed project components could be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, could create a significant hazard to the public or the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.11-5: Operation and maintenance of the proposed project could be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, could create a significant hazard to the public or the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.11-6: Construction of the proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.11-7: Operation and maintenance of the proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.11-8: Implementation of the proposed project could expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.11-1: Construction of the proposed project could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment.

All Project Components

Construction activities associated with the proposed project would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs. Construction for all project components may involve the use routinely used hazardous materials including but not limited to petroleum products (i.e., oil, gasoline, and diesel fuels), automotive fluids (i.e., antifreeze and hydraulic fluids), and other chemicals (i.e., adhesives, solvents, and other chemicals). Additionally, asphalt and coatings, and/or concrete materials would be used. Depending on the age of the existing structures, facilities and/or utilities, they could contain asbestos or lead paint.

Dewatering activities may also occur during construction (i.e., for excavation associated with the treatment plant improvements, existing utility upgrade, Sacramento River water intakes, potable water transmission pipelines). As described in Chapter 2, *Project Description,* storage to contain/ treat water from construction activities would be located within property limits in close proximity to excavated areas requiring dewatering. Dewatering activities may be relocated within SRWTP based on construction activities, phasing, and proximity to a discharge location (e.g., sewer, drainage, swales, etc.).

Improper transport, use, storage, handling, or disposal of hazardous materials could result in an inadvertent release that could pose a potential health risk to the public (i.e., construction workers) or the environment. As discussed in subsection 3.11.2, *Regulatory Setting*, numerous laws and regulations govern the transport, use, storage, handling and disposal of hazardous materials and in order to minimize and, if necessary, mitigate risks associated with the accidental release of hazardous materials during construction. This includes 8 CCR Section 5194 which requires a hazards communication program identifying hazardous materials onsite and reducing the potential for a spill, and 29 Code of Federal Regulations Section 1910.120 which includes requirements for emergency response to releases or substantial threats of releases of hazardous substances. Construction contractors would be required to prepare and implement a Hazardous Materials Business Plan to manage any hazardous materials used. Further, all spent hazardous materials would be disposed of in accordance with DTSC and other applicable regulations such as the California Hazardous Materials Release Response Plan and Inventory Law of 1985, the California Hazardous Waste Control Act; California Health and Safety Code, Division 20, Chapter 6.5, Article 2, Section 25100, and 22 CCR Section 66273 Standards for Universal Waste Management.

As further discussed in Section 3.12, *Hydrology, Water Quality, and Water Supply*, in accordance with NPDES regulations, to minimize the potential effects of construction runoff on receiving water quality, the state requires that any construction activity affecting one acre or more obtain coverage under the Construction General Permit (CGP) (Order No. 2022-0057-DWQ, effective September 1, 2023). For these project components, the City would obtain coverage under the CGP and require contractors to comply with the permit’s conditions. For dewatering activities, the contractor would be required to implement dewatering requirements presented in Attachment J of the CGP.

Compliance with existing regulations (e.g., 8 CCR Section 5194, 29 CFR Section 1910.120, DTSC and other applicable regulations, CGP, dewatering permit, etc.) would ensure that hazardous materials associated with construction activities would be properly stored, handled, transported and disposed. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.11-2: Operation and maintenance of the proposed project could involve the routine transport, use, or disposal of hazardous materials that, if accidentally released, could create a hazard to the public or the environment.

All Project Components

Once constructed, O&M activities for the various project components at both the FWTP and SRWTP project areas would generally be similar to existing activities. However, the ozone generation and treatment system improvements at both water treatment plants would remove storage of chlorine gas and add liquid oxygen and chemicals associated with ozone generation (to be produced as needed versus stored onsite). Maintenance vehicles would most likely include light duty trucks. Large or heavy equipment may be brought to the facility infrequently for repair or replacement or to provide vegetation control. Consistent with existing activities, continued O&M may involve the transportation, use, or temporary storage of hazardous materials as part of routine activities. Such materials may include but are not limited to petroleum products (i.e., oil, gasoline, and diesel fuels), automotive fluids (i.e., antifreeze and hydraulic fluids), and other chemicals (i.e., adhesives, solvents, and other chemicals).

All hazardous materials used on-site would be stored, handled, and disposed of in accordance with the manufacturers' specifications and consistent with all applicable regulatory requirements through Hazardous Materials Business Plans specific to each project area. Workers would be trained to engage in safe work practices, properly identify and handle any hazardous materials on-site, and prevent accidental releases. With adherence to the Hazardous Materials Business Plan, all handling, storage, and disposal of hazardous materials would follow proven practices to minimize exposure to workers or the public. Long-term maintenance and equipment replacement would be scheduled in accordance with manufacturers' recommendations to ensure that equipment integrity is maintained.

As discussed in Section 3.12, *Hydrology, Water Quality, and Water Supply,* the Phase I MS4 Permit, issued to the City (Central Valley Water Board Order No. R5-2015-0023, NPDES Permit No. CAS082597) implements the Basin Plan through the effective implementation of BMPs to reduce pollutants in stormwater discharges to the maximum extent practicable. Any discharges to waters of the United States are regulated by existing waste discharge requirement permits issued by the Central Valley Regional Water Board for the FWTP (Order No. R5-2007-0087) and SRWTP (Order No. R5-2007-0086). The City's Stormwater Management and Discharge Control Ordinance also includes measures to minimize impacts to the environment; such post-construction stormwater quality control measures are specified within the City's Stormwater Quality Design Manual.

Compliance with existing regulations (e.g., Hazardous Materials Business Plans, NPDES permit, City ordinances dewatering permit, etc.) would ensure that hazardous materials associated with O&M activities would be properly stored, handled, transported and disposed. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.11-3: Implementation of the proposed project could involve the handling of hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing school.

All Project Components

As discussed in Impacts 3.11-1 and 3.11-2, construction and O&M activities associated with the proposed project could result in the handling of hazardous materials including but not limited to petroleum products (i.e., oil, gasoline, and diesel fuels), automotive fluids (i.e., antifreeze and hydraulic fluids), and other chemicals (i.e., adhesives, solvents, and other chemicals). Additionally, asphalt and coatings, and/or concrete materials would be used as part of construction. The routine use or an accidental spill of hazardous materials could result in an inadvertent release, which could adversely affect students, school staff, and workers to hazardous materials. Further, the prolonged use of construction equipment could produce hazardous emissions.

There are no schools located within a quarter of a mile of the SRWTP project area, that includes the location of the treatment plant improvements and existing utility upgrades at the SRWTP and Sacramento River water intakes. Therefore, there would be no impact associated with the treatment plant improvements and existing utility upgrades at the SRWTP, or the existing and new Sacramento River water intakes.

The California State University, Sacramento campus is located within one-quarter mile of the FWTP project area that includes the treatment plant improvements and existing utility upgrades at the FWTP. In addition, there are schools located in the vicinity of the SRWTP where potable water transmission pipelines are proposed. Because the exact location of the potable water transmission pipelines is unknown at this time, implementation of this project component could occur within one-quarter mile of an existing school. Therefore, implementation of the treatment plant improvements and existing utility upgrades at FWTP, and potable water transmission pipelines in the vicinity of the SRWTP could involve the handling of hazardous or acutely hazardous materials, substances or waste that could expose school occupants and school site users to the effects of accidental hazardous material spills.

As detailed in Impacts 3.11-1 and 3.11-2, numerous regulations govern the transportation, use, storage, and disposal of hazardous materials during construction and O&M activities. Construction and O&M would be required to comply with these hazardous materials regulations to ensure that hazardous materials would be transported, used, stored, and disposed of in a safe manner to protect worker safety, and to reduce the potential for release of construction-related fuels or other hazardous materials into the environment. The required compliance with these regulations would minimize the risk of exposing nearby schools to hazardous materials. Therefore, impacts associated with the treatment plant improvements and existing utility upgrades at FWTP, and potable water transmission pipelines in the vicinity of the SRWTP would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.11-4: Construction of the proposed project could be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, could create a significant hazard to the public or the environment.

As discussed in subsection 3.11.2, *Environmental Setting*, the proposed project areas may be adjacent to or located in a hazardous materials site compiled pursuant to Government Code Section 6592.5, referred to as the Cortese List. Specifically, in the FWTP project area, there are two active clean-up sites within 0.5 miles of the FWTP and six closed clean-up sites within 0.5 miles of the FWTP. In the SRWTP project area, there are 11 active clean-up sites within 0.5 miles, the majority of which are sites are located at the Railyards, formerly known as Downtown Sacramento Union Pacific Railyards, and are in proximity to the proposed project components.

An "active" clean-up site indicates that the site is in the process of remediation. Each active clean-up site is managed by a lead oversight agency such as the Central Valley Regional Water Board or the DTSC. Construction and operation in and near an active clean-up site would involve coordination with the lead oversight agencies and the implementation of any remediation plans present at the site if necessary. A "closed" status indicates that the lead oversight agency concluded that the clean-up site has been cleaned up such that the clean-up site no longer poses a risk to people or the environment. All closed sites in the FWTP and SRWTP project areas (including the vicinity of the SRWTP) have been remediated to standards set by the SCEMD.

Treatment Plant Improvements and Existing Utility Upgrades at FWTP

Construction activities associated with the treatment plant and utility improvements at FWTP would occur within the fence line of the existing City-owned property. The maximum depth for excavation at FWTP is anticipated to be 25 feet below ground surface (related to installation of the Intermediate Pump Station). As discussed in Section 3.12, *Hydrology, Water Quality, and Water Supply,* dewatering of shallow groundwater that measures 20 to 60 feet below ground surface could be required. For excavated areas requiring dewatering efforts, work would be completed in accordance with applicable National Pollutant Discharge Elimination System (NPDES) permit requirements. Construction activities associated with the storm drainage improvements at FWTP would occur along College Town Drive towards Howe Avenue.

There are no active or closed clean-up sites in the fence line of the existing property. While there are two active clean-up sites within a 0.5-mile radius of the FWTP project area, both sites are approximately 2,000 feet southwest of the FWTP property and would not be disturbed as a result of construction within the footprint of the FWTP property (including anticipated groundwater dewatering), or as a result of installation of storm drainage improvements along College Town Drive. Therefore, construction of the treatment plant improvements and utility upgrades within the FWTP project area would not be anticipated to create a significant hazard to the public or the environment.

Treatment Plant Improvements at SRWTP

Construction activities associated with the treatment plant improvements at SRWTP would occur within the fence line of the existing City-owned property. The maximum depth for excavation at SRWTP is anticipated to be 60 feet below ground surface (related to installation of the High Service Pump Station). As discussed in Section 3.12, *Hydrology, Water Quality, and Water Supply,* dewatering of shallow groundwater that measures 20 to 60 feet below ground surface could be required. For excavated areas requiring dewatering efforts, work would be completed in accordance with applicable NPDES permit requirements.

There are no active clean-up sites within the fence line of the SRWTP, and therefore excavation and other earth work near the site would not be anticipated to disturb contaminated soil that would create a significant hazard to the public or the environment.

Existing Utility Upgrades at SRWTP, Sacramento River Water Intakes, and Potable Water Transmission Pipelines

Construction activities associated with the existing utility upgrades (storm drainage and electrical improvements), new tee screen intake, and the two conveyance pipelines from the new and existing Sacramento River water intakes could potentially be in proximity to or run through the active clean-up sites discussed in subsection 3.11.2, *Environmental Setting*. Additionally, construction of the proposed potable water transmission pipelines could be in proximity to or run through an active clean-up site. Construction activities in these areas could potentially disturb active hazardous materials sites and therefore could create a significant hazard to the public or the environment.

Construction proposed at or near a documented active hazardous materials site would require coordination with the clean-up site lead oversight agency. Construction at or near these sites could require investigation, remediation, and cleanup of the site prior to commencement of construction depending on the characteristics of each site and which agency is assigned regulatory oversight. These activities would occur under the supervision of the lead oversight agencies, which could include DTSC, Central Valley Regional Water Board, and/or SCEMD.

To prevent potential health hazards to construction workers and the public from exposure to previously unknown contamination and hazards to the environment, General Plan policy EJ 1.8 (Site Contamination) would require that buildings and sites under consideration for new development or redevelopment are investigated for the presence of hazardous materials prior to development activities. If contamination is present, the City would coordinate with the appropriate lead oversight agency (i.e., DTSC, Central Valley Regional Water Board, SCEMD) to develop a site remediation plan, and identify construction techniques to ensure adequate protection from hazards associated with contamination and working in an active clean-up site. The site remediation plan would be designed pursuant to Section 25401.05(a)(1) of the California Health and Safety Code and approved by the appropriate oversight agency or authority.

Impact Conclusion

Compliance with General Plan policy EJ 1.8, and adherence to existing regulatory requirements set by lead oversight agencies such as the DTSC, Central Valley Regional Water Board, and/or SCEMD at active clean-up sites would ensure that potential exposure of people and the environment to hazardous materials would be reduced. Therefore, construction activities associated with these project components would not be anticipated to disturb contaminated soil that would create a significant hazard to the public or the environment. This impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact of 3.11-5: Operation and maintenance of the proposed project could be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, could create a significant hazard to the public or the environment.

All Project Components

As discussed in subsection 3.11.2, *Environmental Setting*, and summarized above, the proposed project areas may be adjacent to or located in a hazardous materials site compiled pursuant to Government Code Section 6592.5, referred to as the Cortese List. These include both active and closed clean-up sites within 0.5 miles of the FWTP and SRWTP project areas.

Once construction is completed, O&M activities for the various project components at both the FWTP and SRWTP project areas would generally remain the same as existing conditions and long-term O&M activities for all other project components would be completed under existing maintenance programs. Therefore, O&M activities would not create a significant hazard to the public or the environment compared to existing conditions. This impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.11-6: Construction of the proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

All Project Components

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. As described in

Chapter 2, *Project Description*, during construction, construction vehicles would access the proposed project areas (including staging areas) using existing access roads for delivery of materials, water, and other equipment, as well as for waste disposal. As shown in Table 2-6 in Chapter 2, *Project Description*, daily truck trips for materials, waste and vendors would range from 12 to 56 roundtrips per day (roundtrip). Some of the roads in the proximity of the proposed project areas are identified as emergency evacuation routes in the City's Local Hazard Mitigation Plan. This temporary increase in vehicular traffic associated with construction activities would temporarily increase traffic on designated evacuation routes which could impair an adopted emergency response plan or emergency evacuation plan.

The City of Sacramento Municipal Code requires the preparation of a Traffic Control Plan if work being performed could obstruct vehicle or pedestrian traffic on City streets (Sacramento Municipal Code Section 12.20.020 and 12.20.030). However, while compliance with the City Municipal Code would help minimize potential short-term interference during construction activities, it does not specifically address notification of emergency response agencies and therefore could obstruct an evacuation route. This impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.11-1 (ALL): Prior to the start of construction, the construction contractor shall prepare a Traffic Control Plan in accordance with City of Sacramento Municipal Code Sections 12.20.020 and 12.20.030 that shall be subject to review and approval by the City of Sacramento Utilities Department, in consultation with local emergency service providers including the City of Sacramento Fire and Police departments. The plan shall ensure that acceptable operating conditions on local roadways are maintained. A copy of the approved Traffic Control Plan shall be submitted to local emergency response agencies, and these agencies shall be notified at least 30 days before the commencement of construction that would partially or fully obstruct roadways. At a minimum, the plan shall include:

(a) The number of truck trips, time, and day of street closures.

(b) Time of day of arrival and departure of trucks.

(c) Limitations on the size and type of trucks, provision of a staging area with a limitation on the number of trucks that can be waiting.

(d) Provision of a truck circulation pattern.

(e) Identification of detour routes and signing plan for street closures.

(f) Provision of driveway access plan so that safe vehicular, pedestrian, and bicycle movements are maintained (e.g., steel plates, minimum distances of open trenches, and private vehicle pick up and drop off areas).

(g) Identification of safe and efficient access routes for emergency vehicles and transit.

(h) Manual traffic control when necessary.

(i) Proper advance warning and posted signage concerning street/lane closures.

(j) Provisions for pedestrian and bicycle safety.

Significance After Mitigation: Mitigation Measure 3.11-1 would ensure that a Traffic Control Plan would be developed, approved, and provided to emergency response agencies prior to any road closures during construction to reduce potential interference with local emergency response plans, and to ensure adequate access for emergency responders. Implementation of this mitigation measure would reduce this impact to **less-than-significant with mitigation**.

Impact 3.11-7: Operation and maintenance of the proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and operation of new equipment at the water treatment plants and new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). Additional truck trips for chemical delivery would be required at each treatment plant (one per day to one per week depending on plant operating conditions). Long-term O&M activities for all other project components would be completed under existing maintenance programs and no additional full-time employees or truck trips are anticipated. The additional truck trips would not be anticipated to affect identified emergency evacuation routes in the City. Therefore, no additional traffic associated with O&M activities would be anticipated such that it would impair or physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, this impact would be **less than significant.**

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.11-8: Implementation of the proposed project could expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

All Project Components

Construction activities would mostly occur in existing footprints of previously disturbed areas. Construction activities associated with the proposed project components would involve the use of vehicles and equipment that could ignite dry vegetation and result in a fire. Welding or grading activities also could result in an ignition that could expose people to pollutants (e.g., smoke).

Once construction is completed, O&M activities for the various project components at both the FWTP and SRWTP project areas would generally remain the same as existing conditions. A minimal number of new employees and additional truck trips may be required for certain components of the proposed project, but long-term O&M activities would mainly be completed under existing maintenance programs and would not introduce new maintenance activities or protocols with the potential to exacerbate wildfire risk.

As described in Section 3.20, *Wildfire*, the proposed project areas are primarily urbanized, and wildfire risk is low. CAL FIRE has not identified any Very High Fire Hazard Severity Zones in the City. Additionally, given the relatively flat, urban, developed characteristics of the proposed project areas, an uncontrolled spread of wildfire would not be anticipated.

Therefore, implementation of the proposed project would not likely expose people or structures to significant risk of loss, injury, or death involving wildland fires. As detailed in Section 3.20, *Wildfire*, compliance with the California Fire Code, California Building Code, and General Plan policies (e.g., PFS-1.8: Fire Hazards and PFS-2.1: Hazard Mitigation Planning), and ordinances (e.g., Weed and Rubbish Abatement Ordinance), would further reduce the extent to which the proposed project could increase fire risk. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

3.12 Hydrology, Water Quality, and Water Supply

3.12.1 Introduction

This section of the Draft EIR addresses the potential hydrology and water quality impacts associated with implementation of the proposed project. This section also addresses potential water supply impacts associated with increased diversions associated with the new water intake in the Sacramento River. A summary of the hydraulic and hydrologic modeling used to assess potential impacts is also included in this section and further detailed in **Appendix D** and **E**.

Comments addressing hydrology, water quality, and water supply were received in response to the NOP. Comments requested that the EIR consider that applicability of regulations and permits protecting the quality of surface and groundwaters of the state. These comments are addressed in this section. See Appendix A for NOP comment letters.

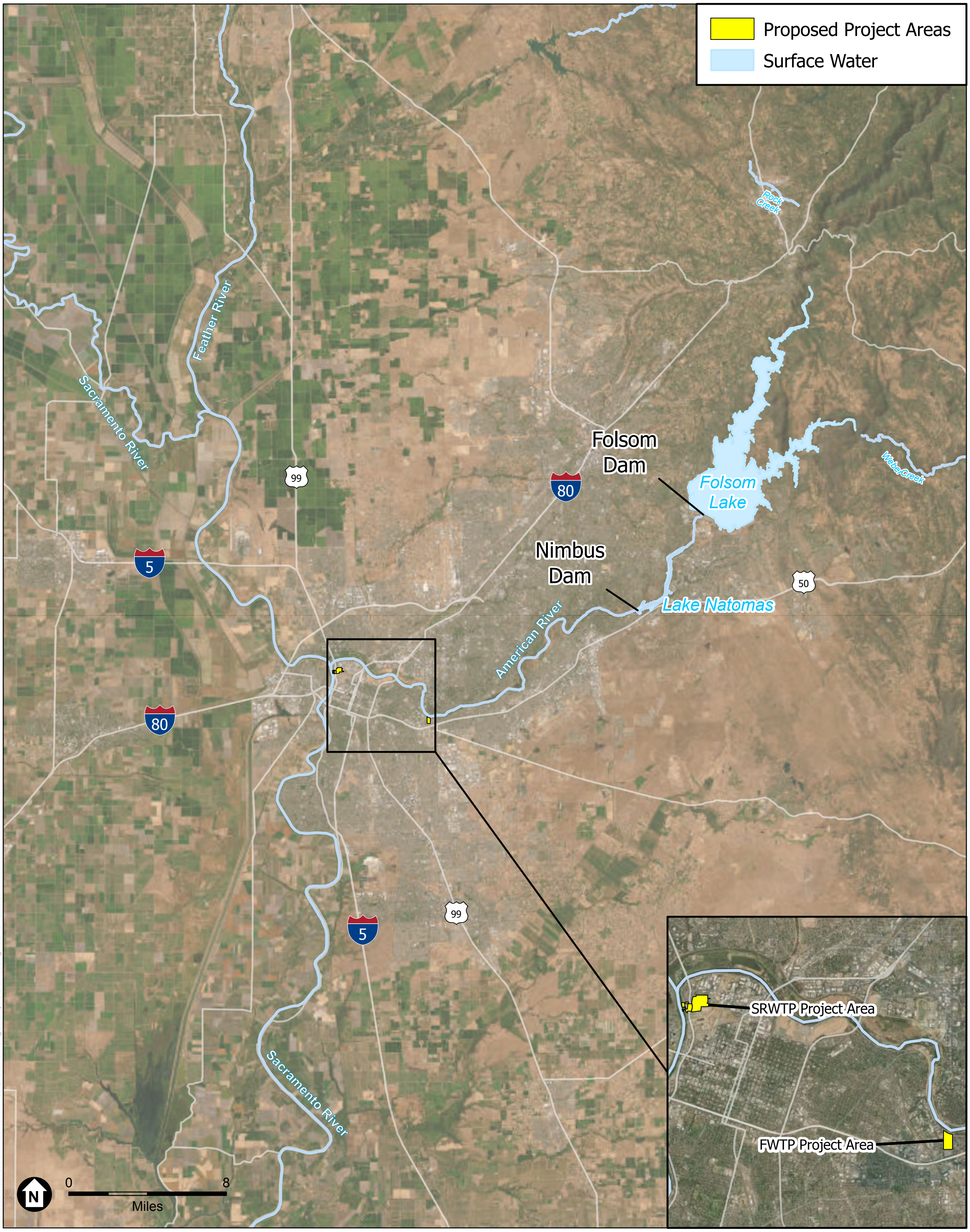
3.12.2 Environmental Setting

Surface Water Resources

The City is located at the confluence of the Sacramento and American rivers in the southern portion of the Sacramento River Basin. The American River flows west past the FWTP project area to join the Sacramento River north of the SRWTP project area and ultimately flows south to the Sacramento-San Joaquin Delta [Delta]) (**Figure 3.12-1**, *Surface Water Resources*). The following subsections describe each of these waterbodies in more detail.

Sacramento River

The Sacramento River is the largest river system in California. It originates near the slopes of Mount Shasta in northern California and flows southward to Suisun Bay in the Delta in central California. The river drains a 26,146 square mile area with an annual outflow averaging 22 million acre-feet (MAF) (Sacramento River Watershed Program, 2024). The upper Sacramento River receives flow contributions from numerous surface waters draining the east and west side of the basin. Several major contributing tributaries include Cow, Battle, Cottonwood, Mill, Thomes, Deer, Stony, Big Chico, and Butte creeks, the Pit River, the Trinity River, the McCloud River, and the Feather River, and associated tributaries including the Yuba and Bear rivers. The lower Sacramento River is defined as the reach south of the Sacramento and Yolo Bypass, near the American River confluence downstream through to the City of Freeport. This reach is heavily protected with a system of levees along both banks. Flows in this section of the river are primarily influenced by the operational releases of large water storage facilities, such as Shasta Lake, located in the upstream regions of the Sacramento River basin as well as flows in the lower American River resulting from Folsom Lake outflows (DWR, 2022a). The lower Sacramento River is tidally influenced, which can result in dramatic fluctuations to outflows and hydraulic conditions near the SRWTP intake.



SOURCE: Maxar 2021; ESA, 20223

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 3.12-1
Surface Water Resources

ESA

The flow of the Sacramento River can significantly vary from year-to-year and within a year. Flows in the Sacramento River normally peak between December and February, corresponding to the annual rainy season, which can be augmented by periodic upper basin snowmelt events. The natural flow pattern of the Sacramento River has been altered over time and contemporary flows are largely managed by the Bureau of Reclamation (Reclamation) for the Central Valley Project (CVP) and Department of Water Resources (DWR) for the State Water Project (SWP) operations (described in more detail below). Upstream or tributary reservoirs (e.g., Shasta, Trinity, Oroville, and Folsom) are operated to fulfill a variety of functions including flood control, water supply, fisheries and wildlife benefits, and power generation; and meeting water quality and flow requirements in the Delta. Shasta Lake is the largest CVP reservoir, capable of storing up to 4.5 MAF. During wetter months, flows in the Sacramento River have been managed to create and maintain reservoir space for flood control storage. During drier months, flows in the Sacramento River are managed to sustain flows at levels capable of meeting SWP and CVP water quality objectives and water delivery obligations downstream (DWR, 2022a).

American River

The American River drains the central portion of the Sierra Nevada basin from the crest near Lake Tahoe to the reservoir at Folsom Lake, and the secondary reservoir below it at Nimbus Dam. The American River drains a total area of 1,975 square miles, though the basin is typically divided at Folsom Lake. The Upper American River Basin encompasses those areas upstream of Folsom Lake, and the Lower American River Basin encompasses those areas downstream of Folsom Lake to the confluence with the Sacramento River.

Folsom Lake is the largest reservoir on the American River with a maximum storage capacity of approximately 967 thousand acre-feet (TAF). As a part of the CVP, Folsom Dam and Lake are operated and managed to provide storage for flood control, provide for storage and delivery of water supplies, generate power, and provide salinity control in the Delta. Flows are also managed to meet instream flow and temperature requirements for aquatic species. Lake Natoma is located 7-miles downstream of Folsom Dam and forms behind Nimbus Dam. Downstream of Nimbus Dam, the lower American River continues flowing another 27 miles westerly to the confluence with the Sacramento River.

Situated adjacent to the greater Sacramento metropolitan area, the lower American River has undergone significant channel and embankment alterations since completion of Folsom and Nimbus dams in the mid-1950s. Downstream of Nimbus Dam to River Bend Park area, the American River is mostly unrestricted by the existing levees but is bordered on the north and south by suburban development. Natural bluffs and terraces in this section of the river provide natural morphological controls on channel geometry. From the River Bend Park area to the confluence with the Sacramento River, the lower American River is less constrained by natural features, but instead by levees, resulting in a slower moving deeper section of river with less meandering.

Sacramento-San Joaquin Delta

The Delta lies at the confluence of the Sacramento and San Joaquin Rivers and is one of the largest estuaries in the United States. The Delta boundary extends north along the Sacramento River terminating just south of the American River, south along the San Joaquin River terminating just north of the Stanislaus River, east to the City of Stockton, and west to Suisun Bay. Flows received directly from the Sacramento, San Joaquin, Mokelumne, and Calaveras Rivers account for approximately 95 percent of Delta inflows. Hydrodynamic conditions in the Delta are influenced by a number of factors such as inflows (controlled and uncontrolled) from tributary streams (e.g., tributary streams that feed into the San Joaquin River, Sacramento River, etc.), tidal influences from the Pacific Ocean, pumping from the south Delta through the Banks Pumping Plant, Jones Pumping Plant, and other smaller water diversions within the Delta.

The Delta is at approximately mean sea level and, consequently, tides significantly influence both the level and direction of flows through its many channels and sloughs. Tidal water level fluctuations can vary from 1 foot on the San Joaquin River near Interstate 5 to more than 5 feet at the outlet of the Delta, near the City of Pittsburg. The direction of flow can also change dramatically with the tides. Releases from Shasta, Folsom, New Melones, and Millerton reservoirs of the CVP and Oroville Reservoir (i.e., Lake Oroville) of the SWP control, to a large extent, how much and when freshwater enters the Delta.

Surface Water Quality

Water quality in the vicinity of the proposed project areas is influenced by numerous natural and artificial sources, including precipitation, soil erosion, discharges from industrial and residential wastewater plants, and stormwater (City of Sacramento, 2023a). There are also several naturally occurring constituents, such as salinity and nutrients (including organic carbon) that are necessary components of the ecosystem and that can vary with natural hydrology and tidal cycles. Direct diversions from reservoirs, rivers, and streams and indirect diversions (e.g., groundwater withdrawals in connected aquifers) in the project area can also affect concentrations of constituents or other conditions (e.g., water temperature).

Water quality degradation occurs through nonpoint- and point-source discharges of pollutants. *Nonpoint-source pollution* is defined as not having a discrete or discernible source and is generated by land runoff, precipitation, atmospheric deposition, seepage, and hydrologic modification. Nonpoint-source pollution includes runoff containing pesticides, insecticides, and herbicides from agricultural areas and residential areas; acid drainage from inactive mines; bacteria and nutrients from septic systems and livestock; volatile organic compounds and toxic chemicals from urban runoff and industrial discharges; sediment from poor road construction, improperly managed construction sites, and agricultural areas; and deposition of pollutants from the atmosphere and modification of hydrologic flow patterns.

In comparison, *point-source pollution* is generated by identifiable, confined, and discrete sources, such as smokestacks, sewers, pipes or culverts, or ditches. These pollutant sources are regulated by the U.S. EPA and the State Water Resources Control Board (State Water Board) through the regional water boards. Point sources discharge have many of the same pollutants as nonpoint sources: municipal (bacteria and nutrients), agricultural (pesticides, herbicides, insecticides), and industrial pollutants (volatile organic compounds and other toxic effluent).

Sediment is considered a major pollutant according to U.S. EPA and the State Water Board, and it is a key total maximum daily load (TMDL) constituent that determines impairment and Clean

Water Act (CWA) Section 303(d) listings of impaired water bodies in a number of watersheds and river basins (refer to subsection 3.12.3, *Regulatory Setting*, for additional information). High sediment loads are detrimental to beneficial water uses and aquatic habitat used by plant, amphibian, and fish communities. Erosion is influenced by a variety of factors, such as geology and soil characteristics, topography, climate, and land use practices. Sedimentation results from erosion and the transport of eroded fine materials to a watercourse or water body and could result in increased turbidity, and in elevated levels of total dissolved solids (TDS) and total suspended solids. Erosion and sedimentation are natural phenomena but are greatly influenced by land management practices and land disturbance activities.

Water quality criteria were adopted by the State Water Board and regional water boards to protect water bodies, water users, and ecological resources, including those in the vicinity of the proposed project areas. Refer to subsection 3.12.3, *Regulatory Setting*, for additional information on the water quality control plans, or Basin Plans, applicable to the proposed project. Water quality in the Sacramento River, American River, and Delta is discussed in more detail below. Refer to Section 3.5, *Biological Resources - Aquatic*, for additional description of water quality implications on fisheries.

Sacramento River

Sacramento River water quality monitoring studies indicate that the river's water is generally of high quality. Sacramento River water quality is primarily affected by land use practices within the basin and associated urban runoff, stormwater discharges, agricultural runoff, effluent discharge from wastewater treatment plants, and acid mine drainage. The lower Sacramento River receives urban runoff, either directly or indirectly (through tributary inflow), from the cities of Sacramento, Roseville, Folsom, and their surrounding communities. Currently, the State Water Board CWA Section 303(d) list indicates that certain segments of the lower Sacramento River contain several constituents of concern, including five pesticides, mercury, polychlorinated biphenyls (PCBs), temperature, and toxicity (refer to subsection 3.12.3, *Regulatory Setting*, Table 3.12-3).

American River

Lower American River water quality conditions are generally considered excellent and are largely determined by the quality of water released from Folsom Lake and Lake Natoma. Beyond these inputs, conditions are influenced to a lesser degree by various water quality constituents present in groundwater inputs, tributary inflow, indirect watershed runoff (unchannelized flow), urban runoff, and stormwater discharges. For instance, seasonal storm water runoff from the urbanized Sacramento metropolitan area can result in temporary increases in the concentrations of urban contaminants (e.g., trash, coliform bacteria, nutrients, trace metals, oil and grease, and pesticides). No municipal wastewater treatment plants discharge to the lower American River. Currently the lower American River is on the State Water Board CWA Section 303(d) list as being impaired for mercury, temperature, bacteria (*E. coli*), toxicity, PCBs, and for two pesticides, Bifenthrin and Pyrethroids (refer to subsection 3.12.3, *Regulatory Setting*, Table 3.12-3). Sources for mercury are related to historic mining activities in the upper American Basin (Regional Water Board, 2010).

Sacramento-San Joaquin Delta

Delta water quality conditions are highly variable throughout the year and affected by the various river inflows into the Delta, tidal exchange in the western Delta channels, upstream agricultural and urban contaminant inputs, diversions from the Delta, and discharges of agricultural runoff in the Delta. Various portions of the Delta (i.e., north, southern, export area, northwest, and Stockton Ship Channel) are on the State's CWA Section 303(d) list as impaired for one or more of the following pollutants: Chlordane, Chlorpyrifos, DDT, total DDT, Diazinon, Dieldrin, Dioxin and Furan compounds, Group A pesticides, arsenic, mercury, PAHs (Polycyclic Aromatic Hydrocarbons), PCBs, toxicity, exotic species, electrical conductivity (EC), organic enrichment/ low dissolved oxygen (DO), and temperature (refer to subsection 3.12.3, *Regulatory Setting*, Table 3.12-3).

Delta water quality parameters can show considerable geographic and seasonal variation. Salinity, bromide concentrations, total organic carbon, and temperature conditions are directly influenced by Delta inflows and outflows (State Water Board, 2006). Storage and instream flow releases from SWP and CVP reservoirs (e.g., Folsom, Shasta, Trinity, Oroville) are an important component of Delta water quality management, particularly for salinity control in the late summer and fall when natural runoff and Delta inflow has decreased. For example, reduced Delta inflows can increase the amount of seawater intrusion, which can adversely affect most every beneficial use of water (e.g., municipal, industrial, agricultural, and recreational uses, as well as aquatic habitat). As another example, reduced Delta inflows can increase the water quality influence of organic-rich agricultural runoff from local lands within the Delta channels.

Salinity is of particular concern in the Delta because it can adversely affect many beneficial uses of the inflowing fresh water (e.g., municipal, industrial, agricultural, and some recreational uses, as well as aquatic habitat). Salinity issues in the Sacramento and San Joaquin rivers result from natural sources, urban discharges, and agricultural discharges. Water diversions from the various locations of inflow, as well as within the Delta (such as the State Water Project diversions) can contribute to salinity intrusion from the Pacific Ocean into the Delta waters, resulting in higher salinity levels within the Delta than might otherwise occur. Conversely, water storage facilities can augment Delta inflows in certain months, resulting in salinity levels lower than would otherwise occur.

The Low Salinity Zone and Position of X2

With regards to Delta water quality, of particular interest is the location of the low salinity zone, the area where freshwater transitions into brackish water. The low salinity zone is typically located within Suisun Bay but can shift two to six miles depending on the factors influencing Delta hydrodynamics and may reach far eastward into the Delta during periods of low freshwater inflow. One important Delta salinity indicator is the "X2" factor. X2 is a physical attribute of the estuary used as a habitat indicator for the location of the low salinity zone. X2 is the location in kilometers upstream from the Golden Gate Bridge where water salinity is 2 parts per thousand (ppt) of isohaline salt. The geographical position of the 2-ppt isohaline is considered significant to the biologically important entrapment zone of the estuary and the resident fishery and provides an indicator of habitat protection outflow and salinity conditions in the Delta. As X2 is an indicator of the extent of saltwater intrusion, it is also used to indicate changes to salinity concentrations within the Delta (discussed further in subsection 3.12.3, *Regulatory Setting*, under *Water Quality Control Plan for Delta and Decision 1641*).

At a 'high-level', Delta water quality is managed by monitoring programs and operational changes associated with meeting objectives for Delta outflows, the timing and number of days that the Delta Cross Channel (DCC) gates are opened, and the X2 location. The DCC is further discussed below under *Water Supply, Central Valley Project and State Water Project Operations*.

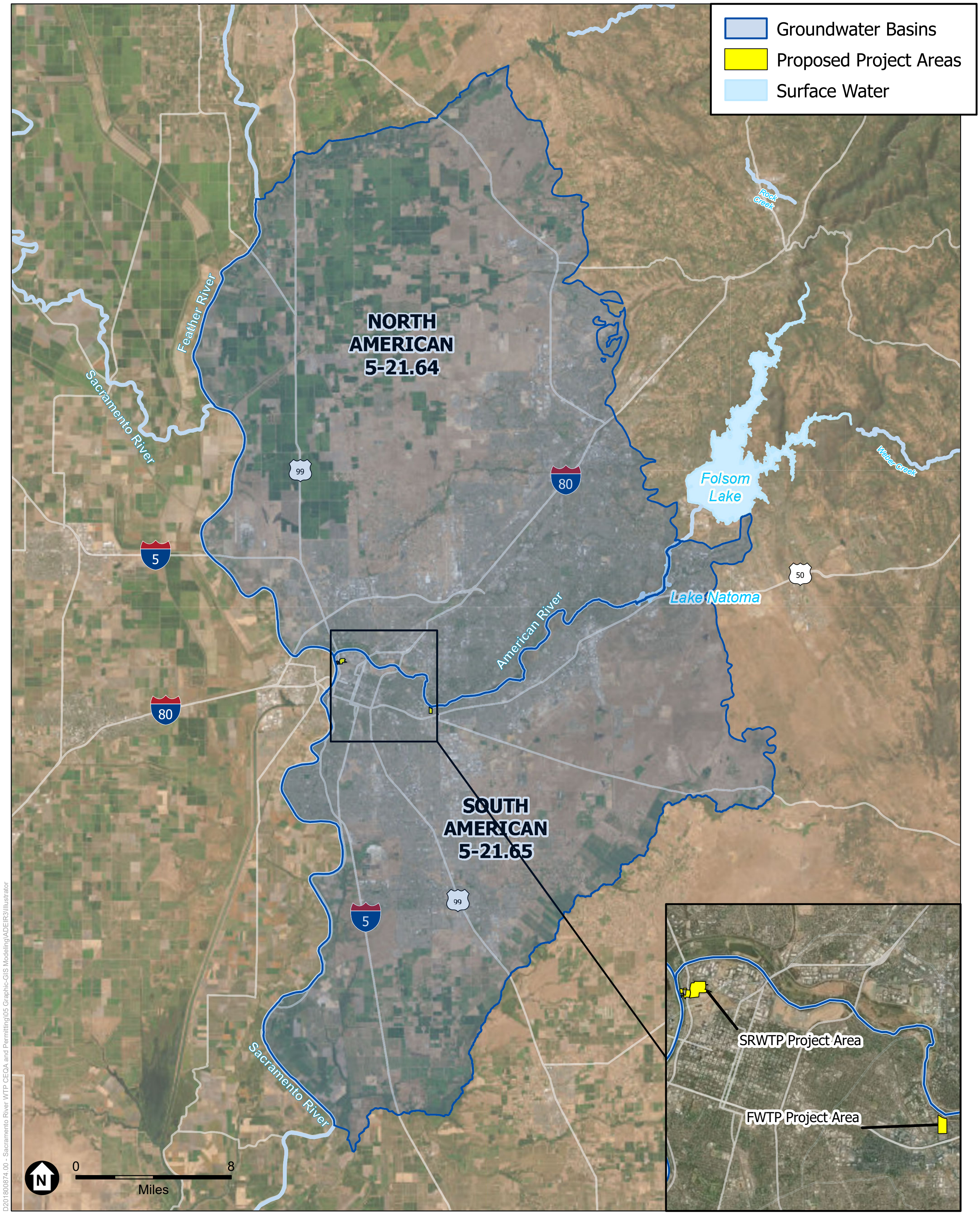
Groundwater Resources

The City overlies two groundwater subbasins of the Sacramento Valley Groundwater Basin: the North American Subbasin (DWR Basin Number 5-021.64) and the South American Subbasin (DWR Basin Number 5-021.65) (**Figure 3.12-2**, *Groundwater Basins*). The quality of the groundwater in the Sacramento Valley Groundwater Basin is generally good and sufficient for municipal, agricultural, domestic, and industrial uses.

The North American Subbasin is bound on the north by the Bear River, to the west by the Feather River, and to the south by the Sacramento River. The eastern boundary is a north-south line extending from the Bear River south to Folsom Lake (DWR, 2006). In the North American subbasin, groundwater levels are generally stable. As of the spring 2019, shallow groundwater ranged from near ground surface to 20 feet below ground surface. Groundwater levels in deeper wells ranged from about 15 to 40 feet below ground surface. The wells typically experience seasonal fluctuations (GEI, 2021) and those closer to surface water sources are influenced by the adjacent waters.

The South American Subbasin is bound to the west by the Sacramento River, on the north by the American River, on the south by the Cosumnes and Mokelumne Rivers, and on the east by the Sierra Nevada foothills (DWR, 2004). As of the spring 2019, groundwater levels near these sites ranged from 20 to 60 feet below ground surface (LWA, 2021). During the 2012–2016 drought period, groundwater was relied upon more heavily and the groundwater levels declined in response to increased pumping but then recovered to pre-drought levels as of 2019. The proposed project areas overly the South American Subbasin.

The North American and South American subbasins are pumped to supplement surface water supplies for local agricultural and municipal uses throughout the region. Both subbasins were designated as high-priority groundwater basins and have completed Groundwater Sustainability Plans (GSPs) that provide a framework for sustainability (GEI, 2021; LWA, 2021). Groundwater Sustainability Agencies (GSAs) within these subbasins have been actively managing groundwater for decades and will continue to implement projects and management actions to achieve sustainable groundwater management. In 2023, DWR approved the GSPs for both the North American and South American subbasins (DWR, 2023). The City's groundwater wells are further discussed below under *Water Supply*.



SOURCE: Maxar 2021; ESA, 20223

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 3.12-2
Groundwater Basins

ESA

Flooding

High water levels along the Sacramento and American Rivers are common throughout the winter and early spring months as a result of increased flow from storm runoff and Sierra Nevada snowmelt. In the proposed project areas, there are several types of flood events: flash, riverine, and urban stormwater (City of Sacramento, 2023a). These floods are often the result of severe weather and heavy rainfall, either in the City or in areas upstream (e.g., Sacramento River watershed). Flash flood describes localized floods of high volume and short duration, usually resulting from a heavy rainfall on a relatively small drainage area. There is also a chance of flash floods occurring from failure of dams, reservoirs, or levees. The most common type of flood event is localized riverine or creek flooding, which occurs when a watercourse exceeds its bank-full capacity. Urban stormwater flooding occurs when storm drains are not adequately sized or experience temporary blockage.

Flood Management

Flood control in the vicinity of the proposed project areas are provided by a comprehensive system of dams, levees, overflow weirs, drainage pumping plants, and flood control bypass channels provided by the Sacramento River Flood Control Project (SRFCP) and the American River Flood Control Project. Collectively, these State-federal flood protection systems are referred to as the State Plan of Flood Control (SPFC). The SPFC relies on many other non-SPFC features, such as non-State or Federal reservoirs to regulate flows and reduce loading on the system, and private levees in the Central Valley or non-project (local) levees in the Delta. The geographic area protected by the SPFC encompasses the Sacramento and San Joaquin Rivers, and tributaries (e.g., American River) with more than 43,000 square miles of combined drainage area (DWR, 2022b).

At a local level, the Sacramento Area Flood Control Agency (SAFCA) plays an important role in flood control protection for the greater Sacramento metropolitan area. SAFCA was formed to address the Sacramento area's vulnerability to catastrophic flooding. This vulnerability was exposed during the record flood of 1986 when Folsom Dam exceeded its normal flood control storage capacity and several area levees nearly collapsed under the strain of the storm.
In response, the City of Sacramento, the County of Sacramento, the County of Sutter, the American River Flood Control District, and Reclamation District 1000 created SAFCA through a Joint Exercise of Powers Agreement to provide the Sacramento region with increased flood protection along the American and Sacramento Rivers. On a regional level, flood control is one of the major functions of the SWP and CVP. SWP and CVP operational priorities do change between seasons, and flood control is generally the top priority from November to April. During this period, reservoir releases are controlled by the need to create and maintain reservoir empty space for flood control storage. Additionally, the American River Common Features 2016 Project has several components with the goal of reconstructing the remainder of the levee system not covered by other projects and increasing the capacity of the Lower American River channel to handle larger flood flows (SAFCA, 2024).

Flood Hazard Zones

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) were reviewed to identify flood hazard zones in the proposed project areas. The FWTP, SRWTP and location of the existing utility upgrades are within Zone X (shaded), an area with reduced flood risk due to levee. These moderate flood hazard areas fall between the limits of the 1-percent and 0.2-percent-annual-change flood (i.e., 100-year-flood and 500-year flood, respectively) (FEMA, 2023). The area north of the FWTP to the American River is designated as Zone AE, an area with high flood hazard subject to the 1-percent-annual-chance flood (i.e., the base flood or 100-year flood). A portion of the SRWTP is located in Zone X (unshaded), an area with minimal flood hazard due to the heightened elevations of certain areas within the water treatment plant facility.

The location of the existing intake and new water intake in the Sacramento River are also located in Zone AE, an area with high flood hazard (FEMA, 2023). The conveyance pipelines from each intake to the SRWTP are located in Zone X (shaded), an area with reduced flood risk due to levee. The area in the vicinity of the SRWTP, where the potable water transmission pipelines are proposed, are also mapped as Zone X (shaded), an area with reduced flood risk due to levee.

Water Supply

City of Sacramento Water Supply

As described in Chapter 2, *Project Description,* the City owns and operates water treatment and distribution facilities that provide drinking water to nearly half a million customers in a 100-square-mile service area. These facilities include two surface water treatment plants, approximately 1,800 miles of distribution pipelines, and 30 permitted groundwater wells (City of Sacramento, 2021).

The City possesses surface water rights to divert water from both the Sacramento and American rivers. Specifically, the City holds permits for five post-1914 appropriative water rights—one for Sacramento River water and four for American River water. The Sacramento River water right has a priority date in the early1920s, and the American River water rights have priority dates from the late 1940s and early 1950s. In addition, the City has a pre-1914 appropriative water right on the Sacramento River from the late 1840s, plus a small riparian right and license for Camp Sacramento, both with 1920s priority dates (City of Sacramento, 2021).

In 1957, the City entered into a permanent water rights operating contract with Reclamation (Reclamation, 1957). Under this contract, the City agreed to: (1) limit its combined rate of diversion under its American River water rights permits to a maximum of 675 cubic feet per second (cfs), up to a maximum amount of 245,000 acre-feet per year (afy) in the year 2030; and (2) limit its rate of diversion under its Sacramento River water rights permit to a maximum of 225 cfs and a maximum amount of 81,800 afy (City of Sacramento, 2021). The contract limits the City's total diversions of Sacramento and American River water under its water rights permits to 326,800 afy in the year 2030.

Under the terms of the 1957 permanent water rights operating contract, Reclamation delivers the City's water rights (which are not CVP contract water) through releases from Folsom and Nimbus reservoirs. The contract also requires Reclamation to operate its Sacramento River and American River facilities such that sufficient water is available for the City's diversions (up to the diversion amounts specified in the contract). The City agreed to make an annual payment to the Reclamation for Folsom Reservoir storage capacity used to meet the Bureau's obligations under the contract, beginning with payment for 8,000 acre-feet (af) of storage capacity in 1963 and building up to payment for the use of 90,000 af of storage capacity in 2035. The City's diversions at the FWTP are subject to voluntary limitations specified in the Water Forum Agreement, further discussed below. The additional water that would be diverted from the Sacramento River by the City through the proposed new water intake would not exceed the amounts specified in the 1957 permanent water rights operating contract.

The City's Department of Utilities operates and maintains many active groundwater wells, which produce up to 20 percent of the City's drinking water. The City currently operates 30 permitted municipal groundwater supply wells within the City limits that pump from the North American and South American subbasins. City wells supply about 20 million gallons a day (MGD) of water for municipal use. The actual total capacity is larger, but varies due to maintenance activities, water quality of produced groundwater and other factors. The City's average annual groundwater deliveries from 2006 to 2017 were approximately 17,932 afy or 16 MGD. The City also operates 22 non-potable wells that are primarily used for park irrigation. The City's groundwater well replacement program (City of Sacramento, 2023b) proposes to replace aging wells, as part of the Groundwater Master Plan which provides a guide for using groundwater reserves to improve water supply reliability and diversity the City's water supply portfolio (City of Sacramento, 2025). The City has an ongoing water conservation program and has long been committed to implementing water conservation measures for all of its customer sectors (City of Sacramento, 2021).

Water Forum Agreement

The Water Forum is a diverse group of business and agricultural leaders, citizens groups, environmentalists, water managers, and local governments in Sacramento County, including the City of Sacramento. In early 2000, numerous water interests in the greater Sacramento region ratified a basin-wide agreement, known as the Water Forum Agreement (Water Forum, 2015a). This long-term agreement was based on two co-equal objectives: providing a reliable and safe water supply for the region's economic health and planned development to the year 2030; and preserving the fishery, wildlife, recreational, and aesthetic values of the lower American River. Ratified through a Memorandum of Understanding, the Water Forum Agreement has the commitment of signatories comprising local water purveyors, business and citizen organizations, environmental groups, and local, State, and federal governments, including the City of Sacramento. Signatories endorse and participate in implementation of the Water Forum Agreement, including seven key elements: increased surface water diversion; actions to meet customers' needs while reducing diversion impacts in drier years; support for an improved flow pattern of fishery flow releases from Folsom Reservoir; Lower American River Habitat Management Element (HME); Water Conservation; Groundwater Management; and Water Forum Successor Effort (Water Forum, 2015b).

The Water Forum Agreement identified several projects, including the development of a water supply plan that is consistent with the Water Forum objectives of pursuing a Sacramento River diversion to meet the water supply needs of the Placer-Sacramento region, and promoting ecosystem preservation along the lower American River. Also, as part of this agreement, the City of Sacramento's FWTP diversion is required to comply with the diversion limitations of the City's Purveyor Specific Agreement (PSA) which apply during certain drought conditions. The

City PSA also identified support for rehabilitation and/or expansion of the SRWTP, in alignment with this proposed project (Water Forum, 2015a, page 301). The agreement was prepared in January 2000 and updated in October 2015. Stakeholders in the Sacramento Region are continuing to work together to update the Water Forum Agreement as part of "Water Forum 2.0" to consider several cross-cutting topics include climate change, fisheries, habitat, groundwater management and urban water management planning (Water Forum, 2020).

Lower American River Minimum Flow and Temperature Requirements

In addition to the standards in D-893, instream flow requirements for the lower American River are set and managed through a variety of court decisions and voluntary management operations. One of the key drivers for instream flows resulted from the 1989 ruling by Judge Richard Hodge in the *Environmental Defense Fund (EDF) et al. v. East Bay Municipal Utility District (EBMUD)* court decision. In the decision Judge Hodge ruled that EBMUD could take water through the Folsom-South Canal, provided that enough water remained in the river to protect public trust resources. Based on available evidence, Judge Hodge determined that the following flows were "enough" to protect fishery resources, riparian habitat values, and recreational values: from October 15 through February 28, 2,000 cfs; from March 1 through June 30, 3,000 cfs; and from July 1 through October 14, 1,750 cfs (Water Forum, 2000).

These flow standards, referred to as the "Hodge Criteria," apply only to diversions by EBMUD or by other parties subject to the litigation, however, many water purveyors have agreed to curtail diversions when flows are less than the Hodge Criteria. In addition to these instream flow requirements, the decision required that an additional 60,000 acre-feet per year be maintained in reserve in Folsom Reservoir from mid-October through June for discretionary release in coordination with CDFW in consideration of fishery requirements. The Hodge Criteria flows did not specifically address water temperature considerations for salmonids and water temperatures associated with the required flows are often detrimental to juvenile steelhead rearing, as well as fall-run chinook salmon spawning and incubation (SWRI, 2001).

In July 2006, Reclamation, the Water Forum, and other stakeholders agreed to a flow and temperature regime (known as the Lower American River Flow Management Standard) to improve conditions for fish in the lower American River. Under the Lower American River Flow Management Standard, the required flow, as measured by the total release at Nimbus Dam, would vary throughout the year depending on the hydrology of the Sacramento and American Rivers. The primary purpose of the proposed Lower American River Flow Management Standard is to maximize the annual production and survival of the anadromous fall-run Chinook salmon and steelhead in the lower American River, within water availability constraints and in consideration of Reclamation's obligation to provide for multi-purpose beneficial uses of the CVP.

In 2015, the Water Forum updated the Lower American River Flow Management Standard based on best-available science and, while Reclamation is not bound to the flow and temperature recommendations, they have generally adopted the 2015 Lower American River Flow Management Standard proposed by the Water Forum as outlined in the "Modified Flow Management Standard Proposed Water-Right Terms and Conditions, November 2017." Ultimately, it is the intent of the Water Forum to have Reclamation petition the State Water

Board to amend its water rights on the American River with those prescriptions set out in the 2015 Lower American River Flow Management Standard (Water Forum, 2015b; ARWA, 2017).

While minimum flow targets in the American River below Nimbus Dam are based on the Lower American River Modified Flow Management Standard, per the 2015 Water Forum Agreement, minimum flows further downstream are based on State Water Board Decision 893 (D-893). Pursuant to the Water Forum Agreement, the City has also agreed to add conditions to its American River water right permits, which became effective after the expansion of the FWTP in 2005, limiting diversions when American River flows at the treatment plant intake fall below the Hodge Flow Criteria, presented in **Table 3.12-1**.

TABLE 3.12-1
HODGE FLOW CRITERIA FOR MAXIMUM DIVERSION AT FAIRBAIRN WATER TREATMENT PLANT INTAKE

Maximum Diversion	River Flow and Time of Year						
	< 2,000 cfs	< 3,000 cfs		< 1,750 cfs			< 2,000 cfs
	01/01 – 02/28	03/01 – 05/31	06/01 – 06/30	07/01 – 08/31	09/01 – 09/30	10/01 – 10/14	10/15 – 12/31
Rate (MGD)	77.6	77.6	100.2	100.2	77.6	64.6	64.6
Rate (cfs)	120	120	155	155	120	100	100

NOTES: cfs = cubic feet per second, MGD = million gallons per day
SOURCE: Water Forum, 2000

Central Valley Project and State Water Project Operations

Reclamation and DWR operate the CVP and SWP, respectively, to divert, store, and convey water consistent with applicable laws and regulations, and contractual obligations for agricultural, urban, and environmental beneficial uses in the Sacramento River Basin, the Sacramento–San Joaquin Delta (Delta), and areas south of the Delta (DWR, 2022a). This includes the City's water supplies.

The CVP represents the largest surface water storage and delivery system in California, with a geographic scope covering 35 of the State's 58 counties. The CVP is composed of some 20 reservoirs with more than 11 MAF of storage capacity, 11 power plants, and over 500 miles of major canals and aqueducts. Within the Sacramento Basin, the CVP operates Shasta, Trinity, and Folsom reservoirs, among others. The Jones Pumping Plant (formerly known as the Tracy Pumping Plant) exports CVP water from the Delta for storage in San Luis Reservoir and delivery to contractors in the San Joaquin Valley. Overall, contract amounts total 6,751 TAF and the CVP supplies water to 253 water service contractors in the Central Valley, Santa Clara Valley, and the San Francisco Bay Area (including Sacramento River Water Settlement Contractors) (DWR, 2022a).

The SWP is operated by DWR and consists of 32 storage facilities, 660 miles of aqueducts and pipelines, 17 pumping plants, and eight hydroelectric power plants. The principal storage facility for the SWP is Oroville Reservoir (i.e., Lake Oroville). SWP export facilities in the South Delta include Clifton Court Forebay, the Skinner Fish Facility, and the Banks Pumping Plant. Using these facilities, the SWP provides urban and agricultural water supply, flood control, recreation, fish and wildlife enhancement, power generation, and salinity control in the Delta. The SWP delivers water to over two-thirds of California's population and approximately 600,000 acres of farmland through 29 urban and agricultural water districts. These agencies have long-term water supply contracts totaling 4.2 MAF per year. However, existing SWP facilities supply less than 2.4 MAF per year during drought conditions (DWR, 2022a).

The DCC is a feature of the CVP's Delta Division. The facility is a gate-controlled diversion channel on the east bank of the Sacramento River, about 30 miles downstream of the City. The DCC facilitates the diversion of fresh water from the Sacramento River to the interior Delta. When the gates are open, the DCC diverts fresh Sacramento River water to the CVP's Jones Pumping Plant and the SWP's Banks Pumping Plant. The DCC gate operations follow State Water Board Decision and the 2019 National Oceanic and Atmospheric Agency's (NOAA's) National Marine Fisheries Service (NMFS) and USFWS Biological Opinions on the Long-Term Operation of the CVP and SWP; it allows greater flexibility for fishery and water quality protection by managing the gates in real-time. High flows on the Sacramento River, unforeseen fishery protection actions, and/or water quality compliance requirements in the Delta dictate when the gates are to be closed for water quality and fishery protection. For example, Reclamation's typical standing operating procedures call for gate closures when flow on the Sacramento River exceeds approximately 22,500 cfs (Reclamation, 2021).

Coordinated Operations Agreement and Long-Term Operation of the Central Valley Project and State Water Project

Both the CVP and SWP rely on the Sacramento River and the Delta as common conveyance facilities. Reservoir releases and Delta exports must be coordinated so that both the CVP and SWP are able to retain their portion of the shared water and jointly share in the obligations to protect beneficial uses. A Coordinated Operations Agreement (COA) between the CVP and SWP was developed and became effective in November 1986 pursuant to P.L. 99-546 as signed by Reclamation and DWR. The COA defines the rights and responsibilities of the CVP and SWP regarding water needs of the Sacramento River system and Delta and includes obligations for in-basin uses, accounting, and real-time coordination of water obligations of the two projects. The COA contains considerable flexibility in the manner with which Delta conditions in the form of flow standards, water quality standards, and export restrictions are met.

Initially the agreement included a fixed ratio of 75 percent CVP and 25 percent SWP for the sharing of regulatory requirements associated with storage withdrawals for Sacramento Valley in-basin uses (e.g., curtailments for water quality and species uses). Changes in California water supply allocations, hydrology, and regulatory requirements and standards, among other things since 1986, have resulted in renegotiation of the original terms of the agreement. Following negotiations in fall 2018, Reclamation and DWR agreed to an addendum to the COA in December 2018 that adjusted the ratio of in-basin sharing percentages based on water year types. The State also agreed in the 2018 revisions to transport up to 195,000 af of CVP water through the SWP's California Aqueduct during certain conditions.

The USFWS and NMFS Biological Opinions on the coordinated long-term operation of the CVP and SWP released in 2008 and 2009, respectively (USFWS, 2008; NMFS, 2009), and updated in

2019, include numerous measures (i.e., Reasonable and Prudent Measures) to avoid jeopardy to listed species that include conditions for revised water operations, habitat restoration and enhancement actions, and fish passage actions. Recent disagreements related to CVP and SWP operational changes by the federal and State governments, in particular those under the Endangered Species Act, have called into question the future of coordinated operations under the COA.

In fall 2021, Reclamation and DWR collaborated with the USFWS, NMFS, and CDFW to develop revised operating rules for the CVP and SWP (the proposed action) and evaluate how the anticipated modifications may cause effects to species listed under the Endangered Species Act and/or designated critical habitat not analyzed in the 2019 biological opinions. The updated rules align operations for the Sacramento-San Joaquin River Delta and present a drought-resilient framework for operating Delta facilities and Shasta Reservoir that will provide more certainty for water users and fish and wildlife. The plan also includes a new winter-run action plan to improve viability over the next 10 years, an adaptive management approach to incorporate new science, and a federal strategy to evaluate impacts of new water infrastructure (Reclamation, 2024a). Reclamation and DWR analyzed impacts of the proposed action and alternatives under National Environmental Policy Act (NEPA) and CEQA, respectively. The fish and wildlife agencies also analyzed this proposed action consistent with FESA and CESA (Reclamation, 2024a). On December 20, 2024, Reclamation signed the Record of Decision signaling approval of the revised operating rules (Reclamation, 2024b).

Water Supply Deliveries

Water deliveries to CVP and SWP contractors are made continually throughout the year, but deliveries vary seasonally and annually based on forecasted reservoir inflows, water supply conditions, water demands, and regulatory requirements. While Reclamation guards against shortages, CVP contracts typically include provisions specifying that deliveries are made only to the extent that water is available. Therefore, delivery reductions can and do occur. Historically, the combination of carryover storage and current-year snowmelt and runoff were sufficient to meet the majority of CVP contractor demands. However, drought, increasing demand, and increasing regulatory constraints have made this more difficult to achieve.

Reclamation considers various factors when determining allocations; however, allocations are generally accomplished through a two-tier hierarchy. In the first tier (Group I) are those with specifically defined minimum supplies such as Sacramento River water rights and San Joaquin Exchange contracts, national refuge water supplies, and municipal and industrial water supplies. The second tier (Group II) includes all other agricultural water service contracts. Under the hierarchy, Group I water demands must be met first. However, recognition of the increasing demands on a finite CVP water supply has recently led Reclamation to consider revising its water delivery allocation guidelines. This has been ongoing since 1991, under Reclamation’s Municipal and Industrial 2001 Water Shortage Policy. Various agreements and regulatory requirements dictate joint CVP/SWP operations (i.e., Delivery Capability Reports; refer to DWR, 2022c).

In order to resolve potential conflicts with the CVP, Reclamation entered into contracts early in the CVP’s development with many senior water rights holders, including the City (i.e., the 1957 permanent water rights operating contract discussed above). These “settlement contracts” recognized senior water rights and clarified the responsibilities of Reclamation and other parties. Reclamation also has entered into long-term water contracts with various water purveyors (e.g., irrigation districts and municipal water agencies) for delivery of CVP water. These water service contracts are a type of wholesale agreement in which water is delivered to the CVP contractor subject to availability. Reclamation operates the CVP to meet environmental requirements and to accommodate diversions by settlement contractors and other water rights holders senior to the CVP. Water is delivered to water service contractors to the extent that water is available in excess of these obligations and may less than contracted amounts under water shortage conditions. Of note, the City is not a CVP contractor.

Drought Curtailments

Water years 2020 through 2022 (October 1, 2019, through September 30, 2022) was the driest three-year period on record. Particularly in water years 2021 and 2022, the Delta watershed experienced critically dry hydrologic conditions. The combination of unusually low precipitation, warm temperatures, and dry soils resulted in unprecedented low runoff from the Sierra-Cascade snowpack, causing low reservoir storage levels and significant reductions in water supplies (State Water Board, 2024a). For example, in water year 2022, Reclamation had a zero allocation for its CVP agricultural contractors north and south of the Delta (DWR, 2022d).

In recognition of these dry conditions, on May 10, 2021, Governor Newsom declared a drought emergency for 41 counties, including those within the Delta watershed. The drought emergency declaration outlined various actions that the State Water Board and other agencies should take or consider, including curtailments to prohibit diversions when water was not available at a water right holder’s or claimant’s priority of right. On August 20, 2021, the State Water Board issued initial orders imposing curtailment and reporting requirements to all water right holders and claimants in the Delta watershed, including both small diverters (annual use/right under 5,000 acre-feet) and larger diverters (annual use/right of 5,000 acre-feet or greater). The State Water Board issued curtailments based on water right priority. On March 24, 2023, Governor Newsom issued a partial rollback of emergency restrictions that were no longer needed. The initial orders issued to small and larger diverters were eventually rescinded on April 3, 2023 (State Water Board, 2024a).

Pursuant to the drought emergency declaration, the State Water Board developed the Water Unavailability Methodology for the Delta watershed to support the issuance of curtailment orders to water right holders and claimants when warranted by conditions between August 20, 2021, and April 3, 2023. The Water Unavailability Methodology identified when supply and demand data indicated that water was unavailable for diversion by water right holders at their priorities of right. The Water Unavailability Methodology improved upon the approach used during the drought years of 2014 and 2015 (State Water Board, 2024b). Curtailment status updates were issued on a regular basis (approximately weekly) between August 20, 2021, when the regulation went into effect, and April 3, 2023, when all curtailment orders were rescinded (State Water Board, 2024c).

The critically dry conditions in the Delta watershed resulted in insufficient water supplies to meet all water demands, water quality objectives, and flow requirements. This resulted in curtailments.

As described above, the City owns both pre- and post-1914 appropriative water rights in Sacramento River watershed, including both the Sacramento Valley Floor subwatershed and Upper American subwatershed. Between August 20, 2021, and April 3, 2023, the City's pre-1914 appropriative water rights were not curtailed. However, some of the City's post-1914 appropriative water rights were curtailed in August 2021 and for some weeks between July and October 2022 (State Water Board, 2024c). Curtailments were applied to select direct diversions (not rediversion of previously stored water).

3.12.3 Regulatory Setting

This section describes Federal, State, and local water resources–related regulations as they pertain to the proposed project. Refer to Section 3.5, *Biological Resources - Aquatic*, for additional description of regulations related to aquatic species habitat.

Federal

Clean Water Act

Regulatory authorities exist on both the state and Federal levels for the control of water quality in California. The U.S. EPA is the Federal agency responsible for water quality management pursuant to the CWA. The purpose of the CWA is to protect and maintain the quality and integrity of the nation's waters by requiring states to develop and implement state water plans and policies. Several sections of the CWA pertain to regulating impacts on waters of the United States and are described in more detail below.

Section 303: Water Quality Standards and Implementation Plans

The State of California adopts water quality standards to protect beneficial uses of state waters as required by Section 303 of the CWA and the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne). Under Section 303(d) of the CWA, states, territories, and authorized tribes are required to develop lists of impaired waters. Impaired waters are waters that do not meet water quality standards, even after point pollution sources have installed control technology necessary to meet the minimum required pollution protection level. The law requires that these jurisdictions establish a priority ranking for listed waters and develop action plans to improve water quality. This process includes development of the TMDL that set discharge limits for non-point source pollutants. A TMDL is the amount of loading that the water body can receive for a given constituent and still meet water quality criteria for that constituent. The TMDL must include an allocation of allowable loadings to point and non-point sources, with consideration of background loadings and a margin of safety. Generally, NPDES permit limitations for listed pollutants must be consistent with the load allocation identified in the TMDL. Section 303(d) listing associated with water bodies in the vicinity of the proposed project areas are described in more detail below.

Section 401: Water Quality Certification

Section 401 of the CWA requires any applicant pursuing a federal permit to conduct any activity that may result in a discharge of a pollutant into navigable waters, including the crossing of rivers or streams during road, pipeline, or transmission line construction, to obtain a water quality certification (or waiver) from the State in which the discharge originates. CWA Section 401 is administered by U.S. EPA. In California, CWA Section 401 authority is delegated to and administered by the State Water Board and water quality certifications are issued by Regional Water Boards in California. Under Section 401 of the CWA, applicants for a federal license or permit to conduct activities which may result in the discharge of a pollutant into waters of the United States must obtain certification or waiver from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge would originate. The regional water boards must issue or waive Section 401 water quality certification for the project to be permitted under Section 404. Water quality certification requires the evaluation of water quality considerations associated with dredging or placement of fill materials into waters of the United States and imposes project-specific conditions on development. The certification ensures that the discharge will comply with the applicable effluent limitations and water quality standards.

Section 402: National Pollutant Discharge Elimination System

The 1972 amendments to the Federal Water Pollution Control Act established the NPDES permit program to control discharges of pollutants from point sources (Section 402). The 1987 amendments to the CWA created a new section of the CWA devoted to non-point source (i.e., stormwater) pollutant permitting (Section 402[p]). The U.S. EPA has granted the State of California (the State Water Board and regional water boards) primacy in administering and enforcing the provisions of CWA and NPDES. NPDES is the primary program that regulates point-source and non-point source discharges to waters of the United States. The State Water Board issues both general and individual permits for discharges to surface waters.

In response to the 1987 amendments, the U.S. EPA developed the Phase I NPDES Storm Water Program for cities with populations larger than 100,000, and Phase II for smaller cities. The goal of NPDES stormwater regulations is to improve the quality of stormwater discharged to receiving waters to the "maximum extent practicable" through the use of structural and non-structural BMPs. BMPs can include the development and implementation of various practices including educational measures (workshops informing public of what impacts results when household chemicals are dumped into storm drains), regulatory measures (local authority of drainage facility design), public policy measures, and structural measures (filter strips, grass swales and detention ponds). NPDES permits administered and enforced by the State that are applicable to the proposed project are further discussed below (e.g., Construction General Permit, Phase I medium municipal separate storm sewer system [MS4] General Permit, General Dewatering Permit, and Limited Threat Discharges to Surface Water General Permit).

Section 404: Discharges of Dredged or Fill Material

Dredging and placement of fill materials into the waters of the United States is regulated by Section 404 of CWA, which is administered by USACE. For projects that discharge dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 would be needed. The Central Valley Regional Water Board would review the permit application to ensure that discharge would not violate water quality standards.

Compliance with Section 404 of the CWA requires that the lead federal agency comply with applicable federal environmental laws and regulations. The USACE cannot issue an individual permit or verify the use of a general nationwide permit until the requirements of ESA and the National Historic Preservation Act have been met. In addition, the USACE cannot issue or verify any permit until a water quality certification has been issued or waived pursuant to CWA Section 401.

Section 408: Levees

USACE Section 408 program allows another party, such as a local government, company, or individual, to alter a USACE Civil Works project (Civil Works project). Reasons for alteration could include improvement projects, relocation of part of a Civil Works project, or installing utilities or other non-Civil Works project features. The Section 408 program verifies that changes to authorized Civil Works project will not be injurious to the public interest and will not impair its usefulness. This requirement was established in Section 14 of the Rivers and Harbors Act of 1899, which has since been amended several times, and is codified at 33 USC Section 408—the section of U.S. Code that gives the program its name.

Federal Antidegradation Policy

The federal antidegradation policy is designed to protect designated beneficial uses of waters via the level of water quality necessary to protect those uses, and to protect and maintain high quality waters and national water resources. The federal policy directs States to adopt a statewide policy that includes the following primary provisions (40 CFR 131.12):

> “(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
>
> (2) Where the quality of waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State’s continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located…
>
> (3) Where high quality waters constitute an outstanding National resource, such as waters of National and States parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.”

Rivers and Harbors Act and Associated Environmental Compliance

The Rivers and Harbors Act regulates placement of fill and structures in navigable waterways. The permit program, regulated under Section 10 of the Act, is administered by the USACE. In practice, permitting is combined with CWA Section 404 permitting. The Sacramento and American River are considered a navigable waterway, and therefore, construction activities occurring in either river (e.g., new water intake in the Sacramento River) may require a permit.

Federal Emergency Management Agency

The FEMA is responsible for determining flood elevations and floodplain boundaries based on hydrologic and hydraulic studies. FEMA is also responsible for distributing the FIRMs which are used in the National Flood Insurance Program (NFIP). These maps identify the locations of special flood hazard areas, including the 100-year floodplain. Federal regulations governing development in a floodplain are set forth in Title 44, Part 60 of the CFR.[1] FEMA imposes building regulations on development within flood hazard areas depending upon the potential for flooding within each area. Building regulations are incorporated into the municipal code of jurisdictions participating in the NFIP. Section 15.104, Floodplain Management Regulations, of the Sacramento City Code includes requirements for compliance with Title 44, Part 60 of the CFR.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq.), passed in 1969, articulates the federal CWA. In the Porter-Cologne Water Quality Control Act, the Legislature declared that the "state must be prepared to exercise its full power and jurisdiction to protect the quality of the waters in the state from degradation..." (California Water Code Section 13000). That is, it requires protection of water quality by appropriate design, sizing, and construction of erosion and sedimentation controls. The State Water Board is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies and has delegated primary implementation authority to the nine Regional Water Boards. The Porter-Cologne Act assigns responsibility for implementing CWA Sections 401 through 402 and 303(d) to the State Water Board and the nine regional water boards.

The Porter-Cologne Water Quality Control Act grants the State Water Board and regional water boards (Boards) the authority to implement and enforce the water quality laws, regulations, policies, and plans to protect the groundwater and surface waters of the state. The Boards are also authorized to regulate discharges of waste, which include discharges of dredged or fill material, and have established their own wetland definition and program for regulation of waters of the state as described in the *State Policy for Water Quality Control: State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (State Water Board, 2021). If affected, waters of the state would require waste discharge permitting and/or a CWA Section 401 water quality certification (in the case of a required USACE permit under Section 404). Generally, all waters of the United States are also regulated as waters of the state. Some aquatic resources, particularly those that are ephemeral or isolated or that are not waters of the United States, will also qualify as waters of the state. The enforcement of the state's water quality requirements is not solely the purview of the Boards and their staff; other agencies (e.g., the CDFW under section 5650 of the California Fish and Game Code) have the authority to enforce certain water quality provisions in state law.

[1] Code of Federal Regulations, 2002. Title 44, Emergency Management and Assistance, Part 60, Criteria for Land Management and Use. October 1, 2002.

Basin Plans

In general, the State Water Board manages both water rights and statewide regulation of water quality, while the regional water boards focus exclusively on water quality in their regions. The Porter-Cologne Act requires preparation and adoption of water quality control plans (Basin Plans) that designate beneficial uses of California's major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters, provide the technical basis for determining waste discharge requirements, identify enforcement actions, and evaluate clean water grant proposals. State law defines beneficial uses to include (but not be limited to) "...domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves" (Water Code Section 13050[f]). Because beneficial uses, together with their corresponding water quality objectives, can be defined per Federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the State and Federal requirements for water quality control (40 Code of Federal Regulations 131.20). Compliance with Basin Plans is primarily achieved through implementation of the NPDES permit programs, which regulate waste discharges. The California Water Code and the CWA require Basin Plans to be reviewed and updated periodically (at a minimum every three years).

There are two Basin Plans relevant to the proposed project areas: the Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin (Central Valley Regional Board, 2019); and the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) (State Water Board, 2018). Each are discussed in more detail below. Beneficial uses for selected water bodies in the vicinity of the proposed project areas are summarized in **Table 3.12-2**.

Water Quality Control Plan for the Sacramento-San Joaquin River Basins

The Basin Plan for the Sacramento-San Joaquin River Basins, adopted by the Central Valley Regional Water Board on December 9, 1994, and most recently updated February 2019, provides water quality objectives and standards for waters of the Sacramento River and San Joaquin River basins. The plan contains specific numeric water quality objectives for bacteria, dissolved oxygen, pH, pesticides, EC, TDS, temperature, turbidity, and trace elements, as well as numerous narrative water quality objectives, that are applicable to certain waterbodies or portions of waterbodies. The plan also contains specific numeric standards for Delta inflow and outflow, chloride, and EC. EC standards in the Delta exist for both agricultural and fish and wildlife beneficial uses.

Water Quality Control Plan for the Delta and Decision 1641

On May 22, 1995, the State Water Board adopted the Basin Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (known as the 1995 Bay-Delta Plan) (State Water Board, 1995). In the 1995 Bay-Delta Plan, the State Water Board set water quality objectives to protect beneficial uses of water in the Delta and Suisun Bay. On December 29, 1999, the State Water Board adopted (and on March 15, 2000, revised) Decision 1641 (D-1641), amending certain terms and conditions of the water rights for the CVP and SWP (State Water Board, 2000). D-1641 substituted certain objectives adopted in the 1995 Bay-Delta Plan for water quality objectives required to be met under the CVP and SWP. These objectives (minimum Delta

TABLE 3.12-2
DESIGNATED BENEFICIAL USES OF SELECTED WATERBODIES IN THE VICINITY OF THE PROPOSED PROJECT AREAS

Designated Beneficial Use	Sacramento River: Clear Creek Below Whiskeytown Reservoir	Sacramento River: Shasta Dam to Colusa Basin Drain	Sacramento River: Colusa Basin Drain to I Street Bridge	Feather River: Fish Barrier Dam to Sacramento River	Folsom Lake	American River: Folsom Dam to Sacramento River	Sacramento-San Joaquín Delta[a]
Municipal and Domestic Supply (MUN)	X	X	X	X	X	X	X
Agricultural Supply Irrigation (AGR)	X	X	X	X	X	X	X
Agricultural Supply Stock Water (AGR)	X	X	--	--	--	--	X
Industrial Process Supply (PRO)	--	--	--	--	--	--	X
Industrial Service Supply (IND)	--	X	--	--	P	X	X
Hydropower Generation (POW)	--	X	--	--	X	X	--
Water Contact Recreation (REC-1)	X	X	X	X	X	X	X
Water Contact Recreation Canoeing and Rafting (REC-1)	X	X	X	X	--	X	X
Non-Contact Water Recreation (REC-2)	X	X	X	X	X	X	X
Warm Fresh water Habitat (WARM)	X	X	X	X	X	X	X
Cold Fresh water Habitat (COLD)	X	X	X	X	X	X	X
Warm Migration of Aquatic Organisms (MIGR-WARM)	--	X	X	X	--	X	X
Cold Migration of Aquatic Organisms (MIGR-COLD)	X	X	X	X	--	X	X
Warm Spawning, Reproduction, and/or Early Development (SPWN-WARM)	X	X	X	X	X	X	X

TABLE 3.12-2
DESIGNATED BENEFICIAL USES OF SELECTED WATERBODIES IN THE VICINITY OF THE PROPOSED PROJECT AREAS

Designated Beneficial Use	Sacramento River: Clear Creek Below Whiskeytown Reservoir	Sacramento River: Shasta Dam to Colusa Basin Drain	Sacramento River: Colusa Basin Drain to I Street Bridge	Feather River: Fish Barrier Dam to Sacramento River	Folsom Lake	American River: Folsom Dam to Sacramento River	Sacramento-San Joaquín Delta[a]
Cold Spawning, Reproduction, and/or Early Development (SPWN-COLD)	X	X	X	X	--	X	--
Wildlife Habitat (WILD)	X	X	X	X	X	X	X
Navigation (NAV)	--	X	X	--	--	--	X
Preservation of Biological Habitats of Special Significance (BIOL)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rare, Threatened, or Endangered Species (RARE)	N/A	N/A	N/A	N/A	N/A	N/A	X
Commercial and Sport Fishing (COMM)	N/A	N/A	N/A	N/A	N/A	N/A	X
Estuarine Habitat (EST)	N/A	N/A	N/A	N/A	N/A	N/A	X
Freshwater Replenishment (FRSH)	N/A	N/A	N/A	N/A	N/A	N/A	--
Groundwater Recharge (GWR)	N/A	N/A	N/A	N/A	N/A	N/A	X
Marine Habitat (MAR)	N/A	N/A	N/A	N/A	N/A	N/A	X
Shellfish Harvesting (SHELL)	N/A	N/A	N/A	N/A	N/A	N/A	X

NOTES: X = is existing beneficial use; P is potential beneficial use; -- is not designated.

a. Uses aggregated from the two relevant WQCPs.

SOURCE: Regional Water Board, 2019; State Water Board, 2018.

outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity levels) are enforced through the provisions of the State Water Board's D-1641 and generally intended to limit the eastward movement of high-salinity water. D-1641 also authorizes the CVP and SWP to jointly use each other's points of diversion in the southern Delta, with conditional limitations and required response coordination plans. Both DWR and Reclamation must monitor the effects of their respective diversions, and CVP and SWP operations to ensure compliance with existing water quality objectives. Among the objectives established in the 1995 Water Quality Control Plan and D-1641 are the "X2" objectives. The Bay-Delta Plan was updated by the State Water Board in 2006 and most recently amended in 2018.

State Water Board Water Right Decision 893

The minimum allowable flows in the lower American River are defined, in part, by State Water Board Water Right Decision 893 (D-893), which states in part that, in the interest of fish conservation, releases should not ordinarily fall below 250 cfs between January 1 and September 15 or below 500 cfs at other times and include an additional 151 cfs for delta salinity control between April and October. Nimbus Dam releases generally exceed the D-893 minimum flows during all but the driest of conditions; operations at Nimbus Dam are more commonly governed by either flood control requirements, coordination with other CVP and SWP releases to meet water supply and Delta operations objectives, or power regulation and management needs. The State Water Board, Reclamation, Water Forum (discussed below), and other stakeholders agree that D-893 does not sufficiently protect the aquatic resources of the lower American River (DWR, 2017). During recent years, Reclamation has operated Folsom and Nimbus dams to provide flows in the lower American River typically more than those required by D-893 and consistent with the lower American River modified flow management standard (see below), though Reclamation is not otherwise obligated to meet requirements outside of D-893.

In addition to the legal mandate of D-893, Reclamation has made a good faith effort to use best available science when considering temperatures and flows necessary to sustain fish resources in the lower American River. Specifically, Reclamation is the lead coordinator of the American River Group (ARG), a multi-agency and stakeholder technical team that coordinates fishery and operational requirements for the lower American River. The formal members include agencies with trust responsibilities for fisheries resources in the lower American River: Reclamation, USFWS, NMFS, CDFW, and the Water Forum (see below). Members of the public and other agencies may attend ARG meetings and comment on matters under consideration by the ARG. The ARG convenes monthly or more frequently, if needed, to discuss water operations, fisheries, and other environmental concerns and to share operational and biological information with the goal of improving the technical understanding of lower American River temperature and hydrological needs and operational constraints and considerations. Ultimately, ARG recommendations are only advisory, and the group has no authority to oversee Folsom and Nimbus dam releases. Yet, Reclamation has managed both Folsom and Nimbus dam releases according to ARG recommendations to the fullest extent possible, given its existing other obligations.

The 2018 version of the plan is the most current. The new flow objectives in the 2018 update recognize the vital role upstream flows provide for habitat and migration of threatened and endangered fish. The revised salinity objectives reflect updated scientific information about salt levels that are suitable for agriculture in the southern Delta.

The State Water Board is considering possible updates to the Bay-Delta Plan that would be needed for a proposed voluntary agreement (i.e., a comprehensive, multi-year solution that brings together water agencies with the state and federal governments to pool resources and take concrete actions to provide targeted river flows and expand habitat) for the Tuolumne River. Updates to the Bay-Delta Plan also include updates on the Sacramento River and its tributaries, Delta eastside tributaries, interior Delta flows, and Delta outflows, including consideration of proposed voluntary agreements.

Total Maximum Daily Loads

In accordance with Section 303(d) of the CWA, the regional water boards periodically review water quality conditions and determine if the conditions impair beneficial uses of each water body. This information is used to prepare lists of impaired water bodies in each basin that do not comply with applicable water quality standards. The regional water boards can develop TMDL criteria that identify the greatest pollutant volume that a water body can receive from discharges and still protect designated beneficial uses. Potential changes due to activities related to discharges, diversions, or water flow changes are reviewed by the regional water boards to determine if the results of these changes would be compliant with the TMDL criteria. The 2020–2022 California Integrated Report (Clean Water Act Section 303(d) list and 305(b) Report) was approved by the U.S. EPA May 11, 2022 and presents the list of impaired water bodies (State Water Board, 2022). TMDLs adopted or being developed to protect the beneficial uses of the 303(d) listed waterbodies in the vicinity of the proposed project areas are summarized in **Table 3.12-3**.

Antidegradation Policy

In 1968, the State Water Board adopted an antidegradation policy aimed at maintaining the high quality of waters in California by issuing Resolution No. 68-16: Statement of Policy with Respect to Maintaining High Quality Waters in California. The policy applies to both surface waters and groundwater, protects existing and potential future beneficial uses of surface water and groundwater, and is incorporated into the regional water boards' basin plans.

The antidegradation policy requires that existing high water quality be maintained to the maximum extent possible but allows lowering of water quality if the change is "consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated use of such water (including drinking), and will not result in water quality less than prescribed in policies." The policy also stipulates that any discharge to existing high-quality waters will be required to "meet waste discharge requirements which will result in the best practicable treatment or control of the discharge to ensure that (a) pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained." The antidegradation policy prohibits actions that tend to degrade the quality of surface water and groundwater. The regional water boards oversee this policy.

TABLE 3.12-3
303(D) LISTED WATERBODIES IN THE VICINITY OF THE PROPOSED PROJECT AREAS AND ASSOCIATED CONSTITUENTS OF CONCERN

Waterbody	Pollutant	Pollutant Category	Expected TMDL Date	U.S. EPA TMDL Approved Date
Sacramento River				
Clear Creek (below Whiskeytown Lake)	Mercury	Metals	2027	
Feather River (Lake Oroville to Sacramento River)	Aluminum	Metals	2035	
	Chlorpyrifos	Pesticides		8/11/2016
	Group A Pesticides	Pesticides	2011	
	Mercury	Metals	2027	
	Oxygen, Dissolved	Nutrients	2023	
	PCBs (Polychlorinated biphenyls)	Toxic Organics	2021	
	Toxicity	Total Toxics	2027	
Sacramento River (Keswick Dam to Cottonwood Creek)	Temperature, water	Other Cause	2033	
	Toxicity	Total Toxics	2019	
Sacramento River (Cottonwood Creek to Red Bluff)	Mercury	Metals	2027	
	Temperature, water	Other Cause	2033	
	Toxicity	Total Toxics	2027	
Sacramento River (Red Bluff to Knights Landing)	DDT (Dichlorodiphenyltrichloroethane)	Pesticides	2027	
	Dieldrin	Pesticides	2027	
	Mercury	Metals	2027	
	Oxygen, Dissolved	Nutrients	2035	
	PCBs (Polychlorinated biphenyls)	Toxic Organics	2027	
	Toxicity	Total Toxics	2027	
Sacramento River (Knights Landing to the Delta)	Mercury	Metals	2012	
	Temperature, water	Other Cause	2033	
	Chlordane	Pesticides	2021	
	DDT (Dichlorodiphenyltrichloroethane)	Pesticides	2027	
	Dieldrin	Pesticides	2022	
	Toxicity	Total Toxics	2027	
	PCBs (Polychlorinated biphenyls)	Toxic Organics	2021	
Sacramento River (Sacramento City Marina to Suisun Marsh Wetlands)	Temperature, water	Other Cause	2034	
	Fipronil	Pesticides	2035	
	Pyrethroids	Pesticides	2035	
	Toxicity	Total Toxics	2035	

Waterbody	Pollutant	Pollutant Category	Expected TMDL Date	U.S. EPA TMDL Approved Date
Sacramento-San Joaquin River Delta				
Delta Waterways	Arsenic	Metals	2027	
	Mercury	Metals		10/20/2011
	Organic Enrichment/Low Dissolved Oxygen	Nutrients		2/27/2007
	Invasive Species	Other Cause	2019	
	Temperature, water	Other Cause	2027	
	Chlordane	Pesticides	2027/2029	
	Chlorpyrifos	Pesticides		10/10/2007
	DDT (Dichlorodiphenyltrichloroethane)	Pesticides	2011/2027	
	Diazinon	Pesticides		10/10/2007
	Dieldrin	Pesticides	2011/2027	
	Group A Pesticides	Pesticides	2011/2027	
	Total DDT (sum of 4,4'- and 2,4'- isomers of DDT, DDE, and DDD)	Pesticides	2035	
	Electrical Conductivity	Salinity/TDS/ Chlorides/Sulfates	2019/2027	
	Toxicity	Total Toxics	2019/2027	
	Dioxin	Toxic Organics	2019	
	Furan Compounds	Toxic Organics	2019	
	PAHs (Polycyclic Aromatic Hydrocarbons)	Toxic Organics	2027	
	PCBs (Polychlorinated biphenyls)	Toxic Organics	2019/2027	
American River				
Folsom Lake	Mercury	Metals	2027	
Natoma, Lake	Mercury	Metals	2019	
	Indicator Bacteria	Pathogens	2035	
American River, Lower (Nimbus Dam to confluence with Sacramento River)	Bifenthrin	Pesticides	2027	
	Indicator Bacteria	Pathogens	2027	
	Mercury	Metals	2010	
	PCBs (Polychlorinated biphenyls)	Toxic Organics	2021	
	Pyrethroids	Pesticides	2027	
	Temperature, water	Other Cause	2034	
	Toxicity	Total Toxics	2021	

NOTE: TMDL = total maximum daily load
SOURCE: State Water Board, 2022.

Construction Storm Water General Permit

The State Water Board regulates stormwater discharges from construction sites because of its potential to mobilize pollutants and discharge into waterbodies or watersheds. Construction activity subject to this permit includes construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground/overhead projects, including installation of water pipelines and other utility lines. Construction activity does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The NPDES General Permit for Stormwater Discharges associated with Construction and Land Disturbance Activities (Order WQ 2022-0057-DWQ, NPDES No. CAS000002) is also referred to as the 2022 Construction General Permit (CGP). The CGP regulates construction activities that have the potential to discharge pollutants in stormwater into waters of the United States, specifically from construction sites that disturb one or more acres of land surface, or that are part of a common plan of development that disturbs more than one acre of land surface.

The CGP requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific construction BMPs designed to prevent sediment and pollutants from contacting stormwater and moving off-site into receiving waters. The BMPs fall into several categories—erosion control, sediment control, waste management, and good housekeeping—and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. The SWPPP must be prepared before construction begins and must contain a site map(s) delineating the construction work area, existing and proposed buildings, parcel boundaries, roadways, stormwater collection and discharge points, general topography before and after construction, and drainage patterns across the project area. The SWPPP must provide a pollutant source assessment and identify BMPs planned to control identified pollutants and map showing placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and for a Risk Level 2 or 3 project,[2] a turbidity monitoring program.

Applicants are required to prepare a notice of intent (NOI) that includes site specific information and the certification of compliance with the terms of the CGP. In addition to stormwater discharges, the CGP covers other non-stormwater discharges including irrigation of vegetative erosion control measures, water to control dust, uncontaminated groundwater from dewatering, and other discharges not subject to a separate general NPDES permit adopted by the Regional Water Board.

Phase I and II Municipal Separate Storm Sewer System Permits

In California, the State Water Board has drafted the General Permit for Discharges of Storm Water from Phase I and II MS4 General Permit. The County of Sacramento and the cities of Sacramento, Folsom, Citrus Heights, Elk Grove, Rancho Cordova, and Galt have a joint Phase I MS4 Permit (Central Valley Water Board Order No. R5-2016-0040, NPDES Permit No. CAS0085324) that was re-issued on November 23, 2016. Collectively, these jurisdictions are referred to as the Sacramento Stormwater Quality Partnership (Partnership). The MS4 Permit is

2 The CGP requires that construction sites be assigned a Risk Level of 1 (low), 2 (medium), or 3 (high), based both on the sediment transport risk at the site and the receiving-waters risk. The sediment risk level reflects the relative amount of sediment that could potentially be discharged to receiving water bodies and is based on the site location (soil types and slope length) and the project duration. The receiving-waters risk level reflects sensitivity of the receiving waters to the sediment discharge.

intended to implement the Basin Plan through the effective implementation of BMPs to reduce pollutants in stormwater discharges to the maximum extent practicable. The permittees listed under the joint permit have the authority to develop, administer, implement, and enforce storm water management programs within their own jurisdiction.

The permit regulates the discharge of all wet and dry weather urban storm water runoff[3] within the City of Sacramento and requires the City to implement a stormwater management program to reduce pollutants in stormwater to the maximum extent practicable. In response, the City of Sacramento and the other Permittees created the Stormwater Quality Improvement Plan (SQIP) to address the MS4 permit requirements and reduce the pollution carried by stormwater into local creeks and rivers. The SQIP is a comprehensive program that includes pollution reduction activities for construction sites, industrial sites, illegal discharges and illicit connections, new development, and municipal operations. The specific BMPs that are appropriate for a project to meet the requirement of reducing the discharge of pollutants to the maximum extent practicable are site specific.

Waste Discharge Requirements

If USACE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are presented in the project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by the Central Valley Water Board. Project involving excavation or fill activities impacting less than 0.2 acre or 400 linear feet of non-jurisdictional waters of the state and projects involving dredging activities impacting less than 50 cubic yards of non-jurisdictional waters of the state may be eligible for coverage under the State Water Board Water Quality Order No. 2004-0004-DWQ (General Order 2004-0004).

The City has an existing WDR for the FWTP (Order No. R5-2007-0087) and SRWTP (Order No. R5-2007-0086) that were both adopted June 22, 2007. The WDRs describe specific operating conditions at each treatment plant; establish discharge prohibitions, specifications and limitations; and provide monitoring and reporting program requirements. Note that the addition of tertiary treatment infrastructure to the facility would require revisions to the WDR that would have to be reviewed and approved by the Regional Water Board.

Dewatering Permit

Where groundwater levels tend to be shallow, dewatering during construction is sometimes necessary to keep trenches or excavations free of standing water when improvements or foundations/footings are installed. Such construction activities would require a dewatering permit.

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley Regional Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085. Small temporary construction dewatering projects are projects that discharge groundwater

[3] Urban storm water runoff is defined in the MS4 Permit as including stormwater and dry weather flows from a drainage area that reaches a receiving water body or subsurface.

to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a NOI with the Central Valley Regional Water Board prior to beginning discharge to surface waters.

Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project would require coverage under a NPDES permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for Limited Threat Discharges to Surface Water (Limited Threat General Order R5-2022-0006-02). This Limited Threat General NPDES Order is designed to allow limited threat waste discharges to surface waters or surface water drainage courses as long as the discharge does not include human waste and is able to meet all effluent limitations and discharge prohibitions. The Limited Threat General Order assumes discharges are low volume and/or short-term in nature (less than 0.25 million gallons and/or less than 120 days). A complete Notice of Intent must be submitted to the Central Valley Regional Water Board to obtain coverage under the Limited Threat General Order prior to commencement of any discharge to surface waters.

Sustainable Groundwater Management Act

In 2014, the Sustainable Groundwater Management Act (SGMA) was signed by the Governor of the state of California, setting the framework for local agencies to sustainably manage California's groundwater basins. To avoid potential State intervention, SGMA requires groundwater basins/subbasins designated by DWR as medium- or high-priority to follow four basic steps: (1) form a GSA by June 30, 2017; (2) develop and adopt a GSP by January 31, 2022; (3) implement the Plan to achieve a sustainability goal and avoid undesirable results within 20 years; and (4) report the implementation activities to the DWR to document whether the sustainability goal and the avoidance of undesirable results is being achieved.

Central Valley Flood Protection Plan

The Central Valley Flood Protection Plan (CVFPP) is California's strategic blueprint to improve flood risk management in the Central Valley. State law requires the DWR to develop and update, and the Central Valley Flood Protection Board (CVFPB) to adopt, the CVFPP on a five-year cycle. The 2022 CVFPP update evaluates progress made since passage of major State bonds in 2007 and recommends future management actions led by State, federal, and local partners to continue implementation of the CVFPP, including 200-year level of flood protection for urban and urbanizing areas (e.g., the Sacramento Metropolitan area, including the SRWTP and FWTP) (DWR, 2022e).

The CVFPB's mission is to reduce the risk of catastrophic flooding to people and property in California's Central Valley through several objectives:

- Manage flooding along the Sacramento and San Joaquin Rivers and their tributaries in cooperation with USACE.
- Cooperate with various agencies of the federal, State, and local governments in establishing, planning, constructing, operating, and maintaining flood control works.

- Maintain the integrity of the existing flood control system and designated floodways through its regulatory authority by issuing permits for projects that may encroach upon, improve, alter, or affect the SRFCP.

Because the proposed new water intake and associated elements would be located on and within the flood control right-of-way for the levee along the Sacramento River, approval for encroachment by the CVFPB is required. The approval process by the CVFPB is contingent on approval of the 408 permit by USACE mentioned previously.

Water Rights

Surface water rights in California are governed under a complex, hierarchical system administered by the State Water Board. Most surface water rights can be categorized either as riparian rights, which are attached to property that abuts a waterway, or pre-1914 or post-1914 appropriative water rights. California's system for regulating appropriative water rights, or water diverted for use in off-stream properties, was established in 1914. Pre-1914 rights are governed differently than post-1914 rights. Riparian and pre-1914 water rights are granted the prior right to use water; when their needs are met, post-1914 water right holders are allowed to divert water. The priority of appropriative water rights holders is governed by the principle "first in time, first in right"; that is, earlier (senior) water rights holders are allowed to use water before junior water rights holders.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies applicable to the evaluation of hydrology, water quality, and water supply effects of the proposed project are provided in **Table 3.12-4**.

TABLE 3.12-4
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – HYDROLOGY, WATER QUALITY, AND WATER SUPPLY

Element	Goals and Policies
Environmental Resources and Constraints	Goal ERC-1: Policies ERC-1.1, 1.2, 1.3, 1.4, 1.6; Goal ERC-5: Policies ERC-5.1, 5.2, 5.3, 5.4: Goal ERC-6: Policies ERC-6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12; Goal ERC-10: Policy ERC-10.8
Public Safety and Safety	Goal PFS-4: Policies PFS-4.1, 4.2, 4.3, 4.5

SOURCES: City of Sacramento, 2024.

The 2040 General Plan Policy ERC-1.3, Runoff Contamination, states that the City shall protect surface water and groundwater resources from contamination from point (single location) and non-point (many diffuse locations) sources, as required by federal and State regulations (i.e., NPDES MS4 permit).

The 2040 General Plan Policy ERC-1.4, Construction Site Impacts, states that the City shall require new development to protect the quality of water bodies and natural drainage systems through site design (e.g., cluster development), source controls, stormwater treatment, runoff reduction measures, BMPs, Low Impact Development (LID), and hydromodification strategies to avoid or minimize disturbances of natural water bodies and natural drainage systems caused by development, implement measures to protect areas from erosion and sediment loss, and continue to require construction contractors to comply with the City's erosion and sediment control ordinance and stormwater management and discharge control ordinance. Relevant City ordinances are described in more detail below.

City of Sacramento Code and Ordinances

Grading Ordinance

For projects that would disturb more than 50 cubic yards of soil, construction activities would be required to adhere to the City's Grading Ordinance (Title 15 Buildings and Construction, Chapter 15.88, Grading, Erosion and Sediment Control). The grading ordinance was enacted for the purpose of regulating grading on property within the City limits to avoid pollution of watercourses with nutrients, sediments, or other materials generated or caused by surface water runoff. The ordinance regulates site operations and conditions in accordance with the City's NPDES requirements to ensure that the intended use of a graded site within the City limits is consistent with the underlying land use designation and zoning as well as the goals and policies in the City's General Plan, as well as any specific plans adopted and all applicable City ordinances and regulations. The Grading Ordinance is intended to control all aspects of grading operations within the City limits as a means to control construction activities in order to minimize, to the maximum extent practicable, the degradation of water quality for any receiving waters.

Contractors are required to prepare an erosion and sediment control plan to control surface runoff and erosion and retain sediment on-site and prevent pollution of site runoff. These plans are required to include a requirement for a Spill Prevention and Control Plan to minimize the potential for, and effects from, spills of hazardous, toxic, or petroleum substances that are typically used during construction activities. These hazardous materials and wastes typically include fuels, oils, solvents, paints, and other products associated with maintenance of construction equipment. Implementation of a Spill Prevention and Control Plan complies with state and federal water quality regulations and provides the protocols to prevent any inadvertent releases of hazards and includes spill response measures to be enacted in the event of an accidental release to minimize exposure and contain any spread of the release.

Stormwater Management and Discharge Control Ordinance

Construction activities that may result in pollutants entering the stormwater conveyance system would be required to adhere to the City's Stormwater Management and Discharge Control Ordinance (Title 13 Public Services, Chapter 13.16, Stormwater Management and Discharge Control). Contractors would be required to develop and implement a SWPPP that includes an employee training program and must include BMPs that would be implemented during construction to reduce adverse effects on receiving water quality. A SWPPP is also required by the CGP.

Groundwater Discharges

All new groundwater discharges to the combined sewer system or separated sewer system are regulated and monitored by the City's Utilities Department pursuant to Department of Utilities Engineering Services Policy No. 0001, adopted as Resolution No. 92-439 by the Sacramento City

Council. Groundwater discharges to the City's sewer system are defined as construction dewatering discharges, foundation or basement dewatering discharges, treated or untreated contaminated groundwater cleanup, discharges, and uncontaminated groundwater discharges.

Short-term limited discharges of seven days duration or less must be approved through the City Department of Utilities by acceptance letter. Long-term discharges of greater duration than seven days must be approved through the City Department of Utilities and the Director of the Department of Utilities through a Memorandum of Understanding (MOU) process. The MOU must specify the type of groundwater discharge, flow rates, discharge system design, a City-approved contaminant assessment of the proposed groundwater discharge indicating tested levels of constituents, and a City-approved effluent monitoring plan to ensure contaminant levels remain in compliance with State standards or the Sacramento Area Sewer District (SacSewer)[4] and Central Valley Regional Board-approved levels.

All groundwater discharges to the sewer must be granted a SacSewer discharge permit. If the discharge is part of a groundwater cleanup or contains excessive contaminants, Central Valley Regional Water Quality Control Board (Regional Water Board) approval is also required. Refer to Section 3.11, *Hazards and Hazardous Materials*, for additional description of construction dewatering and contaminated groundwater.

Wastewater Discharges

The City's code includes requirements for wastewater discharges (Title 13 Public Services, Chapter 13.08, Sewer System Service), prohibiting the discharge of any substances, materials, waters, or waste if the discharge would violate any sewer use ordinance enacted by the Regional San. Section 13.08.040 identifies specific waters, wastes, and substances that may not be discharged to the sewer. In June 2023, the Sacramento County Regional Sanitation District (Regional San, now part of SacSewer) adopted a Consolidated Ordinance that sets forth requirements for the use of Regional San's wastewater collection and treatment system, provides for the enforcement of these requirements, establishes penalties for violations, and establishes the rates and fees for users of Regional San's sewer facilities (Regional San, 2023). Refer to Section 3.19, *Utilities and Service Systems*, for additional description of the City's utilities.

3.12.4 Impacts and Mitigation Measures

Method of the Analysis

To evaluate whether implementation of the proposed project would result in hydrology, water quality, and water supply impacts, the analysis considers how construction (short-term, temporary) and O&M (long-term, permanent) activities would result in changes to existing hydrologic, water quality, and water supply conditions. The proposed project would be regulated by the laws, regulations, plans, and policies summarized in subsection 3.12.3, *Regulatory Setting*. Therefore, the impact analysis assumes that the proposed project would comply with existing applicable regulatory and permitting requirements (i.e., water quality control plans, waste discharge

4 The Sacramento Regional County Sanitation District (Regional San) and Sacramento Area Sewer District (SacSewer) legally merged into one district resulting in a consolidated sewer utility called the Sacramento Area Sewer District, effective January 1, 2024 (SacSewer, 2023).

requirements, groundwater management, City ordinances, etc.). See Section 3.1, *Approach to the Analysis*, for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

To further analyze the potential impacts of operations of the proposed new water intake in the Sacramento River on hydrology, water quality, water supply, and/or aquatic biological resources several modeling efforts were performed to: (1) evaluate localized hydraulic effects due to the presence of the new tee screen intake in the Sacramento River; and (2) evaluate changes in surface water hydrology including flows, reservoir storage and water quality (e.g., temperature) as a result of increased diversion through the new water intake in the Sacramento River. Each modeling effort is summarized below, and a detailed description of the modeling assumptions, scenarios, limitations, and simulation results are provided in Appendix D and E**.**

Localized Effects of the Proposed New Sacramento River Water Intake

Modeling Approach

Potential localized hydraulic effects of the proposed new intake were evaluated using HEC-RAS 1-D models prepared by reducing the Common Features Release 6.2 model (USACE, 2022) to focus the analysis on the area surrounding the proposed new water intake. The model geometry was also modified to include the updated bathymetry and the existing and proposed new intake structures. The resulting hydraulic models cover an approximately 3-mile-long segment of the Sacramento River starting just downstream of its confluence with the American River (i.e., focus reach). The existing and proposed project conditions hydraulic performances were evaluated over a range of flows and downstream stage scenarios, including the 10-, 100-, and 200-year flood events with and without climate change impact, and the 1957 authorized design conditions. The proposed project conditions were conservatively modeled, meaning that they did not account for the potential slight decrease in the Sacramento River flow resulting from the proposed pump station operation.[5] These results were used to analyze potential impacts of the proposed water intake on existing drainage patterns, such as whether the presence of the new water intake in the Sacramento River would result in changes in flow and/or erosion processes.

Modeling Results

The analysis of localized effects of the new water intake determined that operations would result in minimal changes to water surface elevations and velocities in the 3-mile-long segment of the Sacramento River just downstream of its confluence with the American River relative to existing conditions. Due to the compact design of the new water intake (i.e., a tee screen, see Chapter 2, *Project Description*), only a small portion of the flow conveyance area would be blocked. The pump station is located on the east overbank of the Sacramento River (on the riverside of the levee). The minimal changes in channel flood hydraulics (water surface elevation and velocity) indicate that the new intake would not be injurious to the public or affect the state and federal flood control system's ability to meet its authorized purpose. Therefore, operations would result

5 From the perspective of flood assessments, the effects of the pumped diversion are ignored because it provides a more conservative basis for computing the maximum water surface elevation, and typically such diversions are small enough relative to the flow in the river that they have a negligible influence on the actual results.

in a slight decrease in the Sacramento River flow compared to existing conditions. Refer to Appendix D for additional discussion of the localized effects of the new water intake.

Changes in Surface Water Flows, Reservoir Storage, and Water Quality from Increased Diversion from the Sacramento River

Modeling Approach

CalSim 3 Hydrologic Modeling

The California Simulation Model 3.0 (CalSim 3) (DWR, 2022f) was used to evaluate changes in river flows, reservoir storage, SWP and CVP operations and water deliveries, and water quality associated with increased diversion through the new water intake in the Sacramento River. CalSim is a water operation planning model, jointly developed by DWR and Reclamation, that simulates the long-term operational capability of the SWP and the CVP over a period of record that includes a wide range of hydrologic variability. The primary purpose of CalSim is to evaluate SWP and CVP operations at current or future levels of development, with and without various assumed future facilities, various regulatory requirements, and with different facility management options. CalSim 3 represents the most current version of the CalSim model and is the best available planning-level analytical tool for CVP/SWP system operations (DWR, 2022a), and is an improved and expanded version of CalSim II, which has been the standard planning model for system operations since the early 2000s. The Calsim 3 models developed and/or applied for this analysis are generalized and simplified representations of complex 'real-world' water resources systems. CalSim 3 results are used as a "comparative tool" to assess relative changes between simulations (e.g., baseline compared to a proposed project). Because CalSim 3 relies on generalized rules, a coarse representation of project operations, and no specific operations in response to extreme events, results should not be expected to reflect what operators might do in real time operations on a specific day, month, or year within the simulation period. In reality, the operators would be informed by numerous real-time considerations not represented in CalSim 3, such as salinity monitoring. In determining water management operations, CalSim 3 makes storage release decisions and routes water through the stream network based on a set of pre-defined rules that represent existing or future assumed regulations and operations criteria. This means the model "behaves" such that reservoirs and facilities of the SWP and CVP are operated to comply with regulatory flow and water quality requirements.[6]

The model version used as a starting point for the modeling in this study is the same developed by DWR for the Delta Conveyance Project Draft EIR, referred to herein as the 2023 DCR CalSim 3 model version (DWR, 2022b). The 2023 DCR CalSim 3 model includes refinements to performance and representation of the SWP and CVP systems from DWR's 2021 Delivery Capability Report (2021 DCR) release of CalSim 3. The 2023 DCR CalSim 3 model version also includes adjustments to climatic and hydrologic conditions to better reflect modern climate patterns and provide a more accurate baseline for future climate change scenarios (DWR, 2022b). The 2023 DCR CalSim 3 input datasets along with the selected CalSim 3 model represent the best available data at the time when the modeling analysis was conducted for this Draft EIR.

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6 For example, the Hodge Flow conditions are implemented in CalSim 3 such that whenever the river flow is less than the Hodge Flow Criteria, CalSim 3 diversions at the FWTP cannot be more than maximum diversions set by the Water Forum Agreement (refer to Appendix E for additional details).

CalSim 3 assumptions for additional, downstream regulatory requirements related to operations of the SWP and CVP are from the 2019 BiOps (under the reinitiation of consultation on long-term operations; NMFS, 2019), and 2020 CDFW Incidental Take Permit (ITP) (CDFW, 2020). The regulatory assumptions also include continued operations under the CVP-SWP Coordinated Operations Agreement; State Water Board D-1641 (State Water Board, 2000); and the State Water Board Water Quality Control Plan adopted in 2006 (State Water Board, 2006). Overall, meeting regulatory requirements, including Delta water quality objectives, is the highest operational priority in the CalSim 3 model.

HEC-5Q Water Temperature Modeling

To further evaluate potential changes in water temperature under increased diversions through the new water intake, the American River HEC-5Q model version developed by DWR for the Delta Conveyance Project EIR (DWR, 2022a) was used as a starting point. HEC-5Q is a modeling tool often used for long-term planning analyses that simulates reservoir and river water temperatures based on input storage, flow, and meteorological data. No modifications were made to the model code or to the meteorological inputs, meaning the only difference was to the initial storage levels, reservoir and tributary inflows, reservoir outflows, diversions, and reservoir evaporation derived from CalSim 3 outputs. Monthly CalSim 3 outputs, with a period of record from October 1921 to September 2015, were downscaled to daily timeseries and then used to prescribe HEC-5's storage and flow data for use in/by the HEC-5Q model.

Model Scenarios

Table 3.12-5 presents the modeling scenarios simulated to evaluate potential effects of the proposed project's increased diversion through the new water intake. Four existing (2020) condition scenarios with historical hydrology were modeled and are used in the impact analysis. Four future (2040) conditions scenarios with future hydrology under climate change were also modeled for informational purposes but are not further discussed in this section (refer to Appendix E for future conditions modeling results).

TABLE 3.12-5
SUMMARY OF CALSIM 3 AND HEC-5Q MODEL SCENARIOS, EXISTING (2020) CONDITIONS

Modeling Scenario ID	Modeling Scenario	Input Hydrology	Combined Demand at UD-26N-NU3 and UD-26S-NU1 Calsim 3 Demand Nodes (TAF/Y)[1]
1.0	Existing Conditions, Baseline	Historical[2]	122
1.1	Existing Conditions, +75MGD	Historical	206
1.2	Existing Conditions, +150MGD	Historical	290
1.3	Existing Conditions, Projected Demand	Historical	252

NOTES: TAF/Y = thousand acre-feet per year

1. Demand at UD-26N-NU3 is held at a constant 43 TAF/Y for all scenarios.
2. Hydrology inputs (and simulation period) comprise water years 1922-2015 (DWR, 2022a).

SOURCE: Appendix E, Table 1.

CalSim 3 incorporates the City's water demands with two demand units: (1) UD-26N-NU3 (service area north of the American River) and (2) UD-26S-NU1 (service area south of the American River). The City of Sacramento also provides retail services within the City limits, and wholesale and wheeling services outside the city limits. These demands are incorporated into the City's local water demands at demand units UD-26N-NU3 and UD-26S-NU1. The CalSim 3 model logic allows for demands unable to be met at FWTP due to operational constraints and/or regulatory requirements on the American River (e.g., Hodge Flow Criteria) to be met by diversions at the SRWTP on the Sacramento River. As indicated in Table 3.12-5, four levels of demand were simulated under existing conditions. Additional description of the model scenarios is presented below and further detailed in Appendix E (see Chapter 4, *Modeling Approach*).

The *existing conditions baseline model* represents existing 2020 conditions in the absence of the proposed project. Specifically, the existing conditions baseline model includes existing facilities, management operations including SWP and CVP operational assumptions and modeling criteria, ongoing programs, regulatory requirements, water demands, stream diversions and water rights, water transfers, water wheeling, and groundwater elevations as of 2020 and/or as simulated in the CalSim 3 studies of the Draft SWP Delivery Capability Report 2021 (DWR, 2022e) and the Delta Conveyance Project Draft EIR (DWR, 2022a). The hydrology for the existing conditions baseline model is based on existing (historical) hydrological and meteorological conditions (water years 1922 through 2015, or October 1921 to September 2015). Under existing baseline conditions, the total combined annual city demand at units UD-26S-NU1 and UD-26N-NU3 is 122 TAF (see Table 3.12-5). Refer to Appendix E (Section 4.1, *Existing Baseline Conditions Model Scenario*) for additional details.

As discussed in Chapter 2, *Project Description*, the proposed project would be completed in two phases: (1) during the initial phase, the SRWTP treatment capacity would initially be increased from 160 MGD to 235 MGD (an increase of 75 MGD), and (2) during project buildout, the SRWTP treatment capacity would be increased from 235 MGD to 310 MGD (a total increase of 150 MGD). Therefore, two modeling scenarios were developed to represent and assess potential effects of the proposed increased diversion for both the *+75 MGD scenario* and *+150 MDG scenario* under existing conditions. The +75 MGD and +150 MGD model scenarios include increased water demands over baseline conditions based on the additional volumes of water able to be diverted if the SRWTP were operated continuously at the higher diversion rates provided by the proposed capacity improvements. Under +75 MGD and +150 MGD scenarios, the total combined annual city demand at units UD-26S-NU1 and UD-26N-NU3 was 206 and 290 TAF, respectively (see Table 3.12-5).

To conservatively analyze potential effects of proposed increase diversions on the environment, a *projected demand scenario* was also developed based on projected City water demands from the City's 2020 UWMP (City of Sacramento, 2021). The annual City demand specified in the projected demand scenario was set as 252,279 afy which includes a projected 2050 retail water use of 155,219 afy and 2050 projected wholesale demand of 97,060 TAF per year (City of Sacramento 2021; see Tables 4-4 and 4-8, respectively). Under the projected demand scenario, the total combined annual city demand at units UD-26S-NU1 and UD-26N-NU3 was 252 TAF (see

Table 3.12-5). The modeling scenarios are referred to as the "proposed project model scenarios" in this section.

Model Outputs

CalSim 3 Hydrologic Modeling

Table 3.12-6 presents the relevant CalSim 3 model output locations and parameters evaluated to assess potential changes in river flows, reservoir storage, CVP-SWP operations and water deliveries, and water quality attributable to the proposed increased diversions. Refer to Appendix E for a complete list of model outputs. Generally, model results are summarized by calculating long-term and/or water-year-type annual or monthly averages over the entire simulation period of water years 1922–2015. Comparison between simulations is generally quantified as the difference between long-term averaged values from a modeling scenario minus those from the relevant existing conditions baseline, such that negative values represent a decrease in modeled parameters (e.g., river flows, CVP/SWP-related storage facilities, Delta water quality, instream flow and reservoir criteria) compared to the baseline conditions. Both the magnitude of these differences as well as the percentage these differences represent relative to baseline conditions are presented. For each set of model scenario comparisons, results are generally presented as long-term annual or monthly averages over the entire simulation period of water years 1922–2015 and by water year type.[7]

TABLE 3.12-6
CALSIM 3 MODEL OUTPUT NODES AND PARAMETERS

Location	CalSim 3 Node	Parameter	Units	Indicator	Analysis metric(s)[1]
Folsom Reservoir	S_FOLSM	Reservoir Storage	TAF	End of Month	Long-term monthly averages and End of September Storage
Shasta Lake	S_SHSTA	Reservoir Storage	TAF	End of Month	Long-term monthly averages and End of September Storage
Clair Engle Reservoir (Trinity Lake)	S_TRNTY	Reservoir Storage	TAF	End of Month	Long-term monthly averages and End of September Storage
Lake Oroville	S_OROVL	Reservoir Storage	TAF	End of Month	Long-term monthly averages and End of September Storage
American River below Nimbus Dam (above FWTP)	C_AMR009	Flow	cfs	Monthly Average	Long-term monthly averages
American River below FWTP	C_AMR006	Flow	cfs	Monthly Average	Long-term monthly averages
Sacramento River below Keswick and Clear Creek Tunnel	C_KSWCK	Flow	cfs	Monthly Average	Long-term monthly averages
Sacramento River above American River	C_SAC064	Flow	cfs	Monthly Average	Long-term monthly averages

7 Water year type refers to the Sacramento Valley 40-30-30 hydrologic classification (wet, above normal, below normal, dry, critically dry) as defined in D-1641 (State Water Board, 2000).

Location	CalSim 3 Node	Parameter	Units	Indicator	Analysis metric(s)[1]
Sacramento River between American River and SRWTP	C_SAC063	Flow	cfs	Monthly Average	Long-term monthly averages
Sacramento River below SRWTP (Sacramento River Pump Station)	C_SAC062	Flow	cfs	Monthly Average	Long-term monthly averages
Trinity River below Clear Creek Tunnel	C_TRN111	Flow	cfs	Monthly Average	Long-term monthly averages
Feather River flows at Mouth	C_FTR003	Flow	cfs	Monthly Average	Long-term monthly averages
Delta outflow	NDOI	Flow	cfs	Monthly Average	Long-term monthly averages
Banks Pumping Plant (SWP Exports)	C_CAA003_SWP + C_CAA003_WTS	Delta Export	TAF	Monthly Total	Average annual totals
Jones Pumping Plant (CVP Exports)	C_CAA003_CVP + C_DMC000	Delta Export	TAF	Monthly Total	Average annual totals
X2 Position	X2_PRV	Salinity	N/A	Monthly Average	Long term monthly averages

NOTES: TAF = thousand acre-feet; cfs = cubic feet per second.
1. Results also compared to relevant regulatory requirement and objectives.
SOURCE: Appendix E, Table 5.

HEC-5Q Water Temperature Modeling

Table 3.12-7 presents the relevant HEC-5Q model output locations for assessing potential water temperature changes attributable to the proposed increased diversions. Generally, model results are summarized by calculating long-term and/or water-year-type annual or monthly averages over the entire simulation period of water years 1922–2015. Comparisons between simulations are generally quantified as the difference between long-term averaged values from a modeling scenario minus those from the relevant existing conditions baseline, such that negative (positive) values represent a decrease (increase) in water temperature compared to the baseline conditions (e.g., a negative residual means a decrease in temperature relative to the existing conditions baseline and visa-versa). Both the magnitude of these differences as well as the percentage these differences represent relative to Baseline conditions are presented.

TABLE 3.12-7
AMERICAN RIVER HEC-5Q MODEL OUTPUT NODES AND PARAMETERS

Location	Parameter	Units	Indicator	Analysis metric(s)
American River below Nimbus Dam (above FWTP)	Temperature	°F	Monthly Average	Long-term monthly averages
American River at Watt Avenue	Temperature	°F	Monthly Average	Long-term monthly averages
American River below FWTP	Temperature	°F	Monthly Average	Long-term monthly averages
American River above Sacramento River	Temperature	°F	Monthly Average	Long-term monthly averages

Location	Parameter	Units	Indicator	Analysis metric(s)
Sacramento River above American River	Temperature	°F	Monthly Average	Long-term monthly averages
Sacramento River below SRWTP (Sacramento River Pump Station)	Temperature	°F	Monthly Average	Long-term monthly averages
Sacramento River at Freeport	Temperature	°F	Monthly Average	Long-term monthly averages
SOURCE: Appendix E, Table 7.				

Modeling Results Interpretation

The appropriate use of CalSim 3 and HEC-5Q model results are discussed in detail in Appendix E, Sections 3.1 and 3.2, respectively, and summarized below for context.

CalSim 3 Hydrologic Modeling

The CalSim 3 models developed and/or applied for this analysis are generalized and simplified representations of complex 'real-world' water resources systems. CalSim 3 is not considered a predictive model (i.e., calibrated and validated to predict real world conditions) and therefore the results cannot be considered as absolute within a quantifiable confidence interval. Even so, the CalSim 3 models are informative and are accepted tools for understanding the performance and potential effects (both positive and negative) of the operation of a proposed project and its interaction with the water resources system under consideration. This is primarily accomplished by using model results as a "comparative tool" to assess relative changes between two simulations, e.g., existing conditions simulation compared to a proposed project or project alternative simulation. Such comparative analyses can serve as an indicator of meeting specific conditions (e.g., compliance with a standard) and/or of trends or tendencies (e.g., generalized impacts), and allow for reasonable inference of how different project conditions might perform under different scenarios and effect environmental resources. Because CalSim 3 relies on generalized rules, a coarse representation of project operations, and no specific operations in response to extreme events, results should not be expected to reflect what operators might do in real time operations on a specific day, month, or year within the simulation period. In reality, the operators would be informed by numerous real-time considerations not represented in CalSim 3, such as salinity monitoring.

As explained by DWR (2022a), even with comparative analysis, model uncertainty and its influence on the model results cannot be completely avoided. In addition to showing the potential effects of the project being analyzed, differences between two scenarios can sometimes include the unintended effects of model uncertainty. While no exact quantification of model uncertainty is available, DWR believes that CalSim 3 results are subject to uncertainty that is within at least 5 percent and likely lower (DWR, 2021; DWR, 2022b). In other words, when comparing model simulation results, it is possible that changes in modeled flows or storages that are less than 5 percent between two or more scenarios may be strongly influenced by model uncertainty. Therefore, the appropriate inference from an observed difference in modeling results that is less than 5 percent is likely "no change", unless there is additional evidence from detailed examination to suggest otherwise (e.g., the percent change is persistent and/or associated with a relatively large magnitude of water volume or flow). Throughout the use of CalSim 3 and its predecessors, other rule-of-thumb criteria have generally been used for considering the potential significance of an observed difference in modeling results from a comparative analysis (DWR 2022a). For example, observed changes in monthly flow and/or storage of less than 10 TAF are generally considered no change (DWR, 2022b).

When comparing simulated model results, if the relative difference in a given parameter (i.e., reservoir water elevation and storage, river flow, Delta water delivery, water quality, or river temperature) is 5 percent or less and does not exceed the lesser of either 10 TAF or 1 percent of a water facility's total storage capacity or developed storage capacity, the simulated hydrology changes can generally be considered negligible, or "no effect," compared to baseline conditions.[8] Refer to Appendix E (Section 3.3) for additional details regarding model assumptions and limitations.

Table 3.12-8 presents the details of reservoirs for which CalSim 3 model outputs are reported. In the case of Folsom Reservoir, 1 percent is the lesser volume, and in the case of Shasta Lake, Trinity Lake, and Lake Oroville, 10 TAF is the lesser volume. Changes greater than 10 TAF and 1 percent are considered notable in the context of this analysis. For each parameter, the relative difference was considered for annual average changes across all water year types and monthly average changes across dryer water year types.

TABLE 3.12-8
DETAILS OF MAJOR RESERVOIRS THAT MAY BE AFFECTED BY THE PROPOSED PROJECT

Reservoir Name	Sub-Basin	Owner/ Operator	Storage Volume (acre-feet)	1 Percent of Storage Volume (TAF)	Lesser of 1 percent and 10 TAF?
Folsom Reservoir	American	Reclamation	967,000	9.7	1 percent
Shasta Lake	Sacramento	Reclamation	4,552,000	45.5	10 TAF
Trinity Lake (Clair Engle Reservoir)	Trinity	Reclamation	2,447,650	24.5	10 TAF
Lake Oroville	Feather	DWR	3,537,580	35.4	10 TAF

NOTE: DWR = California Department of Water Resources; Reclamation = U.S. Bureau of Reclamation; TAF = thousand acre-feet
SOURCE: Appendix E, Table 6.

Meeting regulatory requirements, including Delta water quality objectives, are the highest operational priority in the CalSim 3 model and are given precedent of discretionary diversions to meet demands. As such, D-893 minimum instream flows at the H Street bridge and Hodge Flow Criteria are always met in all simulations. Further, minimum release requirements at Nimbus Dam based on flow objectives defined in the American River Modified Flow Management Standard, per the 2017 Water Forum Agreement are met with nearly the same frequency in all these simulations (greater than 99 percent of simulation months for both existing and future

8 This approach is consistent with several certified CEQA EIRs or other environmental reviews including but not limited to the EIR for State Water Project Long-Term Operations (DWR, 2019), the Final EIR for Coordinated Long-Term Operation of the Central Valley Project and State Water Project (Reclamation, 2015), the Draft Supplemental Environmental Assessment/EIR for the Folsom Dam Modification Project Water Control Manual Update (USACE, 2017), the Draft EIR for the Delta Conveyance Project (DWR, 2022a), and the Final EIS for the Long-Term Operation of the Central Valley Project and State Water Project (Reclamation, 2024c).

conditions). Importantly, unless otherwise stated, model results always meet or are within the range of relevant uncertainty of regulatory or otherwise agreed upon flow, storage, temperature, and water quality requirements (DWR, 2017; DWR, 2021).

HEC-5Q Water Temperature Modeling

Like CalSim 3, the American River HEC-5Q model is also not a predictive model of actual operations and resulting water temperatures, and therefore the results cannot be considered as absolute with and within a quantifiable confidence interval unless the hypothetical storages and assumed uniform release rates were to occur. Because the American River HEC-5Q model is driven by the long-term hypothetical operations simulated in CalSim 3 on a monthly timestep, typically the temperature results are also presented on a monthly timestep. Monthly flow and temperature results are unlikely to address the daily variability in the river temperatures but reflect changes in the monthly means. When reporting, comparing, and interpreting results, the same considerations as described above for CalSim 3 apply for HEC-5Q.

Modeling Results

CalSim 3 Hydrologic Modeling Results Summary – Existing Conditions

This section provides a summary of CalSim 3 hydrologic modeling results under existing conditions. The results tables that follow depict summary statistics (arithmetic mean) of percent and magnitude changes between baseline and proposed project model scenarios calculated from long-term averaged model output values. [9] Metrics are presented for all water year types and again for just dry and critically dry water year types when water supplies are often most limited**.** These metrics provide a high-level summary of simulated expected changes to surface hydrology parameters between baseline and proposed project model scenarios under existing conditions.

Differences varied by location, water year type, water use scenario, and month, with different combinations of these variables resulting in variability in the patterns of flow changes with larger changes in flow sometimes concentrated in certain month and water year combinations. Refer to Appendix E, Exhibit A, for month and water year combination results. Overall, the summarized results provide a basis for understanding potential environmental effects attributed to these changes which are described in the appropriate resource section.

River Flows

Table 3.12-9 presents changes in simulated long-term average flows between existing baseline and proposed project conditions. Simulated changes varied by output location, month, and water year type (refer to Appendix E, Exhibit A).

CVP/SWP-Related Storage Facilities

Table 3.12-10 presents changes in simulated long-term average end of month reservoir storage at CVP and SWP facilities (i.e., Folsom Reservoir, Shasta Lake, Trinity Lake, and Lake Oroville) between existing baseline and proposed project conditions. Similar to river flows, simulated changes varied by output location, month, and water year type.

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[9] CalSim 3 simulated water management operations at a monthly time-step. Thus, results should be interpreted in the context as being long-term averaged monthly values.

TABLE 3.12-9
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE STREAMFLOW UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (cfs)[a]	Long-term Average Dry/Critical Years (cfs)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Flow at Trinity River below Clear Creek Tunnel				
1.0 - Baseline	1,049	704	-	-
1.1 - +75 MGD	1,046	698	-0.4% (-2.6)	-0.8% (-5.8)
1.2 -+150 MGD	1,045	698	-0.5% (-3.4)	-0.8% (-5.8)
1.3 - Projected Demand	1,046	698	-0.4% (-2.9)	-0.8% (-5.8)
Total Flow at Feather River below Thermalito Afterbay				
1.0 - Baseline	4,130	2,064	-	-
1.1 - +75 MGD	4,132	2,071	0.2% (2)	0.5% (6.6)
1.2 -+150 MGD	4,134	2,078	0.3% (3.6)	1% (14.2)
1.3 - Projected Demand	4,133	2,076	0.3% (3.1)	0.9% (12.3)
Total Flow at Feather River at Mouth				
1.0 - Baseline	7,297	3,297	-	-
1.1 - +75 MGD	7,298	3,304	0.2% (1.4)	0.4% (6.5)
1.2 -+150 MGD	7,299	3,311	0.3% (2.7)	0.7% (14.2)
1.3 - Projected Demand	7,299	3,309	0.2% (2.4)	0.6% (12.3)
Total Flow at Sacramento River below Keswick and Clear Creek Tunnel				
1.0 - Baseline	8,495	6,252	-	-
1.1 - +75 MGD	8,498	6,277	0.1% (2.9)	0.5% (25.4)
1.2 -+150 MGD	8,499	6,288	0.1% (3.8)	0.6% (35.9)
1.3 - Projected Demand	8,499	6,286	0.1% (3.5)	0.6% (33.7)
Total Flow at Sacramento River above American River				
1.0 - Baseline	17,917	10,690	-	-
1.1 - +75 MGD	17,927	10,724	0.1% (9.7)	0.5% (33.8)
1.2 -+150 MGD	17,928	10,737	0.2% (10.4)	0.7% (46.5)
1.3 - Projected Demand	17,927	10,733	0.2% (9.3)	0.6% (42.7)
Total Flow at Sacramento River between American River and SRWTP				
1.0 - Baseline	21,157	12,246	-	-
1.1 - +75 MGD	21,138	12,263	0% (-19)	0.2% (17.1)
1.2 -+150 MGD	21,123	12,263	-0.1% (-33.9)	0.3% (16.7)
1.3 - Projected Demand	21,128	12,269	-0.1% (-28.5)	0.3% (23.3)
Total Flow at Sacramento River below SRWTP (Sacramento River Pump Station)				
1.0 - Baseline	21,078	12,163	-	-
1.1 - +75 MGD	20,983	12,081	-0.6% (-94.8)	-0.8% (-81.9)
1.2 -+150 MGD	20,886	11,970	-1.3% (-192)	-1.8% (-192.7)

Location and Modeling Scenario	Long-term Average All Years (cfs)[a]	Long-term Average Dry/Critical Years (cfs)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
1.3 - Projected Demand	20,928	12,026	-1% (-149.5)	-1.3% (-136.1)
Total Flow at American River below Nimbus Dam (above FWTP)				
1.0 - Baseline	3,339	1,663	-	-
1.1 - +75 MGD	3,332	1,662	0.3% (-6.7)	1% (-0.6)
1.2 -+150 MGD	3,323	1,652	0.2% (-15.4)	0.8% (-10.2)
1.3 - Projected Demand	3,327	1,661	0.3% (-11.2)	1.1% (-1.4)
Total Flow at American River below FWTP (cfs)				
1.0 - Baseline	3,237	1,557	-	-
1.1 - +75 MGD	3,212	1,543	-0.5% (-25.2)	-0.1% (-14)
1.2 -+150 MGD	3,207	1,532	-0.4% (-29.9)	-0.2% (-25)
1.3 - Projected Demand	3,201	1,534	-0.6% (-36.2)	-0.2% (-23.8)
Total Flow at Delta outflow (cfs)				
1.0 - Baseline	21,158	8,428	-	-
1.1 - +75 MGD	21,143	8,439	0% (-15.6)	0.1% (10.9)
1.2 -+150 MGD	21,130	8,422	-0.1% (-28.3)	-0.1% (-6.2)
1.3 - Projected Demand	21,135	8,431	-0.1% (-23.3)	0% (3.3)

NOTES: cfs = cubic feet per second; MGD = million gallons per day

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

SOURCE: Appendix E, Table 8.

TABLE 3.12-10
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE END OF MONTH RESERVOIR STORAGE UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (TAF)[a]	Long-term Average Dry/Critical Years (TAF)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Storage at Folsom Reservoir				
1.0 - Baseline	638	519	-	-
1.1 - +75 MGD	640	522	0.3% (1.7)	0.4% (2.8)
1.2 -+150 MGD	641	522	0.4% (2.2)	0.4% (3)
1.3 - Projected Demand	640	520	0.3% (1.7)	0% (1.1)
Total Storage at Shasta Lake				
1.0 - Baseline	3,287	2,715	-	-
1.1 - +75 MGD	3,274	2,680	-0.7% (-13.2)	-1.9% (-34.7)
1.2 -+150 MGD	3,273	2,685	-0.8% (-14.3)	-1.7% (-29.7)
1.3 - Projected Demand	3,273	2,683	-0.8% (-14.8)	-1.8% (-32.0)
Total Storage at Trinity Lake (Clair Engle Reservoir)				
1.0 - Baseline	1,607	1,214	-	-
1.1 - +75 MGD	1,600	1,203	-0.8% (-7.1)	-1.4% (-10.8)
1.2 -+150 MGD	1,597	1,200	-1.1% (-10.3)	-1.6% (-13.7)
1.3 - Projected Demand	1,598	1,202	-0.9% (-9)	-1.4% (-11.8)
Total Storage at Lake Oroville				
1.0 - Baseline	2,354	1,759	-	-
1.1 - +75 MGD	2,349	1,748	-0.4% (-5.1)	-0.8% (-10.3)
1.2 -+150 MGD	2,345	1,740	-0.7% (-9.6)	-1.4% (-18.9)
1.3 - Projected Demand	2,347	1,744	-0.5% (-7.3)	-1.1% (-14.9)

NOTES: MGD = million gallons per day; TAF = thousand acre-feet

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

SOURCE: Appendix E, Table 9.

Table 3.12-11 presents changes in simulated long-term average end-of-September storage at SWP and CVP facilities (i.e., Folsom Reservoir, Shasta Lake, Trinity Lake, and Lake Oroville) between existing baseline and proposed project conditions. The end of September marks the end of the water year when water supplies are often most stressed, and end-of-September storage serves as an indicator for reservoir carry-over storage going into the new water year.

TABLE 3.12-11
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE END-OF-SEPTEMBER RESERVOIR STORAGE UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (TAF)[a]	Long-term Average Dry/Critical Years (TAF)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Storage at Folsom Reservoir				
1.0 - Baseline	598	473	-	-
1.1 - +75 MGD	600	473	0.2% (1.9)	-0.5% (0.2)
1.2 -+150 MGD	600	475	0.2% (2.1)	-0.3% (2.1)
1.3 - Projected Demand	599	471	0% (1.4)	-1.2% (-2)
Total Storage at Shasta Lake				
1.0 - Baseline	2,790	2,110	-	-
1.1 - +75 MGD	2,776	2,079	-0.9% (-13.9)	-2.2% (-30.3)
1.2 -+150 MGD	2,772	2,073	-1% (-17.6)	-2.5% (-36.4)
1.3 - Projected Demand	2,774	2,076	-1% (-16.2)	-2.4% (-33.1)
Total Storage at Trinity Lake (Clair Engle Reservoir)				
1.0 - Baseline	1,426	932	-	-
1.1 - +75 MGD	1,420	922	-0.7% (-5.9)	-1.2% (-10.1)
1.2 -+150 MGD	1,416	919	-0.9% (-9.2)	-1.5% (-13.2)
1.3 - Projected Demand	1,418	919	-0.8% (-7.7)	-1.4% (-12.7)
Total Storage at Lake Oroville				
1.0 - Baseline	1,964	1,304	-	-
1.1 - +75 MGD	1,959	1,293	-0.5% (-4.9)	-1.2% (-11)
1.2 -+150 MGD	1,954	1,282	-0.9% (-9.4)	-2.3% (-21.8)
1.3 - Projected Demand	1,957	1,286	-0.7% (-6.9)	-1.9% (-17.9)

NOTES: MGD = million gallons per day; TAF = thousand acre-feet

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922–2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

SOURCE: Appendix E, Table 16.

South of Delta Deliveries

Table 3.12-12 presents changes in simulated, long-term average annual CVP and SWP exports (or deliveries) from the Jones and Banks Pumping Plants between existing baseline and proposed project conditions. CVP deliveries from Jones Pumping Plant to its contractors are presented by CVP contract year (March–February), and SWP deliveries from Banks Pumping Plant to its long-term water contractors are presented by SWP contract year.

TABLE 3.12-12
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE ANNUAL CVP AND SWP EXPORTS UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (TAF)[a]	Long-term Average Dry/Critical Years (TAF)[a]	Comparison of Long-term Average Annual Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Annual Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Jones Pumping Plant - CVP				
1.0 - Baseline	2,546	2,014	-	-
1.1 - +75 MGD	2,540	1,995	-0.2% (-5.9)	-0.9% (-18.7)
1.2 -+150 MGD	2,536	1,984	-0.4% (-10.3)	-1.5% (-29.3)
1.3 - Projected Demand	2,538	1,989	-0.3% (-8.3)	-1.2% (-24.8)
Banks Pumping Plant - SWP				
1.0 - Baseline	2,431	1,284	-	-
1.1 - +75 MGD	2,425	1,272	-0.3% (-6.2)	-0.9% (-11.8)
1.2 -+150 MGD	2,419	1,263	-0.5% (-12.8)	-1.7% (-21.6)
1.3 - Projected Demand	2,422	1,266	-0.4% (-9.7)	-1.5% (-18.7)

NOTES: CVP = Central Valley Project; MGD = million gallons per day; SWP = State Water Project; TAF = thousand acre-feet

a. Calculated as arithmetic mean of long-term average of annual sums from entire simulation period (water years 1922–2015).
b. Calculated from long-term annual sums from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

SOURCE: Appendix E, Table 15.

Delta Water Quality

Table 3.12-13 presents changes in CalSim 3 simulated long-term X2 position between existing baseline and proposed project conditions.

TABLE 3.12-13
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM X2 LOCATION UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (km)[a]	Long-term Average Dry/ Critical Years (km)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/ Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
X2 Location				
1.0 – Existing Baseline	75.6	80.5	-	-
1.1 - +75 MGD	75.6	80.5	0.0% (0.01)	0.0% (-0.01)
1.2 -+150 MGD	75.6	80.5	0.0% (0.02)	0.0% (0.01)
1.3 - Projected Demand	75.6	80.5	0.0% (0.01)	0.0% (0.00)

NOTES: MGD = million gallons per day

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922–2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

SOURCE: Appendix E, Table 10.

HEC-5Q Water Temperature Modeling Results Summary – Existing Conditions

This section provides a summary of HEC-5Q water temperature modeling results under existing conditions. The results table that follows depicts summary statistics (arithmetic mean) of percent and magnitude changes between baseline and proposed project model scenarios calculated from long-term monthly averaged model output values. Metrics are presented for all water year types and again for just Dry and Critically Dry water year types when water supplies are often most limited. These metrics provide a high-level summary of simulated expected changes to surface water temperatures between baseline and proposed project model scenarios under existing conditions.

Similar to the CalSim 3 results, differences varied by location, water year type, water use scenario, and month, with different combinations of these variables also resulted in variability in the patterns of water temperatures changes with larger changes sometimes concentrated in certain month and water year combinations. Refer to Appendix E, Exhibit D for month and water year combination results. Overall, the summarized results provide a basis for understanding potential environmental effects attributed to these changes which are described in the appropriate resource section.

Table 3.12-14 presents changes in simulated, long-term average water temperatures between existing baseline and existing proposed project model scenarios.

TABLE 3.12-14
SUMMARY OF HEC-5Q SIMULATED LONG-TERM AVERAGE WATER TEMPERATURE UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (°F)[a]	Long-term Average Dry/ Critical Years (°F)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/ Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
American River below Nimbus Dam (above FWTP intake)				
1.0 - Baseline	56.5	57.7	-	-
1.1 - +75 MGD	56.5	57.7	0.01 (0.02%)	0.02 (0.05%)
1.2 - +150 MGD	56.5	57.7	0.01 (0.02%)	0.02 (0.03%)
1.3 - Projected Demand	56.5	57.8	0.02 (0.03%)	0.04 (0.07%)
American River at Watt Avenue				
1.0 - Baseline	58.7	60.4	-	-
1.1 - +75 MGD	58.7	60.5	0.01 (0.01%)	0.01 (0.02%)
1.2 - +150 MGD	58.7	60.4	0.0 (0.01%)	0.0 (0.0%)
1.3 - Projected Demand	58.7	60.5	0.01 (0.02%)	0.02 (0.04%)
American River below FWTP intake				
1.0 - Baseline	59.0	60.9	-	-
1.1 - +75 MGD	59.0	60.9	0.01 (0.01%)	0.01 (0.02%)
1.2 - +150 MGD	59.0	60.9	0 (0.01%)	-0.01 (0%)
1.3 - Projected Demand	59.0	60.9	0.01 (0.02%)	0.02 (0.03%)

Location and Modeling Scenario	Long-term Average All Years (°F)[a]	Long-term Average Dry/ Critical Years (°F)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/ Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
American River above Sacramento River				
1.0 - Baseline	60.3	62.6	-	-
1.1 - +75 MGD	60.4	62.6	0.01 (0.02%)	0.01 (0.02%)
1.2 - +150 MGD	60.4	62.6	0.0 (0.01%)	-0.01 (-0.01%)
1.3 - Projected Demand	60.4	62.6	0.01 (0.02%)	0.01 (0.02%)
Sacramento River above American River				
1.0 - Baseline	60.0	61.2	-	-
1.1 - +75 MGD	60.0	61.2	0.0 (0.0%)	0.0 (0.0%)
1.2 - +150 MGD	60.0	61.2	0.0 (0.0%)	0.0 (0.0%)
1.3 - Projected Demand	60.0	61.2	0.0 (0.0%)	0.0 (0.0%)
Sacramento River below SRWTP (Sacramento River Pump Station) intakes				
1.0 - Baseline	59.9	61.3	-	-
1.1 - +75 MGD	59.9	61.3	0.0 (0.0%)	0.0 (0.0%)
1.2 - +150 MGD	59.9	61.3	0.0 (0.0%)	0.0 (0.0%)
1.3 - Projected Demand	59.9	61.3	0.0 (0.0%)	0.0 (0.0%)
Sacramento River at Freeport				
1.0 - Baseline	60.4	61.9	-	-
1.1 - +75 MGD	60.4	61.9	0.0 (0.0%)	0.0 (0.0%)
1.2 - +150 MGD	60.4	61.9	0.0 (0.0%)	0.0 (0.0%)
1.3 - Projected Demand	60.4	61.9	0.0 (0.0%)	0.0 (0.0%)

NOTES: MGD = million gallons per day

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922–2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

SOURCE: Appendix E, Table 20.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Violate any water quality standards or waste discharge requirements or otherwise degrade surface or ground water quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - Result in substantial erosion or siltation on- or off-site;

- Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
- Impede or redirect flood flows.

- In a flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Changes to water supply or water supply delivery, by themselves, are not considered an impact under CEQA. However, to disclose potential changes in water supply delivery from increased diversions associated with operation of the proposed new intake, effects on water supply delivery are evaluated. Therefore, an impact is considered significant if increased diversion associated with operation of the proposed new intake would:

- Result in substantial decreases in water supply deliveries because of changes in surface water flows and/or changes in water supply system operations, as measured by substantial changes in reservoir storage, or timing or rate of river flows.

As noted above, when comparing simulated model results, if the relative difference in a given parameter (i.e., reservoir water elevation and storage, river flow, water delivery, Delta water quality, or water temperature) is 5 percent or less and does not exceed the lesser of either 10 TAF or 1 percent of a water facility's total storage capacity or developed storage capacity, the simulated changes can generally be considered negligible, or "no effect," compared to baseline conditions. The term "substantial" is used in this context to indicate relative differences that exceed the relevant threshold (5 percent, 10 TAF, or 1 percent).

Impacts Not Further Evaluated

Risk of release of pollutants due to project location because of being located in a tsunami or seiche zone.

As described in subsection 3.12.2, *Environmental Setting*, the proposed project areas are located in designated flood hazard zones (FEMA, 2023). However, these areas are located far from the Pacific Ocean and other large bodies of water that historically have not been affected by tsunamis. A seiche in the Sacramento River is theoretically possible. However, the risk of this event is considered very low because the river channel is not completely enclosed. Therefore, **no impact** would occur and risk of release of pollutants due to proposed project components being located in seiche and tsunami zones are not further evaluated in the EIR.

Impacts and Mitigation Measures

Table 3.12-15 summarizes the impact conclusions presented in this section.

TABLE 3.12-15
SUMMARY OF IMPACT CONCLUSIONS –
HYDROLOGY, WATER QUALITY, AND WATER SUPPLY

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.12-1: Construction of the proposed project could violate any water quality standards or waste discharge requirements or otherwise degrade surface or ground water quality.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.12-2: Operation and maintenance of the proposed project could violate any water quality standards or waste discharge requirements or otherwise degrade surface or ground water quality.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.12-3: Increased diversions associated with operation of the new water intake could violate any water quality standards or otherwise degrade surface or groundwater quality.	--	--	NI (Existing) LS (New)	--
3.12-4: Construction of the proposed project could substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.12-5: Operation and maintenance of the proposed project could substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.12-6: Construction of the proposed project could substantially alter existing drainage patterns.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.12-7: Operation and maintenance of the proposed project could substantially alter existing drainage patterns.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.12-8: Construction of the proposed project could in a flood hazard zone risk release of pollutants due to project inundation.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.12-9: Operation and maintenance of the proposed project could in a flood hazard zone risk release of pollutants due to project inundation.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.12-10: Implementation of the proposed project could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.12-11: Increased diversions associated with operation of the proposed new intake could result in substantial decreases in water supply deliveries because of changes in surface water flows and/or changes in water supply system operations, as measured by substantial changes in reservoir storage or timing or rate of river flows.	--	--	NI (Existing) SU (New)	--

NI: No Impact
LS: Less than Significant
SU: Significant and Unavoidable
--: Not Applicable

Impact 3.12-1: Construction of the proposed project could violate water quality standards or waste discharge requirements or otherwise degrade surface or ground water quality.

Treatment Plant Improvements and Existing Utility Upgrades

Construction activities associated with treatment plant improvements at both FWTP and SRWTP, including the demolition of existing structures and facilities, would occur primarily within the City-owned property in previously disturbed areas. Construction activities associated with the existing utility upgrades at both treatment plants would also occur in previously disturbed areas. Specifically, construction of the storm drain upgrades would occur within the existing street adjacent to FWTP and in disturbed areas within the SRWTP boundary and in roadways adjacent to the treatment plant boundary. Electrical service upgrades at both treatment plants would be installed overhead or below ground in previously disturbed areas.

Construction activities would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs. Hazardous materials may also be used for construction equipment and activities (e.g., petroleum products, automotive fluids, and other chemicals), as well as asphalt and coatings, and/or concrete materials.

Construction at both the FWTP and SRWTP would include excavation that could reach a maximum depth of 25 feet below ground surface (bgs) at the FWTP (related to installation of the Intermediate Pump Station), and a maximum depth of 60 feet bgs at the SRWTP (related to installation of the High Service Pump Station). Therefore, dewatering of shallow groundwater that measures 20 to 60 feet bgs could be required. As described in Chapter 2, *Project Description,* storage to contain/treat water from construction activities would be located within property limits in close proximity to excavated areas requiring dewatering. Dewatering activities may be relocated within SRWTP based on construction activities, phasing, and proximity to a discharge location (e.g., sewer, drainage, swales, etc.). Water from dewatering activities would be discharged into the existing stormwater collection system.

The earth-disturbing construction activities (e.g., excavation, trenching, grading, etc.) could expose and disturb soils, and stormwater could convey those sediments into the existing storm drain system that that eventually discharges to either the American or Sacramento Rivers (e.g., through the existing stormwater drainage system). If not handled properly, these exposed soils could be transported off-site and adversely affect receiving waterbodies. The use of hazardous materials could also result in discharges of construction-related pollutants that degrade existing surface water or groundwater quality if released. While construction would be temporary, on- or off-site soil erosion, siltation, and discharges of construction-related hazards could result in impacts to surface and groundwater that could violate water quality standards and/or waste discharge requirements.

In accordance with NPDES regulations, to minimize the potential effects of construction runoff on receiving water quality, the state requires that any construction activity affecting one acre or more obtain coverage under the CGP (Order No. 2022-0057-DWQ, effective September 1, 2023). For these project components, the City would obtain coverage under the CGP and require contractors to comply with the permit conditions. Compliance with the CGP would require the development and implementation of a SWPPP. The SWPPP would be prepared by a Qualified SWPPP Developer (QSD) and, along with the required permit registration documents, would be submitted electronically to the State Water Board before implementation. The SWPPP would include standard BMPs required for all projects and any additional measures determined necessary by the QSD to control stormwater run-on/runoff and sediment.

Examples of typical construction BMPs include scheduling or limiting certain activities to dry weather periods, using erosion controls such as hydroseeding or erosion control blankets, installing sediment barriers such as silt fence and fiber rolls, implementing dust control measures, maintaining equipment and vehicles used for construction, storing and handling of chemicals and toxic materials to prevent spills from entering the aquatic environment. These BMPs are designed to avoid or reduce stormwater and water quality effects caused by construction site runoff.

For dewatering activities, the contractor would be required to implement dewatering requirements presented in the CGP (Attachment J), which include:

- pH and turbidity monitoring of discharge, with discharge ceasing if a single sample exceeds water quality numeric action levels.
- The use of outlet structures that withdraw water from the surface of impoundments as feasible.
- Work to prevent dewatering discharge from contacting construction materials or equipment.
- BMPs that reduce the velocity of dewatering discharge (such as check dams and sediment traps).
- Immediate corrective actions identified and implemented by a qualified SWPPP developer to prevent exceedances if any occur.

For projects that would disturb more than 50 cubic yards of soil, construction activities would be required to adhere to the City’s Grading Ordinance that regulates site operations and conditions in accordance with the City’s NPDES requirements. Construction activities that may result in pollutants entering the stormwater conveyance system would be required to adhere to the City’s Stormwater Management and Discharge Control Ordinance. As part of these ordinances, contractors would be required to implement construction BMPs to reduce adverse effects on receiving water quality, prepare an erosion and sediment control plan to control surface runoff and erosion, and develop a Spill Prevention and Control Plan to minimize the potential for, and effects from, spills of hazardous, toxic and petroleum substances. All groundwater discharges to the sewer must be granted a Regional San discharge permit. If the discharge is part of a groundwater cleanup or contains excessive contaminants, Central Valley Regional Water Board approval would also be required.

Given compliance with existing regulations (e.g., CGP, City ordinances, dewatering permit) and the incorporation of BMPs, construction would not violate applicable water quality standards or waste discharge requirements or otherwise degrade surface water or groundwater quality.

Sacramento River Water Intakes

Construction associated with repairs to the existing public rotunda leading to the existing water intake, and construction of the new tee screen intake, pump station and new pipelines would involve many of the same earth-disturbing activities (e.g., excavation, trenching, grading, etc.) associated with the treatment plant improvements and existing utility upgrades. In addition, construction would also require in-water work in the Sacramento River to construct the new tee screen intake and pump station**.** Construction would require installation of a sheet piling cofferdam in the riverbed and on the riverside of the levee to create a dewatered area for construction to occur. Construction of the conveyance pipelines (one for transferring raw water from the new intake to SRWTP, and a second for transporting water and sediment between the existing intake and SRWTP) would require cut and cover trenching and sheet piling shoring and may require minor vegetation and/or tree removal. While construction would be temporary, activities over the construction period could result in impacts to surface and groundwater that could violate water quality standards and/or waste discharge requirements.

As described above, in accordance with NPDES regulations, to minimize the potential effects of construction runoff on receiving water quality, the state requires that any construction activity affecting one acre or more shall obtain coverage under the CGP. For this project component, the City would obtain coverage under the CGP and require contractors to comply with the permit conditions (described above). For dewatering activities, the contractor would be required to implement dewatering requirements presented in Attachment J in the CGP. All groundwater discharges to the sewer must be granted a Regional San discharge permit. Similar to the FWTP and SRWTP improvements, construction activities disturbing more than 50 cubic yards of soil would be required to adhere to the City's Grading Ordinance that regulates site operations and conditions in accordance with the City's NPDES requirements. Construction activities that may result in pollutants entering the stormwater conveyance system would be required to adhere to the City's Stormwater Management and Discharge Control Ordinance.

In-water work required for the construction of the tee screen intake and pump station would involve more extensive dewatering to install sheet piling cofferdams in the riverbed and riverside of the levee. These construction activities could adversely affect surface water quality by increasing existing turbidity and potentially releasing fuels and other chemicals associated with construction equipment. The City would be required to obtain coverage under the Limited Threat General NPDES permit if discharges are low volume and/or short-term in nature (less than 0.25 million gallons and/or less than 120 days), or obtain coverage under the Waste Discharge Requirements or a NPDES permit (if not covered under the General Order). These permits would require contractors to prepare a dewatering and diversion plan for in-water work that identifies BMPs to ensure that construction activities in the Sacramento River meet water quality objectives and reduce siltation and erosion.

Compliance with existing regulations (e.g., CGP, dewatering permit, NPDES permit, City ordinances), and the incorporation of BMPs, would ensure that construction of the new water intake, pump station, and raw water pipeline avoids impacts related to violation of applicable water quality standards or waste discharge requirements, or otherwise degrade surface water or groundwater quality.

Potable Water Transmission Pipelines

Construction of up to 14,000 linear feet of potable water transmission pipelines in the vicinity of the SRWTP would also involve many of the same earth-disturbing activities (e.g., excavation, trenching, grading, etc.) associated with the treatment plant improvements and existing utility upgrades and may involve dewatering (depending on the depth of excavation required). Construction would likely occur in previously disturbed areas, and depending on the location, minor vegetation and/or tree removal may be required.

While the exact location of the potable water transmission pipelines is not known at this time, the types of construction activities for installation would be similar to other ground disturbing activities associated with other project components. These activities would be subject to compliance with existing regulations (e.g., CGP, dewatering permit, City ordinances) and the incorporation of BMPs, and therefore, construction would not violate applicable water quality standards or waste discharge requirements, or otherwise degrade surface water or groundwater quality.

Impact Conclusion

Compliance with existing regulations (e.g., CGP, dewatering permit, NPDES permit, City ordinances), and the incorporation of BMPs, would ensure that construction of the proposed project would avoid impacts related to violation of applicable water quality standards or waste discharge requirements, or other substantial degradation of surface water or groundwater quality. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.12-2: Operation and maintenance of the proposed project could violate any water quality standards or waste discharge requirements or otherwise degrade surface or ground water quality.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). O&M activities for all other project components would be completed under existing maintenance programs.

The Phase I MS4 Permit, issued to the City (Central Valley Water Board Order No. R5-2015-0023, NPDES Permit No. CAS082597) implements the Basin Plan through the effective implementation of BMPs to reduce pollutants in stormwater discharges to the maximum extent practicable. Any discharges to waters of the United States are regulated by existing waste discharge requirement permits issued by the Central Valley Regional Water Board for the FWTP (Order No. R5-2007-0087) and SRWTP (Order No. R5-2007-0086). The City's Stormwater Management and Discharge Control Ordinance also includes measures that prohibit discharges of pollutants, requires measures to reduce pollutants in stormwater, and requires compliance of operational BMPs. These BMPs could include source control and treatment control measures that would prevent or reduce, to the maximum extent practicable, any stormwater pollution or contamination. The post-construction stormwater quality control measures are specified within the City's Stormwater Quality Design Manual.

Compliance with existing regulations (e.g., NPDES permit, City ordinances), and the incorporation of BMPs, would ensure that O&M of the proposed project would avoid impacts related to violation of applicable water quality standards or waste discharge requirements, or other substantial degradation of surface water or groundwater quality. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.12-3: Increased diversions associated with operation of the proposed new intake could violate any water quality standards or otherwise degrade surface water quality.

As described in Chapter 2, *Project Description*, the proposed project involves increased diversion through a new water intake in the Sacramento River. Diversions through the existing Sacramento River water intake would not change, and therefore, there would be no impact associated with this proposed project component. While increased diversions through the new water intake would occur under the City's existing surface water rights, the diversion of additional water could result in potential changes in river flows and reservoir storage levels compared to existing conditions. Depending on the magnitude of these changes, increased diversion could potentially violate water quality standards or otherwise degrade surface water quality in the river. Water quality constituents most likely to be directly impacted by the increased diversion are water temperature and those constituents with a direct relationship to water temperature (e.g., DO, bacteria, and pH). Changes in storage and instream flows can also influence dilution capacity and thereby indirectly affect concentrations or levels of other water quality parameters (i.e., metals, toxicity, pesticides, salinity, pathogens, nutrients, turbidity, etc.) in the vicinity of the proposed project area (i.e., Delta). Depending on the magnitude of changes compared to existing conditions, increased diversions could violate water quality standards or degrade surface water quality, resulting in a significant impact.

The following presents a discussion of select modeling results used to evaluate potential effects of increased diversion on surface water quality as measured by surface water flows, reservoir storage, Delta water quality, and river temperature.

River Flows

As presented in Table 3.12-9, long-term averaged monthly river flows for the proposed project model scenarios were all found to have negligible differences compared to existing baseline conditions (i.e., simulated changes were within 5 percent). However, differences varied by location, water year type, water use scenario, and month, with different combinations of these variables resulting in variability in the patterns of flow changes with larger changes in flow sometimes concentrated in certain month and water year combinations (refer to Appendix E, Exhibit A). The largest simulated percent and magnitude decreases in monthly flows for the proposed project scenarios occurred to the Trinity River below Clear Creek Tunnel, Sacramento River below SRWTP, and American River below FWTP output locations. Simulated changes at each output location are summarized below and further discussed in Appendix E.

- **Sacramento River below SRWTP**: Flows in the Sacramento River below SRWTP were directly influenced by proposed project diversions. On average, simulated average monthly flows at Sacramento River below SRWTP were between 0.6 and 1.3 percent less than existing baseline conditions for the three proposed project scenarios. Comparing monthly average by water year type, the magnitudes of simulated changes in monthly average flows at the Sacramento River below SRWTP were all less than 1.7 percent of the long-term average observed flow at this location, suggesting these simulated changes were relatively small in the context of this location's hydrologic regime and that changes were within the typical range of both model and observational uncertainty, which can be as large as 5–10 percent of actual values (USGS, 1992; Sauer and Meyer, 1992).[10] Decreases in long-term average monthly flow under the proposed project scenarios did not exceed 5 percent for any combination of month and water year type (refer to Appendix E, Exhibit A).

- **Trinity River below Clear Creek Tunnel**: Flows in the Trinity River below Clear Creek Tunnel were more indirectly influenced by proposed project diversions in the sense that flows in this location were reduced to convey more water into the Sacramento River to meet the simulated increased City diversions. Across the three proposed project scenarios, simulated long-term average monthly flows at Trinity River below Clear Creek Tunnel were between 0.4 and 0.5 percent less than existing baseline conditions. Comparing monthly averages by water year type, the magnitude of simulated changes in monthly average flows at the Trinity River below Clear Creek Tunnel between existing baseline and proposed project conditions were all less than 5.8 percent of the long-term average observed flows at this location.[11] During certain month and water year type combinations, average flow decreases were in excess of 5 percent (e.g., August, September, and October of critically dry years for all proposed project scenarios and January of above normal years for the +150 MGD and projected demand scenarios [refer to Appendix E, Exhibit A]).

- **Other Outputs Locations:** At the Feather River and Delta Outflow output locations, as well as the other output locations on the Sacramento River (i.e., Feather River below Thermalito Afterbay, Feather River at Mouth, and Sacramento River nodes upstream of SRWTP) simulated percent and magnitude changes in long-term averaged monthly river flows were either negligible or generally increased[12] for the proposed project scenarios compared to existing baseline conditions.

- **Lower American River**: On the Lower American River, simulated percent and magnitude changes in monthly averaged flow between proposed project scenarios and existing baseline conditions were highly variable depending on project scenario, month, water year type, and output location. On average, percent changes in average monthly flows for the American

[10] Observed data for this location is from the following USGS Gage #s: 11447650 – Sacramento River at Freeport, CA (Period of Record 1948-2015). All data was downloaded from https://waterdata.usgs.gov/nwis.

[11] Observed data for this location is from the following USGS Gage #s: 11525500 – Trinity River at Lewiston, CA (Period of Record 1911-2024). All data was downloaded from https://waterdata.usgs.gov/nwis.

[12] Increased streamflows likely reflect changes in CVP-SWP operations needed to convey water downstream to the SRWTP to meet simulated increased City diversions.

River below Nimbus Dam output location were found to either not change or slightly increase for the proposed project scenarios compared to existing baseline conditions, whereas magnitude changes in average monthly flows were found to either not change or slightly decrease. On average, the percent change in average monthly flows for the Lower American River below FWTP output location were between 0.4 and 0.6 percent less than existing baseline conditions for the three proposed project scenarios. Comparing monthly averages by water year type, the magnitudes of simulated decreases in monthly average flow at the American River below FWTP output location did not exceed more than 6.4 percent of the long-term average observed flows at this location.[13] During certain month and water year type combinations, simulated average flow decreases on the American River at one or both output locations (i.e., below Nimbus Dam [upstream of FWTP] and below FWTP intake) were in excess of 5 percent (e.g., October of critically dry years and September of above normal years for all proposed project scenarios, August and October of dry years for the +150 MGD and Projected Demand scenarios, and January of dry years for the Projected Demand scenario [refer to Appendix E, Exhibit A]). Refer also to Section 3.5, *Biological Resources – Aquatic*, Impact 3.5-3 for further interpretation of results in the lower American River.

SWP and CVP Storage Facilities

Table 3.12-10 presents changes in simulated long-term average end of month reservoir storage volumes between existing baseline and proposed project conditions. Similar to river flows, simulated changes in long-term average end of month reservoir storage volumes between the proposed project and existing baseline conditions varied by output location, month, and water year type. Simulated changes in reservoir storage for CVP-SWP related storage facilities are described below.

- **Folsom Reservoir:** At Folsom Reservoir, long-term average end of month reservoir storage values were, on average, found to increase slightly under the proposed project scenarios compared to existing baseline conditions. Based on comparing the by-month average storage values, slight decreases in end of month Folsom storage, on the order of 0.1 to 0.2 percent occurred between May and July, but the timing and magnitude of such decreases varied by project scenario (refer to Appendix E, Exhibit A). Across all three proposed project scenarios the greatest decrease in average monthly storage for any month and water year type combination was 2.1 percent (equivalent to 5.2 TAF). No simulated decrease in long-term average end-of-month storage at Folsom Reservoir was in excess of 5 percent and none of the long-term average decreases exceeded 1 percent of Folsom Reservoir's total storage capacity (9.7 TAF) (refer to Appendix E, Exhibit A).

- **Shasta Lake, Trinity Lake, and Lake Oroville**: At other CVP-SWP reservoirs, simulated percent and magnitude changes in long-term average end of month reservoir storage generally decreased for the proposed project scenarios compared to existing baseline conditions. These decreases reflect changes in CVP-SWP operations needed to convey water downstream to the SRWTP to meet simulated increased City demand. Decreases in storage were progressively greater from the +75 MGD project scenario to the +150 MGD project scenario. Decreases under the projected demand scenario were slightly less than those for the +150 MGD scenario. At Shasta Lake, on average, storage decreases were greater than 10 TAF for all three proposed project scenarios. At Trinity Lake, average decreases were greater than 10 TAF for the +150 MGD project scenario. At Lake Oroville, average decreases were

[13] Observed data for this location is from the following USGS Gage #s: 11446500– American River at Fair Oaks, CA (Period of Record 1904-2024). All data was downloaded from https://waterdata.usgs.gov/nwis.

less than 10 TAF for all three proposed project scenarios. However, no long-term average decreases exceeded 1 percent of any of these reservoirs' total reservoir capacity for any of the three proposed project scenarios (refer to Table 3.12-10). Relatively large storage decreases (e.g., in excess of 5 percent, 10 TAF, or 1 percent of total reservoir capacity) were simulated to occur during certain months and water year types, at all three locations (refer to Appendix E, Exhibit A). Due to carry-over conditions, whereby a decrease in one month is propagated forward and thus result in similar magnitude decreases in subsequent months, these decreases often persisted throughout the year. The greatest decreases tended to occur between June and March and had a slight tendency to be elevated in dryer water year types compared to other water year types.

As detailed in Appendix E, the primary drivers for changes in simulated reservoir storages are: (1) releasing water to meet simulated increased City demand; (2) re-balancing of CVP North-of-Delta reservoirs in accordance with the dynamic requirements under the Coordinated Operating Agreement (COA)[14] between the SWP and CVP; and (3) to maintain compliance with existing water quality standards (including minimum and recreational flow requirements and objectives) pursuant to applicable agreements and regulatory requirements. In other words, the reservoirs are releasing more water to meet downstream obligations (e.g., City diversions, Delta flows, water deliveries), which is why many of the simulated monthly flow changes for the Sacramento and Feather rivers are positive. D-1641 also authorizes the SWP and CVP to jointly use each other's points of diversion in the southern Delta, with conditional limitations and required response coordination plans.

Delta Water Quality

As described in subsection 3.12.2, *Environmental Setting*, Delta water quality conditions are highly variable throughout the year and show considerable geographic variation. Delta water quality is managed by monitoring programs and operational changes associated with meeting objectives for Delta outflows, the timing and number of days that the DCC gates are opened, and the X2 location. X2 is a physical attribute of the estuary used as a habitat indicator for the location of the low salinity zone. Therefore, changes in Delta outflow and the location of X2 under existing conditions were used to assess potential Delta water quality impacts as a result of increased diversion. The analysis of potential impacts to Delta water quality focused on the frequency and magnitude of changes in these parameters by long-term monthly average and water year types, as compared to baseline conditions. Moreover, for the February through June period, model results were specifically evaluated for any shift in the X2 location from west of Collinsville (X2 less than or equal to 81 km) to east of Collinsville under Project-only conditions, as such a change would be in violation of the 2018 amended Bay-Delta Plan and D-1641 standards.

As shown in Table 3.12-13, simulated average differences in X2 position between proposed project conditions and existing baseline conditions were typically negligible. The maximum increase between all proposed project scenarios and existing baseline conditions was 2 km. Comparison of February through June X2 positions found that all X2 locations were west of

[14] As discussed in subsection 3.12.3, *Environmental Settings*, the COA defines the rights and responsibilities of the CVP and SWP regarding water needs of the Sacramento River system and Delta and includes obligations for in-basin uses, accounting, and real-time coordination of water obligations of the two projects. The COA contains considerable flexibility in the manner with which Delta conditions in the form of flow standards, water quality standards, and export restrictions are met.

Collinsville (i.e., less than 81 km) in accordance with D-1641 objectives. In addition to meeting D-1641 X2 objectives, simulated results for all model scenarios also met other D-1641 objectives, Net Delta Outflow Index (NDOI) outflow standards[15] and export/import (E/I) ratio. Salinity criteria at Rock Slough, Emmaton, Jersey Point, and Collinsville were met consistently across all model scenarios (i.e., there were either no or only negligible differences between proposed project conditions and the existing conditions baseline) and on a monthly basis were found to be met on greater than 93 percent of simulation months, which is consistent with other CalSim 3 modeling (DWR, 2017; DWR, 2021).

River Temperatures

Using CalSim 3 outputs, the HEC-5Q modeling tool was used to simulate water temperatures in the American River from below Nimbus Dam downstream to the confluence with the Sacramento River and in the Sacramento River from the American River confluence downstream to Freeport. As shown in Table 3.12-14, long-term averaged monthly river water temperatures for the proposed project model scenarios were almost all found to have negligible differences compared to existing baseline conditions (e.g., simulated changes were within 5 percent; refer to Table 3.12-14). When considering all water year types, average changes in monthly average river water temperatures at all model output locations under the proposed project scenarios were within 0.02°F and 0.03 percent of those occurring under existing baseline conditions. When considering dry and critically dry water years, average changes in monthly average river water temperatures at all model output locations under the proposed project scenarios were within 0.04°F and 0.07 percent of those occurring under existing baseline conditions.

The largest simulated percent and magnitude increases in monthly water temperatures for the proposed project scenarios occurred at the American River below Nimbus Dam output location, but remained negligible (refer to Table 3.12-14). Further, there was essentially no difference in warming (e.g., simulated changes were within 5 percent) that occurred between Watt Avenue and below the FWTP under the proposed project scenarios relative to what occurred under existing baseline conditions (simulated changes were within 5 percent). There was also negligible difference in warming at the locations on the Sacramento River above and below the SRWTP. These results suggest that increased diversion from the Sacramento River would have a negligible effect on long-term water temperatures at these locations.

Summary and Impact Conclusion

Compared to existing baseline conditions, long-term average changes to modeled river flows associated with the proposed project scenarios were almost all found to have negligible differences compared to baseline conditions (e.g., simulated changes were within 5 percent). In locations where simulated decreases in flow were greater than 5 percent (i.e., the Trinity River below Clear Creek Tunnel and the Lower American River below Nimbus Dam), this magnitude of decreased flow was found only during certain month and water year type combinations (e.g., August, September and/or October of dry or critically dry years for the proposed project scenarios). As detailed in Appendix E, changes in river flows under the proposed project scenarios correspond with logical changes in City water demands and associated diversions, and

[15] The NDOI, or Net Delta Outflow Index, calculation infers outflow from Delta water flow balance includes tributary flows, channel depletions and exports.

changes in reservoir storage. Compared to existing baseline conditions, reservoir storage decreases at Shasta Lake, Trinity Lake, and Oroville Lake associated with the proposed project scenarios were greater than 10 TAF and/or exceeded 1 percent of total reservoir capacity during certain months and water year types. The greatest decreases tended to occur between June and March and had a slight tendency to be elevated in drier water year types compared to other water year types.

Compared to existing baseline conditions, changes in Delta water quality associated with the proposed project scenarios as measured by changes in Delta outflow and the location of X2 were typically negligible. Under all proposed project scenarios, D-1641 X2 objectives, other D-1641 objectives, NDOI outflow standards and E/I ratio were all met, suggesting that increased diversion from the Sacramento River would have a negligible effect on Delta water quality. Compared to existing baseline conditions, changes in river temperature associated with the proposed project scenarios were also found to be negligible (simulated changes were within 5 percent), suggesting that increased diversion from the Sacramento River would have a negligible effect on long-term water temperatures at this location.

Despite the simulated decreases in river flows and reservoir storages associated with the proposed project scenarios, results indicated that regulatory requirements, including Delta water quality objectives, were always met in all simulations and flow objectives such as those defined in the American River Modified Flow Management Standard, per the 2017 Water Forum Agreement, were met with nearly the same frequency in all these simulations. A multitude of flow- and storage-related requirements and criteria ultimately govern how the project would actually operate. Both DWR and Reclamation must monitor the effects of their respective diversions and SWP and CVP operations to ensure compliance with existing water quality objectives. For example, in accordance with federal and State regulatory requirements, the CVP and SWP are frequently required to release water from upstream reservoirs to maintain Delta water quality. Such regulatory requirements stem from documents or decisions that implement State Water Board-promulgated water quality objectives in the Basin Plan for the Sacramento-San Joaquin River Basins and Bay-Delta Plan and D-1641. Other relevant requirements or criteria are drawn primarily from the 2019 NMFS Biological Opinions (NMFS, 2019), the CDFW (2020) Incidental Take Permit, and the Water Forum Agreement (2017)—all of which implement State Water Board water quality standards and objectives and/or measures deemed protective of aquatic resources.

Therefore, increased diversions associated with operation of the new water intake would not violate any water quality standards or otherwise substantially degrade surface water quality and impacts would be considered **less than significant**.

Refer to Section 3.5, *Biological Resources - Aquatic*, for a discussion of potential impacts on aquatic biological resources.

Mitigation Measures

None required.

Impact 3.12-4: Construction of the proposed project could substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

Treatment Plant Improvements and Existing Utility Upgrades

As discussed in Impact 3.12-1, construction activities associated with treatment plant improvements and the existing utility upgrades would occur primarily in previously disturbed areas. Construction activities associated with the existing utility upgrades at both treatment plants would also occur in previously disturbed areas. In general, these are primarily existing impervious surfaces. Following construction, pervious areas would be landscaped. On-site retention structures would be installed to ensure any additional stormwater flows that are created due to new impervious surfaces needed for the various project improvements are retained on-site. Therefore, the extent of groundwater recharge under existing conditions would be minimal and not substantially interfere with groundwater recharge at the basin-scale. Furthermore, construction would not require the use of groundwater supplies; any dewatering required for construction of the FWTP and SRWTP improvements would be temporary and would not result in impacts on groundwater supplies.

Therefore, construction associated with the FWTP and SRWTP improvements would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the South American subbasin.

Sacramento River Water Intakes

As discussed in Impact 3.12-1, construction activities associated with the Sacramento River water intakes (i.e., repairs to the existing public rotunda leading to the existing intake, and construction of the new tee screen water intake, pump station, and new pipelines) would be similar to construction of the treatment plant improvements and existing utility upgrades. Given the nature of construction activities, the in-water work required for the construction of the tee screen intake and pump station would involve more extensive dewatering to install sheet piling cofferdams in the riverbed and riverside of the levee. However, dewatering would be temporary and would not occur for substantial periods of time.

Therefore, construction associated with the Sacramento River water intakes would not result in impacts on groundwater supply or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the South American Subbasin.

Potable Water Transmission Pipelines

As discussed in Impact 3.12-1, construction of up to 14,000 linear feet of potable water transmission pipelines in the vicinity of the SRWTP would primarily occur in previously disturbed areas, with minor crossings of undisturbed grassy/dirt areas. While the exact location of the potable water transmission pipelines is not known at this time, the extent of groundwater recharge under existing conditions would be minimal and not substantially interfere with groundwater recharge at the subbasin-scale. Further, construction would not likely require the use of groundwater supplies; any temporary dewatering required for transmission pipeline construction would be temporary and would not result in impacts on groundwater supplies. Therefore, construction of the transmission pipelines would not be expected to result in impacts on groundwater supply or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the South American Subbasin.

Impact Conclusion

Construction associated with the proposed project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the South American Subbasin consistent with the subbasin's GSP (LWA, 2021). Therefore, this impact would be **less than significant**.

Mitigation Measures

None required.

Impact 3.12-5: Operation and maintenance of the proposed project could substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

All Project Components

As discussed in Impact 3.12-2, O&M activities for the various project components at both the FWTP and SRWTP project areas would generally remain the same as existing conditions. O&M would not require new groundwater supplies or interfere substantially with groundwater recharge; minor changes in impervious surface cover would not alter groundwater recharge at the subbasin-scale. As discussed in Impact 3.12-3, operation of the new water intake would not result in substantial (greater than 5 percent) changes in flow. Any reduction in surface water in the river that would be available for groundwater recharge would be minimal. Therefore, O&M of the proposed project would not substantially decrease groundwater or impede sustainable groundwater management of the South American Subbasin and this impact would be **less than significant**.

Mitigation Measures

None required.

Impact 3.12-6: Construction of the proposed project could substantially alter the existing drainage patterns.

Treatment Plant Improvements and Existing Utility Upgrades

As discussed in Impact 3.12-1, construction activities associated with treatment plant improvements at both FWTP and SRWTP, including the demolition of existing structures and facilities, would occur primarily within the City-owned property in previously disturbed areas. Some utilities (i.e., electrical, water, sewer, and storm drainage) would be relocated on-site due to conflicts with new structures or to accommodate the constructability of other improvements. Construction activities associated with the existing utility upgrades at both treatment plants would also occur in previously disturbed areas. These areas have established drainage patterns routing stormwater to existing stormwater systems.

Short-term construction activities could temporarily alter the existing drainage pattern of the site or area. For example, demolition of structures and facilities at the water treatment plants could temporarily change surface runoff processes and affect stormwater facilities or off-site water quality until construction of the new structure or facility is completed. As discussed in Impact 3.12-1, the City would obtain coverage under the CGP and require contractors to comply with the permit conditions that would mandate the development and implementation of a SWPPP. The SWPPP would be prepared by a QSD, be submitted electronically to the State Water Board before implementation and include standard BMPs required for all projects and any additional measures determined necessary by the QSD to control stormwater run-on/runoff and sediment. Standard BMPs also include the use of erosion control measures to reduce the impacts of temporary erosion as a result of construction.

Given compliance with existing regulations (e.g., CGP, dewatering permit, City ordinances) and the incorporation of BMPs, construction activities would not substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows.

Sacramento River Water Intakes

As discussed in Impact 3.12-1, construction associated with the Sacramento River water intakes (e.g., repairs to the existing public rotunda leading to the existing intake, and construction of the new water intake, pump station and new pipelines) would involve many of the same earth-disturbing activities (e.g., excavation, trenching, grading, etc.) as for construction of the FWTP and SRWTP improvements. Potential alternations to the existing drainage pattern are first considered for the conveyance pipelines (out-of-water), followed by the new tee screen intake and pump station (in-water).

Construction of the conveyance pipelines would occur in previously disturbed areas, and minor vegetation and/or tree removal may be required. Similar to the FWTP and SRWTP, these areas are previously disturbed and would likely occur within established drainage patterns routing stormwater to existing storm water systems. Therefore, construction would not substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows.

Construction of the new tee screen intake and pump station would require in-water work in the Sacramento River; therefore, construction would require installation of sheet piling cofferdams within the riverbed and riverside of the levee to create a dewatered area for construction to occur. Although temporary, construction of a cofferdam would temporarily alter the existing drainage pattern of the Sacramento River in a manner which, if not properly controlled, could result in erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows.

As described above, in accordance with NPDES regulations, to minimize the potential effects of construction runoff on receiving water quality, the state requires that any construction activity affecting one acre or more obtain coverage under the CGP. For this project component, the City would obtain coverage under the CGP and require contractors to comply with the permit conditions (described above). In addition, a CVFPB encroachment permit and USACE Section 408 Permission would be required to show the proposed project will not affect the existing flood management system (i.e., the SPFC or a USACE project levee). For dewatering activities, the contractor would be required to implement dewatering requirements presented in Attachment J in the CGP.

Depending on the volume and duration of discharges associated with intake dewatering and groundwater dewatering, the City would be required to obtain coverage under the Low Threat to Water Quality General Order, Limited Threat General NPDES permit, or obtain coverage under the Waste Discharge Requirements or a NPDES permit (if not covered under the General Order). These permits would require contractors to prepare a dewatering and diversion plan for in-water work that identifies BMPs to ensure that construction activities in the Sacramento River meet water quality objectives and reduce siltation and erosion. Additionally, compliance with existing regulations (e.g., CGP, dewatering permit, NPDES permits, City ordinances,) and the incorporation of BMPs, would ensure that construction activities associated with the new water intake would not substantially alter the existing drainage pattern in a manner which would result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows.

Potable Water Transmission Pipelines

As described in Impact 3.12-1, construction of up to 14,000 linear feet of potable water transmission pipelines in the vicinity of the SRWTP would involve many of the same earth-disturbing activities (e.g., excavation, trenching, grading) and equipment types as for the FWTP and SRWTP improvements. Construction would likely occur in previously disturbed areas, and depending on the location of the pipeline, minor vegetation and/or tree removal may be required. These areas are previously disturbed and would likely occur within established drainage patterns routing stormwater to existing storm water systems. No new impervious surfaces would be created.

The exact locations of the transmission pipelines are not known at this time. However, given the types of activities associated with construction, and compliance with existing regulations (e.g., CGP, dewatering permit, City ordinances) and incorporation of BMPs, any associated increase in runoff or change in drainage patterns would not be anticipated to result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows.

Impact Conclusion

Given compliance with existing regulations (e.g., CGP, dewatering permit, City ordinances) and the incorporation of BMPs, construction activities would not substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.12-7: Operation and maintenance of the proposed project could substantially alter the existing drainage patterns.

Treatment Plant Improvements and Existing Utility Upgrades

Once improvements are completed at the FWTP and SRWTP, O&M activities would be similar to existing conditions. As described in Chapter 2, *Project Description, s*tructures associated with the treatment plant improvements would be constructed at-grade unless there exists a need to facilitate gravity flow of water across the structure, in which case part or all of the structure would be located below grade. A minor amount of additional impervious surface would be constructed (e.g., existing pervious/grassy areas that would be permanently converted to impervious areas). Following construction, pervious areas would be landscaped. On-site retention structures would be installed to ensure any additional stormwater flows that are created due to new impervious surfaces needed for the various project improvements are retained on-site with runoff routed to the existing stormwater drainage system.

The trenches associated with the storm drainage upgrades at the FWTP and the SRWTP, and below ground electrical service upgrades, would be filled and the ground surface finished with either native material (e.g., grass, rock, dirt) or pavement (e.g., asphalt or concrete). These areas would be returned to their existing condition with underground utilities located beneath existing impervious surfaces with runoff routed to the existing stormwater drainage system. Therefore, O&M of the treatment plant improvements and existing utility upgrades would not alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows.

Sacramento River Water Intakes

O&M associated with Sacramento River water intakes would require an incremental increase compared to existing conditions. However, these activities (e.g., routine inspections, equipment testing, etc.) would not alter the existing drainage patterns of the project area in a manner which would result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows. Operations associated with the conveyance pipelines would also not alter the existing drainage pattern of the area; following construction, these areas would be returned to their existing condition, and pipelines would be located underground beneath existing impervious surfaces. However, the presence of these new permanent structures (i.e., the new intake structure in the Sacramento River and pump station on the east bank of the Sacramento River) could alter the existing drainage pattern of the area.

As summarized above under *Method of the Analysis*, the hydraulic modeling of localized effects of the new water intake determined minimal changes to water surface elevations and velocities in the 3-mile-long segment of the Sacramento River just downstream of its confluence with the

American River relative to existing conditions (refer to Appendix D). Therefore, operations of the new water intake and pump station would not alter the existing drainage pattern of the area in a manner which would result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows.

Potable Water Transmission Pipelines

The exact locations of the potable water transmission pipelines are not known at this time. However, as discussed in Impact 3.11-2, O&M activities associated with the potable water transmission pipelines would be similar to existing conditions. The potable water transmission pipelines would be located underground beneath existing impervious surfaces with runoff routed to the existing stormwater drainage system. Therefore, O&M would not alter the existing drainage pattern of the area in a manner which would result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows.

Impact Conclusion

O&M of the proposed project would not alter the existing drainage pattern of the area in a manner which would result in substantial erosion or siltation on- or off-site, increase the rate or amount of surface runoff, create or contribute runoff water, or impede or redirect flood flows. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.12-8: Construction of the proposed project could result in release of pollutants due to being located in a flood hazard zone.

All Project Components

As described in subsection 3.12.2, *Environmental Setting*, the majority of the proposed project areas and associated staging areas are located outside the 100-year flood zone, ranging from moderate to low flood risk (Zone X shaded and unshaded, respectively).

Construction equipment and activities associated with the proposed project would require the use of hazardous materials and pollutants (e.g., fuels, oils, antifreeze, coolants, concrete and cement materials, etc.). Construction staging areas located within the property limits of FWTP and SRWTP, parallel with the pipeline construction on existing roadways, and for the Sacramento River water intakes, along Jibboom Street and within the paved Museum of Science and Curiosity (MOSAC) parking lot, could contain temporary storage of these types of pollutants. Because these staging areas are located in moderate flood risk areas, flooding could result in inundation and thereby release pollutants. The Sacramento River water intakes are located within the 100-year flood zone in a high flood risk area (Zone AE); however, no pollutants would be stored within the 100-year flood zone (the area with the greatest risk for inundation).

As described in Impact 3.12-1, in accordance with NPDES regulations, to minimize the potential effects of construction runoff on receiving water quality, the state requires that any construction activity affecting one acre or more obtain coverage under the CGP. For all project components, the City would obtain coverage under the CGP and require contractors to comply with the permit's conditions, including identifying required BMPs described in a SWPPP to properly store pollutants to protect from stormwater and inundation from potential flooding. Construction activities disturbing more than 50 cubic yards of soil would be required to adhere to the City's Grading Ordinance that regulates site operations and conditions in accordance with the City's NPDES requirements. Construction activities that may result in pollutants entering the stormwater conveyance system would be required to adhere to the City's Stormwater Management and Discharge Control Ordinance.

Given that the majority of the project area is located outside the 100-year flood zone and the staging off pollutant materials would be above the flood risk elevation, construction of the proposed project would not likely result in release of pollutants due to project inundation. Compliance with existing regulations and the incorporation of BMPs would ensure that pollutants associated with construction equipment and activities are properly managed such that releases are avoided to the extent possible. This impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.12-9: Operation and maintenance of the proposed project could result in release of pollutants due to being located in in a flood hazard zone.

All Project Components

As described in subsection 3.12.2, *Environmental Setting*, and summarized above, the majority of the proposed project areas are located outside the 100-year flood zone, ranging from moderate to low flood risk (Zone X shaded and unshaded, respectively). The Sacramento River water intakes are located within the 100-year flood zone in a high flood risk area (Zone AE). As discussed in Impacts 3.12-2 and 3.12-4, O&M activities associated with all project components would generally remain the same as existing conditions. Long-term O&M activities would be completed under existing maintenance programs. Therefore, the O&M of the proposed project would not result in substantial changes to the types or volume of pollutants used to maintenance equipment. Any permanent, on-site pollutants would continue to be stored properly per regulations (e.g., Phase I MS4 Permit, Stormwater Management and Discharge Control Ordinance) such that they are protected from stormwater and inundation from potential flooding to the extent possible. For these reasons and given that the majority of the project area is located outside the 100-year flood zone, O&M of the proposed project would not likely risk release of pollutants due to project inundation and this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.12-10: Implementation of the proposed project could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

All Project Components

Construction

As discussed in Impact 3.12-1, temporary construction activities associated with the proposed project could result in impacts to surface and groundwater that could violate water quality standards and/or waste discharge requirements. Given compliance with existing regulations (e.g., CGP, dewatering permits, and City ordinances) and the incorporation of BMPs, construction would not violate applicable water quality standards or waste discharge requirements, or other substantial degradation of surface water or groundwater quality. Therefore, construction would not conflict with or obstruct implementation of a water quality control plan. As discussed in Impact 3.12-4, construction associated with the proposed project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the South American Subbasin.

Operation and Maintenance

As discussed in Impact 3.12-2, compliance with existing permits (i.e., Central Valley Water Board Order No. R5-2016-0040, NPDES Permit No. CAS0085324) during O&M activities associated with the proposed project would result in no violation of any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. As discussed in Impact 3.12-5, O&M activities would not require new groundwater supplies nor would they interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the South American subbasin. Minor changes in impervious surface cover would not alter groundwater recharge at the subbasin-scale. Therefore, construction, operation and maintenance of the FWTP and SRWTP improvements would not conflict with or obstruct implementation of a water quality control plan or sustainable management plan.

Impact Conclusion

Implementation of the proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.12-11: Increased diversions associated with operation of the proposed new intake could result in substantial decreases in water supply deliveries because of changes in surface water flows and/or changes in water supply system operations, as measured by substantial changes in reservoir storage or timing or rate of river flows.

As described in Chapter 2, *Project Description*, the proposed project involves increased diversion from the Sacramento River through a new water intake. Diversions through the existing Sacramento River water intake would not change compared to existing conditions, and therefore, there would be no impact associated with this proposed project component. The City's increased diversion is consistent with General Plan policies, specifically PFS-4.1 (Exercise and Protect Water Rights), PFS-4.2 (Water Supply Sustainability), and PFS-4.3 (Surface Water Supply). While increased diversions would occur under the City's existing surface water rights, the diversion of additional water could result in potential changes in reservoir storage levels and the timing and rate of river flows compared to existing conditions. For example, flow patterns in the Sacramento River could change, or more broadly, increased diversions may change flow patterns in upstream tributaries to the Sacramento River, including the Trinity and Feather rivers, and storage volumes (and water elevations) of regional reservoirs, including Clair Engle Reservoir, Lake Oroville, Shasta Lake or Folsom Lake. These changes could result in potential decreases in surface water flows and/or changes in water supply system operations—specifically, reservoir operations by the Reclamation as part of the CVP, and DWR as part of the SWP, including joint CVP-SWP water supply allocations and reservoir operations. Additionally, these changes could alter diversions to existing contractors upstream and downstream of the diversion at the new water intake, and other relevant diversions and flows related to the discharge of treated wastewater (e.g., the downstream Sacramento Regional Sanitation District). Depending on the magnitude of changes compared to existing conditions, increased diversions could substantially decrease other users water supply deliveries (i.e., changes greater than 5 percent, 10 TAF, or 1 percent).

The following presents a discussion of the modeling results used to evaluate the potential effects of increased diversions associated with the new water intake on water supply deliveries under proposed project conditions, as measured by changes in reservoir storage, and timing or rate of river flows. For Folsom Reservoir, changes are considered negligible, or "no effect," if less than 1 percent; for Shasta Lake, Trinity Lake and Lake Oroville, changes are considered negligible, or "no effect," if less than 10 TAF (refer to Table 3.12-8). Changes in flows and changes in South of Delta deliveries from the Jones and Banks Pumping Plants are considered negligible, or "no effect," if the relative change was 5 percent or less.

SWP and CVP System and South-of-Delta Deliveries

Water supply deliveries from the SWP and CVP system and South of the Delta are most directly influenced by changes in storage in major SWP and CVP reservoirs (i.e., Shasta Lake, Trinity Lake, Lake Oroville, and Folsom Reservoir) and Banks Pumping Plant and Jones Pumping Plant exports. Substantial changes in reservoir storage (greater than 1 percent or 10 TAF) and Delta exports (greater than 5 percent) could result in decreases in water supply deliveries, particularly to junior water right holders.

Table 3.12-11 summarizes changes in existing conditions simulated long-term average end-of-September storage at SWP and CVP facilities. As mentioned above, the end of September marks the end of the water year when water supplies are often the most stressed. Thus, end-of-September storage serves as an indicator for reservoir carry-over storage going into the new water year. Based on CalSim modeling results, increased diversions from the new water intake would result in changes to SWP and CVP reservoir storage. At Shasta Lake, long-term average decreases in end-of-September storage were greater than 10 TAF all proposed project scenarios for all water year types and when considering only dry and critically dry years. At Trinity Lake and Lake Oroville, long-term average decreases in end-of-September storage were greater than 10 TAF for all proposed project scenarios when considering only dry and critically dry years. Despite decreases greater than 10 TAF, no average decreases in end-of-September storage at Shasta Lake, Trinity Lake, or Lake Oroville were greater than 1 percent of each reservoir's total storage capacity (refer to Table 3.12-8). At Folsom Reservoir, long-term average end-of-September storage tended to slightly increase under the proposed project scenarios for all water year types and slightly decreased when considering only Dry and Critically Dry years.

Table 3.12-12 summarizes the changes in simulated, long-term average annual South of Delta deliveries from the Jones and Banks Pumping Plants. Comparison of average total annual deliveries found percent differences in CVP exports from Jones Pumping Plant between existing baseline and proposed project model scenarios were relatively minor (less than 5 percent) when considering all water year types and when considering only dry and critically dry years. That is, differences in average annual exports were all less than 0.4 percent for all water year types and less than 1.5 percent for dry and critically dry years. These translated into magnitude differences in average total annual deliveries ranging from 5.9 TAF to 10.3 TAF (refer to Table 3.12-12). Decreases were generally greatest between July and October, corresponding to periods with higher City demand (refer to Appendix E, Exhibit A).

Comparison of average total annual deliveries found percent differences in SWP exports from Banks Pumping Plant between existing baseline and existing proposed project model scenarios were relatively minor (less than 5 percent) when considering all water year types and when considering only dry and critically dry years. That is, differences in average annual exports were all less than 0.5 percent for all water year types and less than 1.7 percent for dry and critically dry years. These translated into magnitude differences in average total annual deliveries ranging from 6.2 TAF to 12.8 TAF (refer to Table 3.12-12). Decreases were generally greatest between August and October, corresponding to periods with higher City demand (refer to Appendix E, Exhibit A).

Lower American River

Water supply deliveries in the lower American River area are most directly influenced by changes in Folsom Reservoir storage and flow changes in the lower American River. Substantial changes in Folsom Reservoir storage and surface water elevations could impede the ability of others to pump and divert water from the reservoir. Similarly, others' ability to divert could result from changes in lower American River flows and/or temperature impacts that would trigger regulatory constraints on supply diversions. Based on CalSim 3 modeling results, changes in average end-of-month storage and water surface elevation at Folsom Lake under the proposed project model scenarios were all relatively negligible compared to existing baseline conditions. Based on comparing the by-month average storage values, across all water year types and all three proposed project scenarios, the maximum decrease in average end-of-month Folsom Lake storage under the proposed project was 2.1 percent (5.2 TAF). However, decreases of this magnitude were temporally limited and, on average, the long-term monthly decrease was much more limited, ranging from 0.3 to 0.4 percent (1.7 to 2.2 TAF). Overall, from a water supply perspective, the simulated storage volumes for the proposed project scenarios are largely the same as those for the existing baseline conditions. As discussed in Impact 3.11-3, based on CalSim 3 modeling results, changes in monthly average flows for the lower American River under the proposed project model scenarios were all relatively negligible compared to the existing baseline conditions (between 0.4 and 0.6 percent).

As described in Section 3.12.3, *Regulatory Setting*, under *Lower American River Minimum Flow and Temperature Requirements*, the Hodge decision, issued in 1989 by Judge Hodge in *Environmental Defense Fund, et al. v. East Bay Municipal Utility District*, regulates water diversions from the American River by setting seasonal minimum flow requirements, known as "Hodge Flows," to protect fish populations, particularly salmon and steelhead, while balancing municipal water needs. If river flows drop below these thresholds, the City must halt diversions from the American River and instead divert its water supplies from its alternative water intake on the Sacramento River and/or rely on its groundwater sources. Based on CalSim 3 modeling results, there would be effectively no difference in the simulated number of times the Hodge Flows condition would be triggered over the simulated period compared to existing baseline conditions.

Summary and Impact Conclusion

Under existing conditions, increased diversion through the new water intake resulted in changes in storage in SWP and CVP reservoirs and South-of-Delta exports. For the lower American River, changes Folsom Reservoir storage and lower American River flows for the proposed project scenarios are largely the same as those for the existing baseline conditions. However, for Shasta Lake, Trinity Lake and Lake Oroville, substantial decreases (greater than 10 TAF) in long-term average end-of-September storage were observed during dry and critically dry years. Thus, model simulations suggest that increased diversion to meet increased City demand may be met from various water sources and/or operational changes including but not limited to water releases from upstream SWP and CVP reservoir storage, reduced deliveries to junior water rights holders, or interbasin water transfers.

The South of Delta deliveries, and by connection SWP and CVP upstream reservoir releases for Delta outflow requirements and Delta export objectives, are under the discretion of the operators of these two projects, who can reduce allocations to contractors. That is, it is up to the operators of the SWP and CVP to control how any proposed project-related effect is manifested and/or shared across water users. Further, pursuant to the City's 1957 permanent water rights operating contract with Reclamation (Reclamation, 1957), it is stipulated that Reclamation would: (1) operate its facilities so as to make available in the lower American River sufficient water for the City's diversions up to the amounts specified in the operating contract, and (2) operate its CVP Sacramento River storage facilities so as not to interfere with the City's diversions up to the amounts specified in the operating contract. As specified in the 1957 permanent water rights operating contract, “representatives of the United States and the City will confer with each other at least once per year, and if it shall appear to them that storage, retention, or releases other than that contemplated by this contract may be made without substantial injury or harm to the respective interests of the parties hereto in such water and their use, then it is agreed between the parties that such storage retention, or release may be made for the period agreed upon” (Reclamation, 1957; Section 35). Additionally, “representatives of the United States (i.e., Reclamation) and the City shall confer with each other as often as necessary for the purposes of agreeing upon or approving methods, procedure, data or other matters required under the contract to be mutually agreed upon or approved by the United States and the City” (Reclamation, 1957; Section 36). Under the proposed Project, it is assumed that Reclamation and the City would continue to meet at least annually During dry and critically dry water years, “other matters” discussed during the meeting could include a discussion of forecasted water supply delivery changes under increased City diversion and notification to SWP and CVP contractors that have water rights junior to those of the City such that reduction of water supply deliveries can be planned and managed accordingly.

Despite this regulatory context, the CalSim 3 modeling results demonstrate that in dry and critically dry water years, several SWP and CVP reservoirs experienced long-term average decreases in end-of-September storage greater than 10 TAF. Thus, increased diversion by the City could result in substantial reductions in water supply deliveries during dry and critically dry years to SWP and CVP water contractors that have water rights junior to those of the City. In response to reduced surface water deliveries, water rights holders with access to groundwater could increase use of groundwater in-lieu of surface water to meet demand. As such, potential actions of water users could have an indirect effect on groundwater. Therefore, increased diversion associated with the operation of the proposed new water intake could result in substantial decreases in water supply deliveries. This would be **significant and unavoidable**.

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3.13 Land Use and Planning

3.13.1 Introduction

This section of the Draft EIR describes and evaluates land use and planning effects associated with implementation of the proposed project.

No comments specifically addressing land use and planning were received in response to the NOP. See Appendix A for NOP comment letters.

3.13.2 Environmental Setting

Regional Setting

The City's water treatment plants, raw water supply, and distribution system facilities are located within the City of Sacramento (see Figure 2-1 in Chapter 2, *Project Description*). The City of Sacramento is located approximately 80 miles east of San Francisco and 85 miles west of Lake Tahoe in the northern portion of the Central Valley, at the northern end of the Sacramento–San Joaquin Delta and at the confluence of the Sacramento and American Rivers. Sacramento is the seat of government for the State of California and serves as the county seat of Sacramento County. Sacramento is the largest incorporated city in Sacramento County.

Sacramento is a major transportation hub, the point of intersection of major transportation routes that connect Sacramento to the San Francisco Bay Area to the west, the Sierra Nevada and the state of Nevada to the east, the City of Los Angeles to the south, and Oregon to the north. The city is bisected by a number of major freeways, including I-5, which traverses the state from north to south, paralleled to the east by State Route 99 (SR-99) from Red Bluff in the north to Bakersfield in the south; I-80 and the Capital City Freeway (or Business 80), which together provide an east-west connection between San Francisco and Reno; and US-50, which provides an east-west connection between Sacramento and South Lake Tahoe.

Project Areas

FWTP Project Area

As described in Chapter 2, *Project Description*, the FWTP project area, including the approximately 34-acre FWTP property, is located adjacent to the south bank of the American River and near California State University, Sacramento (Sacramento State) (see Figure 2-2 in Chapter 2). The FWTP project area is bounded by State University Drive to the west, College Town Drive to the south, and Howe Avenue to the east. Adjacent land uses include the Sacramento State campus to the west and apartment complexes and student housing to the east and south. A paved pedestrian path runs along the northern edge of the FWTP property.

The FWTP project area is located within the East Sacramento Community Plan area as defined in the City of Sacramento 2040 General Plan. The East Sacramento Community Plan area encompasses approximately seven square miles bounded on the north by the American River, on the south by the Gold Line Light Rail line and Jackson Highway (State Route 16), on the east by

Watt Avenue, and on the west by Alhambra Boulevard. The East Sacramento Community Plan area encompasses a diverse collection of traditional neighborhoods, centers, and transportation routes. Four neighborhoods make up the East Sacramento Community Plan Area, including East Sacramento, College/Glen, the Sacramento State campus and environs, and River Park. The majority of residential development in East Sacramento is made up of single-family homes in traditional neighborhoods.

The FWTP project area is zoned Standard Single Family–Parkway Corridor Overlay (R-1-PC) (Sacramento City Code, Title 17). The purpose of the R-1 zone is to accommodate low-density residential uses. Industrial and agricultural uses, including solar energy systems and city property, are also permitted in the R-1 zone. The purpose of the Parkway Corridor overlay zone is to reduce those impacts that are incompatible with the maintenance of the American River as a natural resource and to implement the City's General Plan and the American River Parkway Plan (County of Sacramento, 2008). The FWTP property is designated Public/Quasi-Public in the City's 2040 General Plan. Allowed uses under this designation include government buildings, public and private schools, colleges, hospitals, cemeteries, airports, transportation and utility facilities, and other compatible public and quasi-public uses.

SRWTP Project Area

As described in Chapter 2, *Project Description*, the SRWTP project area, including the approximately 50-acre SRWTP property, is located near the confluence of the Sacramento River and American River (see Figure 2-3 in Chapter 2). The SRWTP project area is bounded on the north by the American River, on the east by 7th Street, on the south by the Union Pacific Railroad, and on the west by the Sacramento River. The SRWTP project area also includes the existing Sacramento River water intake and the site of the proposed new water intake, which are located on the east bank of the Sacramento River.

The SRWTP project area is located within the River District Specific Plan area (City of Sacramento, 2011) and the Sacramento Railyards Specific Plan Area (City of Sacramento, 2016), which are both located in the Central City Community Plan area of the City's 2040 General Plan. The River District is comprised of approximately 748 acres of land generally bounded by the Sacramento River on the west, the American River on the north, the Sacramento Railyards on the south, and 18th Street on the east. The River District Specific Plan area includes mostly developed land that includes a mix of residential, industrial, retail/wholesale, and office uses, and community and social service facilities. The Sacramento Railyards is comprised of approximately 244 acres of central Sacramento, located directly south of the River District, bounded generally on the south by I Street and H Street until 7th Street, at which point it follows the Union Pacific Railroad main line to its eastern boundary at 12th Street. The Sacramento Railyards Specific Plan area is a planned mixed-use development to include residential, retail, office, medical, and hotel development, historic/cultural space, public parks, plazas, and walkways. Riverfront Promenade and Park are to be located along the Sacramento River, south of Railyards Boulevard and north of the I Street Bridge; Viaduct Park and Civic Plaza Park are to be located along the north side of I Street; and Vista Park, the largest of the planned open spaces in the Railyards Specific Plan area, is to be located along Summit Tunnel Avenue, immediately southeast of the SRWTP property.

The SRWTP property is designated Public/Quasi-Public in the City's 2040 General Plan (see description of this land use designation above under the discussion of the FWTP project area). The existing and proposed new water intake structures and pump station are located within the Sacramento River and levee, adjacent to land designated Parks and Recreation. The Parks and Recreation designation allows for parks, parkways, trails, golf courses, and compatible public and quasi-public uses. The conveyance pipelines would cross through both land designations (Public/ Quasi-Public and Parks and Recreation) to carry water and sediment between the Sacramento River water intakes and the SRWTP. The existing utility upgrades and potable water transmission pipelines would be located within an area that also includes lands designated as Residential Mixed Use, which allows for a full range of residential, retail, employment, entertainment, cultural, and personal service uses; general offices and community institutional uses; assembly facilities, and compatible public and quasi-public uses. The entire SRWTP project area (outside of the Sacramento River itself) falls within one of two design review Special Planning Districts (SPDs): the River District SPD and the Sacramento Railyards SPD (Sacramento City Code, Title 17). Both SPDs serve to establish procedures to implement the policies and development standards of the River District Specific Plan and the Railyards Specific Plan, respectively, which are the primary policy and regulatory documents used to designate land uses and guide development within the boundaries of the Plan areas. Among other objectives, the River District SPD plans for improved circulation, infrastructure, and community facilities that will serve existing and future needs within the area and seeks to rehabilitate industrial uses as they relocate to provide for significant future residential populations. The Railyards SPD focuses on facilitating the development of a dynamic mixed-use urban environment that allows for a broad mixture of uses, including residential and non-residential infill building intensities, as well as pedestrian-friendly and transit-oriented connectivity between neighborhoods and neighboring districts.

Base zoning underlying the River District and Railyards SPD designations includes the SRWTP property zoned as Heavy Industrial (M-2). The purpose of the M-2 zone is to permit the manufacture or treatment of goods. The existing utility upgrades associated with the SRWTP would occur within areas zoned Residential Multi-Family (R-5). The purpose of the R-5 zone is to permit dwellings, institutions and limited commercial goods and services. The existing and proposed new water intakes and associated pump station are zoned American River Parkway Floodplain (ARP-F). The purpose of the ARP-F zone is to prevent the 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. The conveyance pipelines from the Sacramento River water intakes to the SRWTP cross through areas zoned General Commercial (C-2) and Flood Zone (F). The purpose of the C-2 zone is to provide for the sale of goods; the performance of services, including repair facilities; office uses; dwellings; small wholesale stores or distributors; and limited processing and packaging. The purpose of the F zone, which is considered an open space zone, is to conditionally permit specified uses along the Sacramento and American Rivers that are subject to inundation.

The potable water transmission pipelines could potentially occur within a mix of additional zoning designations, including Limited Commercial (C-1), Central Business District (C-3), Hospital (H), Residential Mixed Use (RMX), Office Building (OB), and Agriculture-Open Space (A-OS). In addition, some locations within the potable water transmission pipelines area, north of Richards Boulevard and east of North 5th Street, are within the Continental Plaza Planned Unit Development. None of these zoning designations would prohibit the installation of underground transmission pipelines for the distribution of treated water to the City's service area.

3.13.3 Regulatory Setting

Federal

No federal regulations that specifically regulate land use or land use planning would be applicable to the proposed project.

State

No state regulations that specifically regulate land use or land use planning would be applicable to the proposed project.

Local

City of Sacramento General Plan

State law requires each city and county to prepare and adopt a comprehensive and long-range general plan for its physical development (California Government Code Section 65300). A comprehensive general plan provides a jurisdiction with a consistent framework for land use decision-making. The general plan has been referred to as the "constitution" for land use development to emphasize its importance to land use decisions. The general plan and its maps, diagrams, and development policies form the basis for the City's zoning, subdivision, and public works actions. Under California law, no specific plan, area plan, community plan, zoning, subdivision map, nor public works project may be approved unless the City finds that it is consistent with the adopted General Plan.

The City of Sacramento 2040 General Plan was adopted on February 27, 2024. General Plan goals and policies that are applicable to the evaluation of proposed project effects on land use and planning are provided in **Table 3.13-1**.

TABLE 3.13-1
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – LAND USE AND PLANNING

Element	Goals and Policies
Land Use and Placemaking Element	Goal LUP-2: Policies LUP-3.9, 3.11; Goal LUP 4: Policies LUP-4.5, 4.6; Goal LUP-7: Policies LUP-7.1, 7.2, 7.3, 7.5
Youth, Parks, Recreation, and Open Space Element	Goal YPRO-1: Policies YPRO-1.1, 1.17

SOURCES: City of Sacramento, 2024

East Sacramento Community Plan

There are no policies applicable to the proposed project that are unique to the East Sacramento Community Plan area (discussed above in subsection 3.13.2, *Environmental Setting*), in which the FWTP project area is located, that supplement citywide General Plan policies.

Central City Community Plan

As described in subsection 3.13.2, *Environmental Setting*, The SRWTP project area is located within the River District Specific Plan area and the Sacramento Railyards Specific Plan Area, which are both designated as Special Planning Districts in the Central City Community Plan of the City's 2040 General Plan. The City's General Plan points to these Specific Plan documents, described below, for details related to land use goals and policies and design and development standards.

River District Specific Plan

As described above, the SRWTP project area is mainly located within the River District Specific Plan area. The River District Specific Plan establishes planning and design standards for approximately 748 acres of land within the River District Specific Plan area, with a focus on transitioning from industrial to residential mixed uses, services, and community facilities.
The Land Use chapter of the River District Specific Plan describes the land use designations and allowable development densities for the River District Specific Plan area, which correspond to and implement the "development concepts" for each of the River District's subareas. The Plan establishes goals and policies for orderly upgrading, replacement, and expansion of public utility infrastructure, including water, sanitary sewer, and storm drainage systems.

Sacramento Railyards Specific Plan

The potable water transmission pipelines within the SRWTP project area could be partially located in the Railyards Specific Plan area. As described above, the Railyards Specific Plan guides development and land use within the Plan area, focusing on the development of a mixed-use urban environment with green spaces and a connection to surrounding districts. Chapter 4 of the document provides principles, goals, and policies that align with, clarify, and expand upon these objectives, including a goal to provide adequate water facilities to serve the needs of new development (Goal CS-1).

City of Sacramento Planning and Development Code (Title 17)

The City of Sacramento Planning and Development Code (Sacramento City Code Title 17) is intended to implement the City's General Plan through the adoption and administration of zoning laws, ordinances, rules, and regulations. To achieve this outcome, the Planning and Development Code regulates all of the following:

- The use of land, buildings, or other structures.
- 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.
- The physical characteristics of buildings, structures, and site development, including the location, height, and size of buildings and structures; yards, courts, and other open spaces; lot coverage; land use intensity through regulation of residential density and floor area ratios; and architectural and site design.

The SRWTP project area is located within two Special Planning Districts of the Central City Community Plan (the River District and the Sacramento Railyards). Development standards that are specific to the River District Special Planning District and the Sacramento Railyards Special Planning District can be found in Chapters 17.436 and 17.440, respectively, of the City's Planning and Development Code. Unless otherwise stated in Chapters 17.436 and 17.440, all citywide land use and zoning code requirements that apply to a particular zoning designation citywide are also in effect within the River District Special Planning District and the Sacramento Railyards Special Planning District.

There are no zoning requirements specific to the East Sacramento Community Plan area, in which the FWTP project area is located, that supplement the City Planning and Development Code.

Site Plan and Design Review

As a condition of project approval, the proposed project is required to obtain a site plan and design review permit pursuant to the requirements set forth in Chapter 17.808 of the Planning and Development Code. The purpose of the site plan and design review permit is to ensure that the physical aspects of development project are consistent with the General Plan and applicable specific plans and with all applicable design guidelines; to ensure the development is of high quality and is compatible with and complimentary to surrounding development; to ensure streets and other public access ways and facilities, parking facilities, and utility and other infrastructure, both on-site and off-site, are adequate and available to support the development and conform to City development standards; to promote energy efficiency and water conservation; and to avoid or minimize to the extent feasible adverse environmental effects of development.

Sacramento River Parkway Plan

The City of Sacramento adopted the Sacramento River Parkway Plan on October 21, 1997. The Sacramento River Parkway Plan is a policy guide for habitat preservation and restoration and recreational development for lands adjacent to the Sacramento River. The plan identifies current conditions, develops a vision for the future, and identifies programs and actions for achieving the vision. The plan includes the following goals for the Sacramento River Parkway:

- To recognize the multiple use aspect of the Sacramento River Parkway for recreation, habitat preservation, and flood control;
- To preserve, protect, and enhance the natural and cultural resources of the Parkway;
- To provide appropriate access and facilities for the enjoyment of the Parkway by present and future generations;
- To create a continuous, lineal on-river parkway with a bicycle and pedestrian trail along the Sacramento River from the City limits at I-80 and Garden Highway in South Natomas to the City limits at Freeport; until such time that all of the Parkway lands are under public ownership, the goal is to provide a continuous lineal parkway on and off-river by using an interim bypass trail; and
- To establish development policies and implementation measures for the development of the Sacramento River Parkway.

American River Parkway Plan

The County of Sacramento adopted the American River Parkway Plan on September 10, 2008 and the City of Sacramento approved Resolution 2008-731 on November 6, 2008, which recommended adoption of the Plan by the California State Legislature (acting under the Urban American River Parkway Preservation Act). The purpose of the plan is to provide a guide to land use decisions affecting the Parkway; specifically addressing its preservation, use, development, and administration. The plan also acts as the management plan for the Federal and State Wild and Scenic Rivers Act. The plan includes the following goals for the American River Parkway:

- To provide appropriate access and facilities so that present and future generations can enjoy the amenities and resources of the Parkway which enhance the enjoyment of leisure activities;
- To preserve, protect, interpret and improve the natural, archaeological, historical and recreational resources of the Parkway, including an adequate flow of high-quality water, anadromous and resident fishes, migratory and resident wildlife, and diverse natural vegetation;
- To mitigate adverse effects of activities and facilities adjacent to the Parkway; and
- To provide public safety and protection within and adjacent to the Parkway.

3.13.4 Impacts and Mitigation Measures

Method of the Analysis

Section 15125 of the CEQA Guidelines states that an EIR shall discuss any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans. Accordingly, this section discusses potential inconsistencies between the proposed project and the adopted City of Sacramento 2040 General Plan (including the East Sacramento Community Plan), the River District Specific Plan, the Sacramento River Parkway Plan, the American River Parkway Plan, and the City's Planning and Development Code. Section 15064 (d) of the CEQA Guidelines states that a lead agency shall consider only direct and reasonably foreseeable indirect physical changes in the environment when evaluating the significance of a project's impacts. As such, and as reflected in the wording of the Land Use and Planning thresholds in CEQA Guidelines Appendix G, CEQA does not consider inconsistency with land use plans and policies to be a physical effect on the environment *unless the plan or policy was adopted for the purpose of avoiding or mitigating a significant environmental effect*. Additionally, while an EIR may provide information regarding economic and social changes resulting from a project, which may include socioeconomic or population-related land use issues, CEQA does not recognize these changes as significant effects on the environment unless they cause a physical change or worsen the impacts of physical changes on the environment (CEQA Guidelines Section 15064 (e)). Therefore, this section does not identify environmental impacts and mitigation measures for potential conflicts with applicable planning documents and regulations unless the conflict would result in a direct or reasonably foreseeable indirect change in the environment. To the extent that significant environmental impacts would occur as a result of plan or policy inconsistencies, these potential impacts are evaluated and disclosed in the appropriate technical sections of this EIR.

See also Section 3.1, *Approach to the Analysis*, for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Physically divide an established community.
- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Impacts Not Further Evaluated

Physically divide an established community.

Improvements at both the FWTP and SRWTP would occur within the existing plant boundaries, which are built environments surrounded by urban uses. Work associated with the Sacramento River water intakes would be located along the Sacramento River, where the existing and original intakes are already located. Conveyance pipelines between the Sacramento River water intakes and the SRWTP, existing utility upgrades at both treatment plants, and potable water transmission pipelines in the vicinity of the SRWTP would be installed within existing paved and previously disturbed areas. All proposed project activities are therefore in keeping with existing uses and natural and built boundaries, and the nature of proposed project activities would not divide established communities or isolate individual neighborhoods within the communities. Therefore, **no impact** would occur related to the division of an established community and is therefore not further evaluated in the EIR.

Impacts and Mitigation Measures

Table 3.13-2 summarizes the impact conclusions presented in this section.

TABLE 3.13-2
SUMMARY OF IMPACT CONCLUSIONS – LAND USE AND PLANNING

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.13-1: Implementation of the proposed project could cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.13-1: Implementation of the proposed project could cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

All Project Components

As described in above, the plans and policies regulating land use and development in the proposed project areas are contained in the City's 2040 General Plan, the City's Planning and Development Code (Title 17 of the City Code), the River District Specific Plan, the Sacramento Railyards Specific Plan, and in the Sacramento and American River Parkway Plans. Proposed project activities would occur in land use and zoning designations conducive to public utility uses, including public, industrial, commercial, residential, mixed use, and parks and recreation/open space designations, as well as special designations associated with the American and/or Sacramento River Parkways and the River District and Railyards SPDs.

The proposed project includes facility and treatment process improvements at both the FWTP and the SRWTP, as well as construction and operation of utility upgrades needed to serve both water treatment plants (designated Public/Quasi-Public and Residential Mixed Use; zoned R-1-PC, M-2, and R-5). These activities would occur within the existing plant boundaries and/or within existing parkways, parking lots, or public rights-of-way on paved surfaces, within built environments surrounded by urban uses, in alignment with the public, residential, and industrial land use designations/zones in which they occur. At FWTP, the nature of the utility upgrades and treatment and process improvements would not alter or disrupt the protection of the American River as a natural, cultural, or recreational resource (in accordance with the Parkway Corridor overlay).

The proposed project also includes improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP (designated Parks and Recreation and Public/Quasi-Public; zoned ARP-F, C-2, and F). These activities would occur within the Sacramento River and levee, and along existing public rights-of-way and/or previously paved or disturbed surfaces. Construction related to the new intake/pump station and conveyance lines may require temporary disruption of the bike and pedestrian pathway along the levee, but a detour would be provided and no temporary or permanent obstruction to the continuity of the Sacramento River Parkway would occur (in accordance with the purpose of the Sacramento River Parkway Plan), nor would these features interfere with the floodway (see Section 3.11, *Hydrology and Water Quality*), in accordance with the ARP-F and F zones.

Installation of new water transmission pipelines to distribute treated water from the SRWTP to the City's service area could potentially occur in areas designated Residential Mixed Use and zoned C-1, C-3, H, RMX, OB, and/or A-OS. Construction methods and intensity for these pipelines would be similar to that for the treatment plant upgrades and conveyance pipelines from the Sacramento River intakes to the SRWTP. These activities would occur within paved roads and/or previously disturbed surfaces, in a built and urban environment with many existing public utilities.

As described in Section 3.13.2, the entire SRWTP project area (outside of the Sacramento River itself) is located within one of two design review SPDs: the River District SPD and the Sacramento Railyards SPD. The proposed project would be required to obtain a site plan and design review permit as a condition of approval pursuant to the requirements set forth in Chapter 17.808 of the City's Planning and Development Code. The purpose of the site plan and design review permit is to ensure that the physical aspects of development projects are consistent with the General Plan and applicable Specific Plan and with all applicable design guidelines; to ensure the development is of high quality and is compatible with and complimentary to surrounding development; to ensure streets and other public access ways and facilities, parking facilities, and utility and other infrastructure, both on-site and off-site, are adequate and available to support the development and conform to City development standards; to promote energy efficiency and water conservation; and to avoid or minimize to the extent feasible adverse environmental effects of development. Issuance of a site plan and design review permit would require a finding that the proposed project is consistent with applicable General Plan policies, design guidelines, and any other applicable planning-related documents prior to approval of the proposed project.

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). Existing O&M activities are consistent with existing land use designations and zoning (as presented above in subsection 3.13.2, *Environmental Setting*) and they would remain consistent with implementation of the proposed project. Therefore, no changes to existing land uses, land use designations, or zoning are proposed or required for implementation of the proposed project. For this reason and those stated above, the proposed project would be consistent with applicable land use plans, policies, and regulations. Consequently, impacts related to this significance criterion would be **less than significant**.

Mitigation Measure

Mitigation Measures (ALL): None required.

3.14 Noise and Vibration

3.14.1 Introduction

This section of the Draft EIR addresses the potential for the construction and operation of the proposed project to result in significant noise and vibration impacts.

Comments received in response to the NOP requested that the EIR avoid and minimize impacts of nesting birds or their nests by incorporating measures to the project's phasing and timing, monitoring of proposed project-related noise (where applicable), sound walls, and buffers, where appropriate. See Appendix A for NOP comment letters. Proposed project-related noise and vibration effects on terrestrial biological resources are discussed in Section 3.6, *Biological Resources - Terrestrial*.

3.14.2 Environmental Setting

This section describes relevant metrics used in the assessment of noise and vibration impacts and provides a generalized description of the regional noise environments within the City of Sacramento.

Noise Background

Sound is characterized by various parameters that describe the rate of oscillation (frequency) of sound waves, the distance between successive troughs or crests in the wave, the speed that the sound wave travels, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound, and the decibel (dB) scale is used to quantify sound intensity. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called "A-weighting," expressed as "dBA." The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. An increase of 10 dBA in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated. **Table 3.14-1** shows some representative noise sources and their corresponding noise levels in dBA (Caltrans, 2013).

Planning for acceptable noise exposure must take into account the types of activities and corresponding noise sensitivity in a specified location for a generalized land use type. Some general guidelines are as follows: sleep disturbance can occur at noise levels above 35 dBA; interference with human speech begins at about 60 dBA (FICON, 1992). Hearing damage can result from prolonged exposure to noise levels in excess of 85 dBA as an 8-hour time weighted average (NIOSH, 2024).

TABLE 3.14-1
TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT

Common Outdoor Activities	Decibels (dBA)	Common Indoor Activities
	110	Rock Band
Jet Flyover at 1,000 feet	105	
	100	
Gas Lawnmower at 3 feet	95	
	90	
Diesel Truck at 50 feet at 50 mph	85	Food Blender at 3 feet
Near Freeway Auto Traffic	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime	75	
Gas Lawnmower at 100 feet	70	Vacuum Cleaner at 10 feet
	65	Normal Speech at 3 feet
Commercial Area Heavy Traffic at 300 feet	60	
	55	Large Business Office
Quiet Urban Daytime	50	Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room Background
	30	Library
Quiet Rural Nighttime	25	Bedroom at Night

SOURCE: Caltrans, 2013.

Attenuation of Noise

Noise from line sources, such as roadway traffic, attenuates (lessens) at a rate of 3.0 to 4.5 dBA per doubling of distance from the source, based on the inverse square law and the equation for cylindrical spreading of noise waves over hard and soft surfaces.

Noise from point sources, including stationary mobile sources such as idling vehicles or on-site construction equipment, attenuates at a rate of 6.0 to 7.5 dBA per doubling of distance from the source, based on the inverse square law and the equations for spherical spreading of noise waves over hard and soft surfaces. For this analysis, it is assumed that noise from line and point sources to a distance of 200 feet attenuates at rates of between 3.0 and 6.0 dBA per doubling of distance, and the noise from line and point sources at a distance greater than 200 feet attenuates at a rate of 4.5 to 7.5 dBA per doubling of distance, to account for the absorption of noise waves due to ground surfaces such as soft dirt, grass, bushes, and intervening structures (Caltrans, 2013).

Noise Descriptors

An individual’s noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given period of time. Community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic. What makes community noise variable throughout a day, besides the slowly changing background noise, is the addition of short-duration, single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual. These successive additions of sound to the community noise environment change the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise effects. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: The L_{eq}, or equivalent sound level, is used to describe noise over a specified period of time in terms of a single numerical value; the L_{eq} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. The L_{eq} may also be referred to as the average sound level.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

L_{90}: The level of noise exceeded 90 percent of the time is sometimes conservatively considered as the background ambient noise level for the purposes of assessing conformity with noise ordinance standards with respect to noise from stationary equipment or entertainment venues.

L_{dn}: Also termed the day-night average noise level (DNL), the L_{dn} is the average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dB to measured noise levels between the hours of 10 PM to 7 AM to account for greater nighttime noise sensitivity.

CNEL: CNEL, or Community Noise Equivalent Level, is the average A-weighted noise level during a 24-hour day that is obtained after an addition of 5 dB to measured noise levels between the hours of 7 PM to 10 PM and after an addition of 10 dB to noise levels between the hours of 10 PM to 7 AM to account for greater noise sensitivity in the evening and nighttime, respectively.

Health Effects of Environmental Noise

The World Health Organization (WHO) is perhaps the best source of current knowledge regarding the health effects of noise impacts because European nations have continued to study noise and its health effects, while the United States Environmental Protection Agency all but eliminated its noise investigation and control program in the 1970s. According to WHO, sleep disturbance can occur when continuous indoor noise levels exceed 30 dBA or when intermittent interior noise levels (such as from traffic) reach 45 dBA, particularly if background noise is low. With a bedroom window slightly open (a reduction from outside to inside of 15 dB), the WHO criteria suggest that exterior continuous (ambient) nighttime noise levels should be 45 dBA or below, and short-term events should not generate noise in excess of 60 dBA. WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability of people to initially fall asleep (WHO, 2009).

Other potential health effects of high noise levels identified by WHO include decreased performance for complex cognitive tasks, such as reading, attention span, problem solving, and memorization; physiological effects such as hypertension and heart disease (after many years of constant exposure, often of workers, to high noise levels); and hearing impairment (again, generally after long-term occupational exposure, although shorter term exposure to very high noise levels, for example, exposure several times a year to concert noise at 100 dBA, can also damage hearing). Finally, noise can cause annoyance and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that, during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA or moderately annoyed with noise levels below 50 dBA.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as truck backup beepers, the crashing of materials being loaded or unloaded, and car doors slamming, contribute very little to 24-hour noise levels but are capable of causing sleep disturbance and annoyance. The importance of noise to receptors depends on both time and context. For example, long-term high noise levels from large traffic volumes can make conversation at a normal voice level difficult or impossible, while short-term peak noise levels, if they occur at night, can disturb sleep.

Vibration Descriptors

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe physical vibration impacts on buildings and structures. Another useful vibration descriptor is known as vibration decibels or VdBs. VdBs are generally used when evaluating human response to vibration, as opposed to damage to structures (for which PPV is the more commonly used descriptor). Vibration decibels are established relative to a reference quantity, typically 1×10^{-6} inches per second and are based on the root mean square velocity amplitude (FTA, 2018).

Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors to vibration include people (especially residents, the elderly, and sick people), structures (especially older masonry structures), and vibration-sensitive equipment.

The background vibration velocity levels in residential areas are typically 50 VdB or lower, and the threshold of perception for humans is approximately 65 VdB. A vibration level of 85 VdB in a residence can result in strong annoyance (FTA, 2018).

Existing Noise and Vibration Environment

FWTP Project Area

The FWTP project area, including the approximately 34-acre FWTP property, is located adjacent to the American River and near California State University, Sacramento (Sacramento State) (see Figure 2-2 in Chapter 2, *Project Description*). Streets adjacent to and within the FWTP property include State University Drive to the west and College Town Drive to the south.

The FWTP is bordered on the north by the American River and adjacent riparian corridor, on the west by State University Drive, on the east by apartment buildings, and on the south by College

Town Drive. Adjacent land uses include the Sacramento State campus to the west and apartment complexes and student housing to the east and south. Noise sources in the FWTP project area primarily consist of vehicle traffic on College Town Drive, State University Drive, and US-50 which is approximately 750 feet to the south. Events at Sacramento State's Hornet Stadium, approximately 1,000 feet to the west, also occasionally contribute to the noise environment as does operation of the FWTP itself. The City's 2040 General Plan identifies that the 65 dBA, CNEL noise contour from traffic on College Town Drive extends 105 feet from the roadway centerline, while the 70 dBA, CNEL noise contour noise from Howe Avenue extends 164 feet from the roadway centerline (City of Sacramento, 2023).

SRWTP Project Area

The SRWTP project area, including the approximately 50-acre SRWTP property, is located near the confluence of the Sacramento River and American River (see Figure 2-3 in Chapter 2). Included in the SRWTP project area are the existing water intake, the proposed new water intake and pump station, and the original intake, all of which are located on the east bank of the Sacramento River. Features associated with the existing intake and the new intake (i.e., conveyance pipelines for water and sediment) would be located on portions of Jibboom Street and Interstate 5 (I-5), between the existing and proposed new intake and SRWTP. Nearby roads around the SRWTP property include Bannon Street and Richards Boulevard to the north, 7th Street and North B Street to the east, Summit Tunnel Avenue to the south, and Bercut Drive to the west (see Figure 2-3). Nearby noise sources include I-5 along the western property line and operation of the SRWTP itself. The City's 2040 General Plan identifies that the 70 dBA, CNEL noise contour noise from Richards Boulevard extends 82 feet from the roadway centerline (City of Sacramento, 2023).

Additionally, two long-term (24-hour) ambient noise level measurements collected for the Sacramento Railyards Specific Plan Update indicate that in 2016 the L_{dn} noise levels at the southern boundaries of the SRWTP are 70 dBA, and 60 dBA, respectively.

Sensitive Receptors

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication, and can cause stress and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. The City of Sacramento 2040 General Plan identifies sensitive noise receptors to typically include residences, schools, childcare centers, hospitals, long-term health care facilities, convalescent centers, and retirement homes.

FWTP Project Area

The nearest sensitive land uses to the FWTP include the College Town Apartments (located approximately 70 feet east of the FWTP), and the Sacramento State Hornet Commons apartments (located approximately 60 feet south of the FWTP, across College Town Drive).

SRWTP Project Area

The nearest sensitive land uses to the SRWTP include lodging facilities (located adjacent to and north of the anticipated construction staging and storage areas). While not an existing use, the future Kaiser Permanente Medical Center, located south of the SRWTP property across Summit Tunnel Avenue, is estimated to be complete and operational by 2030. While technically not a noise-sensitive land use, the Sacramento Municipal Utility District (SMUD) Museum of Science and Curiosity is also located south and east of the anticipated construction staging and storage areas.

With respect to the new intake and pump station, the nearest sensitive land uses are the Riverwalk Apartments (located approximately 1,300 feet southwest across the Sacramento River from the anticipated impact- or vibratory-pile driving for sheet piling cofferdam and steel piling to support the pump station).

3.14.3 Regulatory Setting

Federal

Federal Aviation Administration

The Federal Aviation Administration develops noise exposure maps that use average annual CNEL noise contours around an airport as the primary noise descriptor. The administration states that all land uses are considered compatible when aircraft noise effects are less than 65 dB CNEL.

Federal Transportation Administration

The Federal Transit Administration (FTA) has adopted vibration standards that are used to evaluate potential building damage impacts from construction activities. **Table 3.14-2** shows FTA's vibration damage criteria.

TABLE 3.14-2
CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	PPV (in/sec)
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

NOTES: in/sec = inches per second; PPV = peak particle velocity
SOURCE: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

In addition, FTA has adopted standards related to human annoyance for groundborne vibration impacts for the following three land use categories: Vibration Category 1, High Sensitivity; Vibration Category 2, Residential; and Vibration Category 3, Institutional. FTA defines these categories as follows:

- **Category 1***:* Buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes.

- **Category 2***:* All residential land uses and any buildings where people sleep, such as hotels and hospitals.
- **Category 3***:* Institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but still have the potential for activity interference.

Under conditions where there is an infrequent number of events per day, FTA has established criteria of 65 VdB for Category 1 buildings, 80 VdB for Category 2 buildings, and 83 VdB for Category 3 buildings.[1] Under conditions where there is an occasional number of events per day, FTA has established criteria of 65 VdB for Category 1 buildings, 75 VdB for Category 2 buildings, and 78 VdB for Category 3 buildings.[2] No thresholds have been adopted or recommended for commercial and office uses. These criteria were developed to assess vibration impacts from transit operations which can impact human receptors during the sensitive nighttime hours when most people would reasonably be expected to sleep.

State

State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings (other than detached single-family dwellings) that are intended to limit the extent of noise transmitted into new habitable spaces proposed to be developed. These requirements are collectively known as the California Noise Insulation Standards and are found in Title 24 of the California Code of Regulations.

The 2022 California Building Code includes sound transmission standards (California Building Code, Title 24, Part 2 of the California Code of Regulations) and requires that walls and floor/ceiling assemblies separating dwelling units from each other, or from public or service areas, have a Sound Transmission Class of at least 50, meaning they can reduce noise by a minimum of 50 dB.[3] The California Building Code (Section 1207.4, Allowable Interior Noise Levels) also specifies a maximum interior noise limit of 45 dBA (L_{dn} or CNEL) in habitable rooms, and requires that common interior walls and floor/ceiling assemblies meet a minimum Sound Transmission Class rating of 50 for airborne noise.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies applicable to the evaluation of noise and vibration effects of the proposed project are provided in **Table 3.14-3**.

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1 FTA defines “infrequent events” as fewer than 30 vibration events of the same kind per day.
2 FTA defines “occasional events” as between 30 and 70 vibration events of the same source per day.
3 State Building Code Section 1207.2.

TABLE 3.14-3
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – NOISE AND VIBRATION

Element	Goals and Policies
Environmental Constraints	Goal ERC-10.1: Policies: 10.1 through 10.3, 10.5 through 10.7, 10.9

SOURCES: City of Sacramento, 2024

The 2040 General Plan Goal ERC-10.1 directs the city to protect residents and workers from the harmful and nuisance effects of exposure to excessive noise. The City has established maximum exterior noise compatibility standards for sensitive receptors of 60 dBA L_{dn} and Policy ERC-10.3 for indoor spaces of 45 dBA L_{dn}. With respect to construction-related vibration, the City requires construction projects anticipated to generate a significant amount of vibration to ensure acceptable interior vibration levels at nearby vibration-sensitive uses based on FTA criteria.

Central City and East Sacramento Community Plans

The City's Central City and East Sacramento Community Plans do not contain goals and policies specific to noise and vibration.

City of Sacramento Municipal Code (Noise Control Ordinance)

The Sacramento Municipal Code includes noise regulations in Title 8 – Health and Safety, Chapter 8.68 – Noise Control (referred to generally as the Noise Control Ordinance). Of the regulations in Chapter 8.68, the following regulations would be applicable to the proposed projects:

- Section 8.68.080 exempts certain activities from Chapter 8.68, including "noise sources due to the erection (including excavation), demolition, alteration, or repair of any building or structure" as long as these activities are limited to between the hours of 7:00 a.m. and 6:00 p.m. Monday through Saturday, and between the hours of 9:00 a.m. and 6:00 p.m. on Sunday. The use of exhaust and intake silencers for internal combustion engines is also required. Construction work can occur outside of the designated hours if the work is of urgent necessity and in the interest of public health and welfare for a period not to exceed 3 days. Section 8.68.080 also exempts noise from any mechanical device, apparatus, or equipment related to or connected with emergency activities or emergency work from Chapter 8.68 requirements.
- Section 8.68.060 sets standards for cumulative exterior noise levels at residential and agricultural properties, including exterior noise standards of 55 dBA from 7:00 a.m. to 10:00 p.m., and 50 dBA from 10:00 p.m. to 7:00 a.m. Per Section 8.68.060(b), the allowable decibel increase above the exterior noise standards in any one hour are:
    1. 0 dB for cumulative period of 30 minutes per hour;
    2. 5 dB for cumulative period of 15 minutes per hour;
    3. 10 dB for cumulative period of 5 minutes per hour;
    4. 15 dB for cumulative period of 1 minutes per hour; or
    5. 20 dB not to be exceeded for any time per hour.

- In addition, per Section 8.68.060(c), each of the noise limits above shall be reduced by 5 dB for impulsive or simple tone noises, or for noises consisting of speech or music. If the ambient noise level exceeds that permitted by any of the first four noise limit categories specified in subsection (b) above, the allowable noise limit shall be increased in 5 dB increments in each category to encompass the ambient noise level. If the ambient noise level exceeds the fifth noise level category, the maximum ambient noise level shall be the noise limit for that category.

3.14.4 Impacts and Mitigation Measures

Method of the Analysis

The analysis of environmental impacts for noise and vibration focuses on the potential for construction-related noise or vibration levels to exceed thresholds established by the City's General Plan Environmental Resources and Constraints Element or City Code for the City of Sacramento or would result in speech interference during daytime hours and sleep interference during nighttime hours.

This analysis focuses on reasonably foreseeable noise sources from construction and operation of the proposed project and identifies mitigation measures that might be taken in the future. Temporary impacts are those that would be temporary in nature (e.g., construction-related activities). Permanent impacts are those that would continue through the life of a project as a result of the environmental conditions caused by components implemented under the proposed project (e.g., operational-related activities). Impacts were evaluated separately for the FWTP and SRWTP improvements, existing utility upgrades at both water treatment plants, Sacramento River water intakes, and potable water transmission pipelines.

Significance determinations assume that the components implemented under the proposed project will comply with relevant federal, state, and local ordinances and regulations described in subsection 3.14.3, *Regulatory Setting.* Thresholds of significance used to evaluate impacts are based on Appendix G of the CEQA Guidelines. Additional thresholds are proposed for potential issues identified as relevant to the proposed project areas.

This evaluation uses speech interference as an indicator that construction noise could cause a substantial adverse impact on daytime and evening activities, and sleep interference as an indicator that construction noise could cause a substantial adverse impact on nighttime activities. The speech and sleep interference criteria are based on objective research of speech and sleep interference (as opposed to subjective surveys of annoyance) can be used to evaluate a project's noise impacts. The speech and sleep interference criteria used in this EIR are defined below:

- **Speech Interference.** A speech interference threshold, in the context of impact duration and time of day, is used to identify substantial increases in noise from temporary construction activities. This analysis assumes noise peaks generated by construction equipment could result in speech interference in adjacent buildings if the noise level in the interior of the buildings exceeds 45 dBA. A typical building can reduce noise levels by approximately 25 dB with the windows closed (USEPA, 1974). This noise reduction could be maintained only on a temporary basis in some cases, since it assumes windows must remain closed at all times. Assuming a 25 dB reduction with the windows closed, an exterior noise level of

70 dBA L_{eq} would maintain an acceptable interior noise environment of 45 dBA during the day and evening hours. Noise levels would vary depending on the phase of construction and the types of construction equipment being used. Therefore, an exterior noise level that exceeds 70 dBA L_{eq} during the daytime is used as the threshold for substantial construction noise where the duration of construction noise exceeds two weeks at any given receptor location.

- **Sleep Interference.** Based on available sleep data, an interior nighttime level of 35 dBA is considered acceptable for sleeping (USEPA, 1974). Assuming a 25 dB reduction with the windows closed, an exterior noise level of 60 dBA would maintain an acceptable interior noise environment of 35 dBA at night. Therefore, a significant impact would occur if the proposed project were to generate exterior noise levels above the 60 dBA L_{eq} sleep interference threshold for one or more nights.

Operational noise could substantially increase noise levels at noise-sensitive land uses if they would expose sensitive receptors to noise levels exceeding daytime standard of 55 and nighttime standard of 50 dBA established by City of Sacramento Noise Control Ordinance Section 8.68.060.

For the purposes of the assessment of potential vibration impacts, the methodology described in the Caltrans' *Transportation and Construction Vibration Guidance Manual* was used to evaluate project-related vibration effects to nearby sensitive land uses (2020). The Caltrans guidance manual focuses entirely on addressing vibration from construction activities. Impact pile driving is considered a continuous/frequent intermittent source (Caltrans, 2020). The building damage threshold for historic and some older buildings is 0.25 PPV (in/sec) and for modern structures it is 0.5 PPV (in/sec).

For human annoyance from vibration, FTA has identified criteria depending on the frequency of events. Under conditions where there is an infrequent number of events per day, FTA has established criteria of 65 VdB for Category 1 buildings, 80 VdB for Category 2 (residential and hotel) buildings and 83 VdB for Category 3 buildings. Under conditions where there is an occasional number of events per day, FTA has established criteria of 65 VdB for Category 1 buildings, 75 VdB for Category 2 buildings, and 78 VdB for Category 3 buildings. Off-site sensitive receptors exposed to construction vibration levels that would exceed the later of these thresholds during nighttime hours would be considered to result in a significant impact.

Construction vibration impacts are considered significant if they would either result in levels substantial enough to result in damage to nearby structures or buildings or result in vibration levels that exceed Caltrans' or FTA's groundborne vibration impact criteria.

See also Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

- Generate excessive groundborne vibration or groundborne noise levels.
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

Impacts Not Further Evaluated

Expose people residing or working in the project area to excess noise levels due to being within 2 miles of an airport.

The closest airport to proposed project components is the Sacramento Executive Airport, located approximately 5 miles south from the SRWTP project area. The proposed project would not locate a new noise-sensitive land use or a new place of employment and therefore, would not result in exposure of people residing or working in the project area to excessive noise levels. The proposed project areas are well outside of the 65 CNEL noise contours for the airport (County of Sacramento, 2022) and, therefore, would not result in exposure of people working at the treatment plants, or the proposed new intake to excessive noise levels. Consequently, there would be no impact associated with exposing people near an airport or private airstrip to excessive noise levels and exposure to excessive noise levels due to proximity to airport is not further evaluated in the EIR.

Impacts and Mitigation Measures

Table 3.14-4 summarizes the impact conclusions presented in this section.

TABLE 3.14-4
SUMMARY OF IMPACT CONCLUSIONS – NOISE AND VIBRATION

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.14-1: Construction of the proposed project could generate a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LSM (FWTP) SU (SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.14-2: Operation and maintenance of the proposed project could generate a substantial permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.14-3: Construction of the proposed project could generate excessive groundborne vibration or groundborne noise levels.	LS (FWTP/ SRWTP)	LSM (FWTP) LS (SRWTP)	LSM (Existing/ New)	LSM
3.14-4: Operation and maintenance of the proposed project could generate excessive groundborne vibration or groundborne noise levels.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

SU: Significant and Unavoidable
LS: Less than Significant
LSM: Less than Significant with Mitigation

Impact 3.14-1: Construction of the proposed project could generate a substantial temporary increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Noise levels from construction activity at nearby sensitive receptors would fluctuate depending on the nature of the construction and the particular type, number, and duration of use of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips made and types of vehicles used. In addition, certain types of construction equipment generate impulsive noises (such as impact pile driving), which can be disruptive. **Table 3.14-5** shows typical noise levels produced by the types of construction equipment that would likely be used during the proposed project. The operation of each piece of off-road equipment would not be constant throughout the day, as equipment would be turned off when not in use. Most of the time over a typical workday, the equipment would be operating at different locations within the project sites and would not likely be operating concurrently.

**TABLE 3.14-5
REFERENCE CONSTRUCTION EQUIPMENT NOISE LEVELS
(50 FEET FROM SOURCE)**

Type of Equipment	L_{max}, dBA	Hourly L_{eq}, dBA/% Use[1]
Aerial Lifts	75	68/20%
Dumpers	77	73/40%
Generator Sets	81	78/50%
Paver	77	74/50%
Compactor	83	76/20%
Pumps	81	78/50%
Roller	80	73/20%
Welder	74	70/40%
Backhoe	80	76/40%
Grader	85	81/40%
Concrete Mixer Truck	85	81/40%
Tractor	84	80/40%
Loader	80	76/40%
Forklift	83	79/40%
Air Compressor	80	76/40%
Crane	75	68/20%
Impact Pile Driver	101	94/20%
Vibratory Pile Driver	101	94/20%
Auger Drill Rig	85	78/20%
Concrete Saw	90	83/20%
Excavator	85	81/40%

NOTES:

1. Percent used during the given time period (usually an hour – hourly L_{eq}) were obtained from the Federal Highway Administration (FHWA) Roadway Construction Noise Model User's Guide.

SOURCE: FHWA, 2006. *FHWA Roadway Construction Noise Model*. January 2006.

As described in Chapter 2, *Project Description*, construction in the FWTP project area is expected to occur between July 2026 and July 2031. Construction activities in the SRWTP project area (improvements at the SRWTP, existing utility upgrades, Sacramento River water intakes, and potable water transmission pipelines) would occur in two phases. The initial phase would occur over a total period of approximately 10 years (January 2027 through July 2037), and the buildout phase would occur over approximately 10 years (2040 through 2050). Standard daytime shifts for construction activities would be 6:00 a.m. to 6:00 p.m. Monday through Friday. However, some nighttime and/or weekend construction is anticipated; standard nighttime construction shifts would occur between 6:00 p.m. and 6:00 a.m. As discussed above, City of Sacramento Municipal Code Section 8.68.080 exempts construction activities from noise standards as long as these activities are limited to between the hours of 7:00 a.m. and 6:00 p.m. Monday through Saturday, and between the hours of 9:00 a.m. and 6:00 p.m. on Sunday. Anticipated night-time construction activities would not be exempt. Consequently, the analysis of construction noise impacts focusses on whether nearby sensitive land uses exposed to an exterior noise level of 70 dBA L_{eq} and 60 dBA L_{eq} would result in speech interference and sleep interference, respectively. For noise generated during construction between the hours of 6:00 p.m. and 6:00 a.m., the sleep interference threshold of 60 dBA L_{eq} is used to determine whether nearby sensitive receptors are exposed to construction noise levels that is considered to result in a substantial increase in ambient noise levels.

Peak construction noise was modeled using the Roadway Construction Noise Model for the nearest noise-sensitive receptor. This model includes the calculation of noise levels (L_{max} and L_{eq}) at incremental distances for a variety of types of construction equipment. The model inputs include acoustical use factors and L_{eq} values at various distances depending on the receptor locations analyzed. FTA's general assessment approach recommends assessing the two noisiest pieces of construction equipment operating concurrently at the center of a project site.

Treatment Plant Improvements and Existing Utility Upgrades

FWTP

Proposed improvements within the FWTP project area at the FWTP and the associated existing utility upgrades would require construction activities that include the mobilization of off-road equipment and materials. Construction activities would occur within the existing FWTP property limits and in the adjacent public street. Storm drainage improvements would occur along the perimeter of the FWTP along College Town Drive from State University Avenue to Howe Avenue. Electrical service line upgrades would occur on the east side of the property from College Town Drive north further into the FWTP property. These activities would occur closest to residential receptors.

Table 3.14-6 presents the results of the modeling showing the predicted noise levels of the construction activities in the FWTP property at the nearest sensitive receptors. Construction noise levels were calculated based on the equipment list presented in Table 2-6 in Chapter 2, *Project Description*. The nearest sensitive receptors are residential dwellings. These predicted noise levels are worst case estimates, and the duration of noisy activity would vary. Open cut excavations for installation of the new storm drainage pipeline along College Town Drive would proceed at a rate of approximately 50 feet a day thereby limiting exposure to construction noise at a given receptor to under two weeks. While the daytime construction noise may, at times, exceed the speech interference noise level of 70 dBA, given the limited duration of the noise exposure to any given receptor.

TABLE 3.14-6
ESTIMATED CONSTRUCTION NOISE LEVELS FROM NOISIEST ACTIVITIES AT THE FWTP

Representative Receptor	Loudest Two Noise Sources	Reference Noise Level (dBA)[a]	Distance to Receptor (feet)[b]	Usage Factor	Adjusted L_{eq} Level (dBA)[c]
Daytime					
College Town Apartments[d]	Concrete Saw, Concrete Saw	89.6/89.6	70	20/20%	83
Sacramento State Hornet Commons[d]	Concrete Saw, Concrete Saw	89.6/89.6	60	20/20%	84
College Town Apartments[e]	Concrete Saw, Concrete Saw	89.6/89.6	120	20/20%	78
College Town Apartments[f]	Concrete Saw, Concrete Saw	89.6/89.6	240	20/20%	72
Sacramento State Hornet Commons[g]	Concrete Saw, Concrete Saw	89.6/89.6	470	20/20%	66
Nighttime					
College Town Apartments[d]	Tractor, Forklift	84.0/83.4	70	40/40%	80
Sacramento State Hornet Commons[d]	Tractor, Forklift	84.0/83.4	60	40/40%	81
College Town Apartments[e]	Tractor, Forklift	89.6/89.6	120	20/20%	75
College Town Apartments[f]	Tractor, Forklift	84.0/83.4	240	40/40%	69
Sacramento State Hornet Commons[g]	Tractor, Forklift	84.0/83.4	470	40/40%	63

NOTES: dBA = A-weighted decibels; L_{eq} = equivalent sound level; NA = not applicable

a The instantaneous maximum noise level (L_{max}) at 50 feet.
b Distance between the approximate location of equipment and the property line of the sensitive receptor.
c The L_{eq} level is adjusted for distance and percentage of usage.
d Distance between the Storm Drainage Improvements and the property line of the sensitive receptor.
e Distance between the Electrical Service Line and the property line of the sensitive receptor.
f Distance between the center of East Filter Building and the property line of the sensitive receptor.
g Distance between the center of the Pump Station and the property line of the sensitive receptor.

SOURCE: FHWA, 2006. *Roadway Construction Noise Model User Guide*; Data compiled by ESA in 2024 (see Appendix F).

Construction of FWTP improvements, such as installation of the ozone treatment system, basins, filters and pump stations, and the new substation within the FWTP property, would occur further from the nearest receptors and construction noise levels would be greatly reduced due to attenuation by both distance and intervening structures including the approximately 16-foot tall concrete walls above grade for the eastern sedimentation basin that form the eastern boundary of the project area, adjacent to Sacramento State student housing. Some components of the work (e.g., buried utilities and new storage building) would not be buffered by the existing basins but only by landscaping and trees along the eastern boundary.

Additionally, some activities could occur during the nighttime and/or weekends. If nighttime work activities were to occur for some locations, the sleep interference noise impact criterion of 60 dBA during nighttime hours would apply and may be exceeded. However, it is assumed no impact equipment would occur during nighttime hours. As indicated in Table 3.14-6, the construction noise levels could exceed nighttime construction noise impact criteria of 60 dBA for the nearest off-site sensitive receptors of the two loudest pieces of non-impact equipment during both improvements at the FWTP and existing utility upgrades. Therefore, the potential exists for nighttime construction work to result in a significant temporary increase in nighttime noise levels that could adversely affect adjacent residential uses.

SRWTP

Proposed SRWTP improvements would require construction activities that include the mobilization of off-road equipment and materials and removal of substantial soil quantities from borrow sites or off-site locations which would generate truck trips and temporary construction noise that could impact noise-sensitive land uses if they are located near the construction or staging areas. Existing utility upgrades consist of stormwater retention facilities and a pump station to attenuate flows would be installed within the plant boundaries, and overhead and underground electrical service line connections would be replaced and/or constructed between the SRWTP and SMUD's Station J. Additionally, impact- or vibratory-pile driving may be required for piles to support new structures.

Table 3.14-7 presents the results of the modelling of construction showing the predicted noise levels from pile driving activities at the nearest sensitive receptors. Construction noise levels were calculated based on the equipment list provided in Table 2-6. The current nearest sensitive receptors are residential dwellings. Once completed and occupied by 2030, the Kaiser Permanente Medical Center would also be a sensitive receptor that could be affected by construction noise due to its proximity to the SRWTP and because construction activities in the SRWTP project area would still be on-going. These predicted noise levels are worst case estimates, and the duration of noisy activity would vary with each new structure location. Open cut excavations for storm drainage improvement would proceed at a rate of approximately 50 feet a day thereby limiting exposure to construction noise at a given receptor to under two weeks. While the daytime construction noise may, at times, exceed the speech interference noise level of 70 dBA, given the limited duration of the noise exposure to any given receptor. Overhead service line connections would be approximately 840 feet north of the nearest receptor (future Kaiser Permanente Medical Center) which would be sufficient to reduce noise levels to below the 70 dBA daytime criterion.

As indicated in Table 3.14-7, the construction noise levels would be above the daytime speech interference construction noise impact criteria of 70 dBA, and resultant noise levels at the closest sensitive receptors (and the future Kaiser Permanente Medical Center would be above the 70 dBA daytime criterion. Other construction activities would have lesser noise impacts than those for pile driving and would occur farther (more than 1,800 feet) from noise-sensitive receptors.

As described previously, some activities could occur during the nighttime and/or weekends. However, it is assumed no pile driving would occur during nighttime hours. As indicated in Table 3.14-7, the construction noise levels could exceed nighttime construction noise impact criteria of 60 dBA for the nearest off-site sensitive receptors for the nearest off-site sensitive receptors of the two loudest non-impact equipment. Therefore, the potential exists for nighttime construction work to result in a significant temporary increase in nighttime noise levels.

TABLE 3.14-7
ESTIMATED CONSTRUCTION NOISE LEVELS FROM NOISIEST ACTIVITIES AT THE SRWTP (INITIAL PHASE/BUILDOUT)

Representative Receptor	Loudest Two Noise Sources	Reference Noise Level (dBA)[a]	Distance to Receptor (feet)[b]	Usage Factor	Adjusted L_{eq} Level (dBA)[c]
Daytime					
Future Kaiser Permanente Medical Center[d]	Concrete Saw, Concrete Saw	89.6/89.6	100	20/20%	80
Future Kaiser Permanente Medical Center[e]	Concrete Saw, Impact Pile Driver	89.6/101.3	250	20/20%	81
Future Kaiser Permanente Medical Center[f]	Concrete Saw, Concrete Saw	89.6/89.6	840	20/20%	61
Riverwalk Apartments[i]	Concrete Saw, Impact Pile Driver	89.6/101.3	1,840	20/20%	63
Cannery Place Apartments[i]	Concrete Saw, Impact Pile Driver	89.6/101.3	2,200	20/20%	62
8th Street Residences[k]	Concrete Saw, Impact Pile Driver	89.6/101.3	2,500	20/20%	61
Nighttime					
Future Kaiser Permanente Medical Center[d]	Tractor, Forklift	84.0/83.4	100	40/40%	77
Executive Inn and Suites[g]	Tractor, Forklift	84.0/83.4	165	40/40%	72
Future Kaiser Permanente Medical Center[e]	Tractor, Forklift	84.0/83.4	250	40/40%	69
Governors Inn Hotel Sacramento[g]	Tractor, Forklift	84.0/83.4	385	40/40%	65
Motel 6 Sacramento[h]	Tractor, Forklift	84.0/83.4	470	40/40%	63
Quality Inn[h]	Tractor, Forklift	84.0/83.4	650	40/40%	61
Future Kaiser Permanente Medical Center[f]	Tractor, Forklift	84.0/83.4	840	40/40%	58
Crossroad Inn[g]	Tractor, Forklift	84.0/83.4	735	40/40%	59
Riverwalk Apartments[i]	Tractor, Forklift	84.0/83.4	1,840	40/40%	51
Cannery Place Apartments[j]	Tractor, Forklift	84.0/83.4	2,200	40/40%	50
8th Street Residences[k]	Tractor, Forklift	84.0/83.4	2,500	40/40%	49

NOTES: dBA = A-weighted decibels; L_{eq} = equivalent sound level; NA = not applicable

a. The instantaneous maximum noise level (L_{max}) at 50 feet.
b. Distance between the approximate location of equipment and the property line of the sensitive receptor.
c. The L_{eq} level is adjusted for distance and percentage of usage.
d. Distance between the Storm Drainage Improvements and the property line of the sensitive receptor.
e Distance between center of Grit Basin and the property line of the sensitive receptor.
f. Distance between Overhead Electrical Service Line and the property line of the sensitive receptor.
g. Distance between center of High Service Pump Station and the property line of the sensitive receptor.
h. Distance between center of Plant Electrical Substation and the property line of the sensitive receptor.
i. Distance between Grit Basin and the property line of the sensitive receptor.
j. Distance between Gravity Thickeners and the property line of the sensitive receptor.
k. Distance between South Chem Area and the property line of the sensitive receptor.

SOURCE: FHWA, 2006. Roadway Construction Noise Model User Guide; Data compiled by ESA in 2023 (see Appendix F).

Sacramento River Water Intakes

The proposed project includes improvements to the existing Sacramento River water intake and associated facilities; construction of a new water intake, pump station and associated conveyance pipelines to the SRWTP. Construction activities that could include the mobilization of off-road equipment and materials and transport of soil from borrow sites or off-site locations which would generate truck trips and temporary construction noise that could impact noise-sensitive land uses if they are located near the construction or staging areas. Additionally, impact- or vibratory-pile driving may be required for sheet piling of the cofferdam and steel piling to support the pump station and the sending and receiving pits for the raw water pipeline crossing under the interstate.

Table 3.14-8 presents the results of the modeling of construction showing the predicted noise levels associated with construction of the proposed new water intake at the nearest sensitive receptors. Construction noise levels were calculated based on the equipment list included in Table 2-6. The nearest sensitive receptors are residential dwellings, hotels (nighttime), and the future Kaiser Permanente Medical Center. These predicted noise levels are worst case estimates, and the duration of noisy activity would vary with each construction activity at the intakes and raw water supply pipeline to the SRWTP.

TABLE 3.14-8
ESTIMATED CONSTRUCTION NOISE LEVELS FROM NOISIEST ACTIVITIES AT THE SACRAMENTO RIVER INTAKES

Representative Receptor	Loudest Two Noise Sources	Reference Noise Level (dBA)[a]	Distance to Receptor (feet)[b]	Usage Factor	Adjusted L_{eq} Level (dBA)[c]
Daytime					
Future Kaiser Permanente Medical Center[e]	Concrete Saw, Impact Pile Driver	89.6/101.3	350	20/20%	78
Nighttime					
Best Western Sandman Hotel[d]	Tractor, Tractor	84.0/84.0	50	40/40%	83
Future Kaiser Permanente Medical Center[e]	Tractor, Tractor	84.0/84.0	350	40/40%	66

NOTES: dBA = A-weighted decibels; L_{eq} = equivalent sound level; NA = not applicable

a. The instantaneous maximum noise level (L_{max}) at 50 feet.
b. Distance between the approximate location of equipment and the property line of the sensitive receptor.
c. The L_{eq} level is adjusted for distance and percentage of usage.
d. Distance between Raw Water Pipe Alignment and the property line of the sensitive receptor.
e. Distance between Raw Water Pipe Alignment across I-5 and the property line of the sensitive receptor.

SOURCE: FHWA. 2006. Roadway Construction Noise Model User Guide; Data compiled by ESA in 2023 (see Appendix F).

As indicated in Table 3.14-8, the construction noise levels would be above the daytime construction noise impact criteria of 70 dBA. Other construction activities would have lesser noise impacts than those for pile driving and would occur farther (more than 1,280 feet) from noise-sensitive receptors.

As described above, some activities could occur during the nighttime and/or weekends. However, it is assumed no pile driving would occur during nighttime hours. As indicated in Table 3.14-8, the construction noise levels would also exceed nighttime construction noise impact criteria of 60 dBA for the nearest off-site sensitive receptors of the two loudest non-impact equipment.

Potable Water Transmission Pipelines

The proposed transmission pipelines require construction activities that could include the use of off-road equipment and would generate truck trips and temporary construction noise that could impact noise-sensitive land uses if they are located near the construction or staging areas.

There are no specific alignments for the transmission pipelines available at this time. Therefore, it is not possible to provide specific estimates of the noise levels at individual receptor locations that would result from construction. It may reasonably be expected that construction equipment of proposed transmission pipelines may be as close as 25 feet from adjacent existing noise-sensitive receptors. Table 3.14-5 presents reference noise levels of construction equipment for informational purposes. Given the data in Table 3.14-5 and the possibility that existing receptors could be as close as 25 feet away, the potential exists for unobstructed noise levels to be 86 dBA or higher at the nearest receptor locations from construction equipment, which would exceed exterior speech interference noise standards.

Impact Conclusion

Daytime construction of the improvements at the FWTP and existing utility upgrades at both water treatment plants would not generate a substantial temporary increase in ambient noise levels in excess of established standards. However, nighttime construction activities could potentially result in noise levels above the sleep disturbance threshold when activities are proximate to receptors.

Both daytime and nighttime construction of project components in the SRWTP project area would generate a substantial temporary increase in ambient noise levels in excess of standards established in the City's General Plan or noise ordinance, and applicable standards of other agencies. Therefore, impacts associated with construction activities would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.14-1 (ALL): The City shall require contractors to implement the measures below, as a condition of contract, to avoid and minimize temporary and short-term construction noise effects on sensitive receptors. These measures will be implemented during construction, to avoid and minimize temporary and short-term construction noise effects on sensitive receptors:

(a) All construction activity on the project sites shall comply with the provisions of City Code Chapter 8.68 relating to noise between the hours of 7:00 a.m. and 6:00 p.m. Monday through Saturday, and between the hours of 9:00 a.m. and 6:00 p.m. on Sunday. Construction outside of these hours may be approved through a development permit based on a site-specific "construction noise mitigation plan" and a finding by the Director of Community Development or their designee that the Construction noise mitigation plan is adequate to prevent excessive noise disturbance of affected residential uses. Because it is anticipated that certain construction activities (such pipeline work outside the treatment plants at major street intersections) may require work outside normally permitted construction hours (e.g., overnight), the project's Development Permit would allow for such construction activities, subject to conditions of approval, including performance standards, imposed by the City to limit noise impacts.

(b) All construction equipment shall be equipped with noise-reduction devices, such as mufflers, to minimize construction noise, and all internal combustion engines will be equipped with exhaust and intake silencers, in accordance with manufacturers' specifications.

(c) The use of bells, whistles, alarms, and horns will be restricted to safety warning purposes only.

(d) Excessive noise-generating activities such as concrete cutting and pile driving shall be conducted during daytime hours only.

(e) Impact tools shall be restricted to daytime construction hours.

(f) Impact tools and equipment that are particularly loud (e.g., concrete saws) shall have the working area/impact area shrouded or shielded, with intake and exhaust ports on power equipment muffled or suppressed. The use of temporary or portable, application-specific noise shields or barriers, or temporary construction barriers adjacent to or at the boundary of the construction area may be necessary to reduce associated noise levels.

(g) Stationary noise-generating equipment such as air compressors or portable power generators shall be located as far as possible from sensitive receptors. Temporary noise barriers shall be constructed, if needed, to screen stationary noise-generating equipment when located near adjoining noise-sensitive land uses.

Significance After Mitigation: Implementing Mitigation Measure 3.14-1 would reduce temporary increases in noise generated by construction activities to below speech interference levels at sensitive receptors during daytime hours in the FWTP project area and SRWTP project area. However, it is unlikely that these measures would be sufficient to reduce nighttime noise below sleep interference levels during nighttime hours associated with construction activities at the SRWTP. Therefore, although temporary and short-term, these impacts at the SRWTP would remain **significant and unavoidable**.

Impact 3.14-2: Operation and maintenance of the proposed project could generate a substantial permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Treatment Plant Improvements

Once improvements are completed at the FWTP and SRWTP, O&M activities would generally be similar to existing O&M activities. However, the ozone generation and treatment system improvements at both water treatment plants would require some additional maintenance. At the FWTP, O&M activities would be greatly reduced due to attenuation by both distance and intervening structures including the approximately 8-foot concrete walls of the eastern sedimentation basin that form the eastern boundary of the project area, adjacent to Sacramento State student housing. At the SRWTP, O&M activities would occur 300 feet from the nearest noise-sensitive land use and would be above the 55 dBA daytime threshold established in the City of Sacramento Noise Control Ordinance.

Additional emergency generators would be used to support inspection activities in the event of an emergency or power outage (up to 2 at the FWTP and up to 3 at the SRWTP; refer to Tables 2-1 and 2-2, respectively). Generators would be installed within an enclosure at both treatment plants which would provide acoustical attenuation. Emergency generators at the FWTP would be approximately 400 feet north of the nearest receptors which would be sufficient to reduce noise levels to below the 55 dBA daytime threshold established in the City of Sacramento Noise Control Ordinance. Emergency generators at the SRWTP would be located more than 500 feet from the nearest receptors and, assuming large 2,500 kW generators, noise levels would be reduced to 35 dBA at 500 feet and would also be below the 55 dBA daytime threshold. These generators would not be used routinely, as they are intended for emergency use only.

To conduct these additional maintenance activities and for the operation of new equipment, additional full-time employees would be needed at both water treatment plants (2 at FWTP and 10 at SRWTP). In addition, there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions). As a practical matter, vehicle trips for all project components would not result in increased roadside noise levels. Generally, roadway traffic volumes must double to result in a significant (3 dBA) increase in roadside noise levels, which would not occur from occasional O&M activities, and therefore, would not result in a noticeable increase in roadside noise levels.

Sacramento River Water Intakes

The proposed new water intake would operate in parallel with the existing water intake. Maintenance activities at the proposed new intake would include periodic cleaning of the tee screens that would be accomplished both manually and with airburst equipment, which would be located at the proposed pump station and associated compressed air piping buried alongside the conveyance pipeline. O&M related to sediment removal in the pumping bays of both intakes would be performed at most annually. Maintenance of the proposed conveyance pipeline for sediment removal from the existing intake to SRWTP would be performed at most annually.

SRWTP employees would inspect and maintain the existing water intake, new water intake, pump stations, and conveyance pipelines. As maintenance trips already occur for the existing intake, additional truck trips for maintenance of the new intake are not anticipated. No additional emergency generators are required for O&M activities at either the existing or proposed new intake. However, portable generators may be used by divers during routine maintenance.

Existing Utility Upgrades and Potable Water Transmission Pipelines

Once constructed, O&M activities of the existing utility upgrades to serve both the FWTP and SRWTP would remain generally the same as existing activities. The proposed new upgraded storm drain pipelines would be operated and maintained the same as the existing storm drain pipelines. Similarly, the replacement electrical service lines would also be operated and maintained as the existing service lines are under SMUD’s maintenance program. O&M for the proposed potable water transmission pipelines would be performed as part of ongoing City programs and would remain the same as existing conditions.

Impact Conclusion

Proposed project O&M activities for the FWTP, existing and proposed new Sacramento River intakes, existing utility upgrades and potable water transmission pipelines would not generate a substantial permanent increase in ambient noise levels in excess of established standards. O&M activities at the ozone generation and treatment system improvements at the SRWTP could on occasion generate an increase in ambient noise levels in excess of established standards. Given the limited occurrence of this activity, while noticeable this occasional impact would be **less than significant**.

Impact 3.14-3: Construction of the proposed project could generate excessive groundborne vibration or groundborne noise levels.

Construction activities associated with the proposed project could include off-road equipment known to generate vibration. Specifically, the operation of pile drivers, plate compactors, and bulldozers are associated with groundborne vibration. Activities that would potentially generate excessive vibration, such as vibratory or impact pile driving would be expected to occur from construction of the tee screen intake within the river to create a dewatered area, construction of the pump station on the riverside of the levee, and construction of the pipeline from the pump station to I-5.

Receptors sensitive to vibration include structures (especially older masonry structures), people (especially residents), and equipment (e.g., magnetic resonance imaging equipment, high resolution lithographic, optical and electron microscopes). Regarding the potential effects of groundborne vibration to people, except for long-term occupational exposure, vibration levels rarely affect human health.

An analysis was conducted using a matrix of vibration from construction activities with distances to receptors. This matrix, presented in **Table 3.14-9**, uses dark-shaded areas to indicate the distances at which vibration levels would exceed the criterion for damage to conventional structures. The lighter shaded areas indicate the distances at which the criterion for historic structures or buildings that are documented to be structurally weakened would be exceeded.

TABLE 3.14-9
VIBRATION LEVELS FOR CONSTRUCTION ACTIVITY

Equipment	Estimated Peak Particle Velocity (inches per second)					
	At 25 Feet (reference)	At 40 Feet	At 75 Feet	At 100 Feet	At 420 Feet	At 700 Feet
Loaded Trucks	0.076	0.038	0.023	0.017	0.001	0.001
Large Bulldozer	0.089	0.044	0.027	0.019	0.001	0.001
Vibratory Roller	0.20	0.103	0.063	0.046	0.003	0.001
Impact Pile Driver	0.65	0.321	0.194	0.141	0.009	0.004
Vibratory Pile Driver	0.65	0.321	0.194	0.141	0.009	0.004

NOTE:

Dark-shaded areas indicate distances where vibration levels would exceed the damage criterion for conventional structures.
Lighter shaded areas indicate the distances at which the criterion for historic structures or buildings that are documented to be structurally weakened would be exceeded.

SOURCES: Caltrans, 2020; FTA, 2018.

Treatment Plant Improvements and Existing Utility Upgrades

FWTP

The nearest residential buildings (Sacramento State Hornet Commons) would be located approximately 60 feet from the proposed storm drainage improvements alignment. The highest vibration levels would be generated by vibratory compaction equipment. At a distance of 60 feet, vibration from operation of vibratory compaction equipment would be reduced to approximately 0.056 inches/second PPV, which is equivalent to approximately 83 VdB. This level of vibration would be below FTA's 0.5 inches/second PPV criterion for building damage to modern construction. A vibration level of 83 VdB would exceed FTA's 80 VdB criterion for infrequent (construction-related) events at residential receptors during nighttime hours when people would be likely to be sleeping which would occur at receptors located within 60 feet of compaction activity if it were to occur during nighttime hours.

This analysis assumed the nearest structure would be College Town Apartments, approximately 120 feet from the treatment plant improvements and electrical service upgrades. The highest vibration levels would be generated by vibratory compaction equipment. At a distance of 120 feet, vibration from operation of vibratory compaction equipment would be reduced to approximately 0.020 inches/second PPV, which is equivalent to approximately 74 VdB. This level of vibration would be below FTA's 0.5 inches/second PPV criterion for building damage to modern construction. A vibration level of 74 VdB would be well below FTA's 80 VdB criterion for infrequent (construction-related) events at residential receptors during nighttime hours when people would be likely to be sleeping which would occur at receptors located within 120 feet of compaction activity if it were to occur during nighttime hours.

If compaction activities were to occur during nighttime hours, construction of the storm drainage improvements in the FWTP project area alignment would generate a substantial temporary vibration effect due to proximity of sensitive receptors. Therefore, vibration levels during nighttime hours could result in an adverse community response based on the criteria established by FTA, depending on proximity of sensitive receptors and the time of day compaction activities are conducted.

SRWTP

The highest vibration levels would be generated by pile driving activities at the construction of the SRWTP. The closest potential pile driving activity would be approximately 250 feet from the future Kaiser Permanente Medical Center. The majority of any pile driving efforts would be further inside the property boundary near the interior of the property (e.g., 200 - 500 ft inside property boundary). At 250 feet vibration from pile driving would be reduced to approximately 0.021 inches/second PPV. No pile driving activity is to occur during the nighttime (from 6:00 p.m. to 6:00 a.m.) as described in Chapter 2, *Project Description*.

This analysis assumed the nearest structure would be the Executive Inn Suites approximately 80 feet from the high service pump station. At this distance vibration from pile driving would be reduced to approximately 0.114 inches/second PPV, which is below FTA's 0.5 inches/second PPV criterion for building damage to modern construction. For nighttime activity, the highest vibration levels would be generated by vibratory compaction equipment. At a distance of 80 feet, vibration from operation of vibratory compaction equipment would be reduced to approximately 0.037 inches/second PPV, which is equivalent to approximately 79 VdB. This level of vibration would be less than FTA's 80 VdB criterion for infrequent (construction-related) events at sensitive receptors where people sleep.

Sacramento River Water Intakes

The highest vibration levels would be generated by pile driving activities at the construction of the tee screen intake and the pump station. The location of the tee screen intake would be approximately 1,200 feet from the nearest off-site residences (Riverwalk Apartments) across the American River. At this distance vibration from pile driving would be reduced to approximately 0.002 inches/second PPV, which is equivalent to approximately 53 VdB. This level of vibration would be less than FTA's 80 VdB criterion for infrequent (construction-related) events at residential receptors. The nearest structure would be the SMUD Museum of Science and Curiosity, which is approximately 80 feet from pile locations used for the pump station. At this distance, vibration from pile driving would be reduced to approximately 0.113 inches/second PPV, which is below FTA's 0.5 inches/second PPV criterion for building damage to modern construction.

Construction of the pipeline from the pump station to I-5 and under I-5 would be approximately 25 feet from the nearest structures (SMUD Museum of Science and Curiosity and Best Western Sandman). At this distance vibration from operation of vibratory compaction equipment would be reduced to approximately 0.20 inches/second PPV, which is equivalent to approximately 94 VdB. This level of vibration would be below FTA's 0.5 inches/second PPV criterion for building damage to modern construction. Although a vibration level of 94 VdB would exceed FTA's 80 VdB criterion for infrequent (construction-related) events at sensitive receptors during nighttime hours, this criterion would not apply to museum but only the hotel, where people would be likely to be sleeping which would occur at receptors located within 25 feet of compaction activity if compaction were to occur during nighttime hours.

A sending pit and receiving pit for the jack and bore installation of the pipeline would be needed on either side of I-5. These pits would require a shoring system that includes piles. The nearest structure would be the SMUD Museum of Science and Curiosity approximately 270 feet from pile locations across I-5. At this distance vibration from pile driving would be reduced to approximately 0.018 inches/second PPV, which is below FTA's 0.5 inches/second PPV criterion for building damage to modern construction.

Potable Water Transmission Pipelines

The highest vibration levels would be generated by a vibratory roller for the construction of the transmission pipelines. There is no specific alignment for transmission pipelines available at this time. Therefore, it is not possible to provide specific estimates of the vibration levels at individual receptor locations that would result from construction. It may reasonably be expected that construction equipment of proposed transmission pipelines may be as close as 25 feet from adjacent existing vibration sensitive receptors. Table 3.14-9 presents reference vibration levels of construction equipment for informational purposes. Given the data in Table 3.14-9 and the possibility that existing receptors could be as close as 25 feet away, vibration levels would be below FTA's 0.5 inches/second PPV criterion for building damage to modern construction.

Although the potential exists for haul trucks or vibratory rollers to occasionally exceed the 80 VdB annoyance threshold when operating within 25 feet, because of the limited duration and frequency of the impact as cut and cover trenching progresses at a rate of approximately 100 feet per day, vibrations would not be anticipated to be significant. However, if compaction activities were to occur during nighttime hours in proximity to sensitive receptors, installation of the potable water transmission pipelines could generate substantial temporary vibration effects.

Impact Conclusion

Construction of facility and treatment improvements at the FWTP and SRWTP, and upgrades to existing utilities serving both water treatment plants, would not generate a substantial temporary vibration effect. Therefore, impacts would be **less than significant**.

However, nighttime construction of the storm drainage improvements at the FWTP, improvements to the existing Sacramento River water intake and associated facilities; construction of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and, installation of the new potable water transmission pipelines could generate a substantial temporary vibration effect. Therefore, vibration levels during nighttime hours would result in an adverse community response based on the criteria established by FTA, depending on time of day and proximity of sensitive receptors and this impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.14-2 (EUU-FWTP – storm drainage improvements only, SRWI-Existing/New, TP): The City shall require contractors to implement the following measures at work sites within 90 feet of sensitive receptors during project construction to avoid and minimize the effects of temporary and short-term construction-related groundborne vibration on sensitive receptors.

(a) Equipment shall be operated as far away as practical from vibration-sensitive receptors.

(b) As a condition of the construction contract, compaction activities shall be limited to the hours of 8:00 a.m. to 6:00 p.m. when work is within 90 feet of a sensitive land use.

(c) Where practicable, contractors use smaller vibratory rollers to minimize vibration levels during compaction activities where needed to meet vibration standards.

Significance After Mitigation: Implementing Mitigation Measure 3.14-2 would reduce the impacts of construction vibration generated from construction equipment and allocate the most substantial vibration-generating activities to avoid hours when nearby residents would reasonably be expected to sleep which is the basis for the FTA’s vibration criterion for human annoyance. In addition, vibration levels would be reduced by using alternative equipment and this impact would be **less than significant with mitigation**.

Impact 3.14-4: Operation and maintenance of the proposed project could generate excessive groundborne vibration or groundborne noise levels.

Treatment Plant Improvements

Once improvements are completed at the FWTP and SRWTP, O&M activities would generally be similar to existing O&M activities. There would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions).

Vibration from operation of a loaded truck at 25 feet would be approximately 0.076 inches/second PPV. This level of vibration would be below FTA's 0.5 inches/second PPV criterion for building damage to modern construction. O&M vehicle trips associated with FWTP and SRWTP would not result in a noticeable increase in roadside vibration levels.

Sacramento River Water Intakes

The proposed new water intake would operate in parallel with the existing water intake. O&M related to sediment removal in the pumping bays of both intakes would be performed at most annually. Intake screen cleaning with air would occur during times when the river is turbid, and screens become clogged. However, with the screens being submerged in the river, noise and vibrations are attenuated with minimal to no disturbance to nearby structures or receptors. SRWTP employees would inspect and maintain the existing water intake, new water intake, pump stations, and conveyance pipelines. As maintenance trips would be conducted on an intermittent basis and would result in a minor increase in motor vehicle trips which would not result in excessive vibration.

Existing Utility Upgrades and Potable Water Transmission Pipelines

Once constructed, O&M activities of the existing utility upgrades to serve both the FWTP and SRWTP would remain generally the same as existing activities. The proposed new upgraded storm drain pipelines would be operated and maintained the same as the existing storm drain pipelines. Similarly, the replacement electrical service lines would also be operated and maintained as the existing service lines are under SMUD's maintenance program. O&M for the proposed potable water transmission pipelines would be performed as part of ongoing City programs and would remain the same as existing conditions. Therefore, O&M activities would not result excessive vibration.

Impact Conclusion

Vehicle trips associated with O&M activities for all project components would not result in increased roadside vibration levels. Intake screen cleaning with the screens being submerged in the river, noise and vibrations are attenuated with would not result in increased vibration levels for nearby structures. Therefore, O&M activities associated with the proposed project would not generate excessive groundborne vibration or groundborne noise levels and this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

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3.15 Public Services

3.15.1 Introduction

This section of the Draft EIR describes the existing public services in the proposed project areas and evaluates the physical environmental impacts that could result in order to maintain provision of adequate public services with implementation of the proposed project. The services evaluated in this section include police protection, fire protection, public schools, and parks. Additional discussion of impacts to parks and other recreational uses is included in Section 3.16, *Recreation*.

No comments specifically addressing public services were received in response to the NOP. See Appendix A for NOP comment letters.

3.15.2 Environmental Setting

Sacramento Police Department

Sacramento Police Department (Sacramento PD) provides law enforcement services in the City of Sacramento, including the proposed project areas. Sacramento PD is staffed by approximately 669 sworn police officers and 280 civilian staff; the department received 738,231 calls for service in 2016 and 351,472 of those calls resulting in officers dispatched to respond to the call (Sacramento Police Department, 2017).

Sacramento PD's main headquarters (the Public Safety Center and Headquarters) is located at 5770 Freeport Boulevard. The Sacramento PD has three substations from which patrol divisions operate for four command areas. The SRWTP project area is in Police District 3-Central and the FWTP project area is in Police District 6-Eastern. These two Police Districts are served by Richards Police Facility. The Richards Police Facility is located at 300 Richards Boulevard in the River District. This substation serves the East Command, which includes many portions of East and Southeast Sacramento located to the east of the Capital City Freeway and SR-99 and south of the American River. The Joseph E. Rooney Police Facility at 5303 Franklin Boulevard serves as the main substation for areas within the area located to the south of US-50 (i.e., the Broadway Corridor), as well as more broadly serving the South Command (Southwest District 4 and Southeast District 5). The William J. Kinney Police Facility at 3550 Marysville Boulevard serves the North Command (Northwest District 1 and Northeast District 2), which generally contains portions of the City located to the north of the American River.

California Highway Patrol

California Highway Patrol is responsible for law enforcement along the highways that run through the plan areas, which include I-5, US-50, Capitol City Freeway, and SR-99. Following a merger in 1995, California Highway Patrol also protects State property, such as the State Capitol, as well as State employees, the Governor, and other dignitaries.

Sacramento Fire Department

The Sacramento Fire Department (SFD) is a full-service department, with the responsibility of responding to and mitigating incidents involving fires, medical emergencies, hazardous materials, and technical and water rescues within the City of Sacramento, including the proposed project areas. In the 2022–2023 fiscal year, SFD was budgeted with 730 full time equivalent positions, comprising the following staffing levels: three staff in the Office of the Fire Chief Division, 615 staff in the Fire Ops/Emergency Medical Services (EMS) Division, 52 staff in the Tech Services Division, and 14 staff in the Fire Administrative Services Division (City of Sacramento, 2022). Currently, SFD operations are divided into three divisions: Suppression, Emergency Medical Services (EMS), and Special Operations (Sacramento Fire Department, 2022a). Fire suppression involves the act of extinguishing fires and preventing fire expansion, i.e., firefighting. Currently, SFD's Fire Suppression Division operates 24 fire engines, 9 ladder trucks, and one heavy rescue at a total of 24 fire stations (Sacramento Fire Department, 2022b). The stations are organized into three battalions, with each battalion led by a battalion chief that coordinates operations at emergency scenes.

The EMS Division collaborates with a variety of agencies, including the Sacramento County EMS Authority, local hospitals, and community organizations, to participate in emergency prehospital care operations (Sacramento Fire Department, 2022c). The EMS Division delivers Basic Life Support and Advanced Life Support first responder and ambulance transportation services. All SFD Engine and Truck Companies are used as EMS first responders and staffed with Firefighter-Emergency Medical Technicians and/or Firefighter-Paramedics, with at least Basic Life Support capabilities. SFD currently deploys fifteen 24-hour Advanced Life Support ambulances and up to three flex Advanced Life Support ambulances when additional staffing and equipment are available. Each ambulance is staffed by two Firefighters, with at least one also being a licensed Paramedic.

The Special Operations Division provides a multi-pronged approach for a variety of programs including Hazardous Materials, Domestic Preparedness, Technical Rescue and Urban Search and Rescue (Sacramento Fire Department, 2022d). In addition, this division also manages boat and heavy rescue programs.

Sacramento City Unified School District

The Sacramento City Unified School District is the 10th largest public K-12 district in California and one of the oldest in the western United States (established in 1854). The district serves 43,000 students on 76 campuses (SCUSD, 2023).

City Parks

The City of Sacramento Department of Parks and Recreation maintains approximately 3,200 acres of developed parkland and manages more than 210 parks and numerous other community centers and recreational facilities within the City (City of Sacramento, 2023). Several parks or recreation facilities within the City are owned or operated by other jurisdictions, such as the County of Sacramento and the State of California. The City's Parks and Recreation Master Plan guides park development in the City (City of Sacramento, 2023). For further description of parks and recreational opportunities within the vicinity of the proposed project areas, see Section 3.16, *Recreation*.

Open Space

Along with parks, various open space areas exist throughout and in the vicinity of the Central City area, including the Sacramento River Parkway and the American River Parkway. For further description of the Sacramento River Parkway and American River Parkway, see Section 3.16, *Recreation*.

3.15.3 Regulatory Setting

Federal

There are no Federal Regulations regarding public services that pertain to the proposed project.

State

California Occupational Safety and Health Administration

In accordance with the California Code of Regulations, Title 8, Sections 1270 (“Fire Prevention”) and 6773 (“Fire Protection and Fire Equipment”), California Occupational Safety and Health Administration has established minimum standards for fire suppression and EMS. The standards include, but are not limited to, guidelines on the handling of highly combustible materials, requirements for the sizing of fire hoses, restrictions on the use of compressed air, access roads, and the testing, maintenance, and use of all firefighting and emergency medical equipment.

California Health and Safety Code

State fire regulations are set forth in Sections 13000 et seq. of the California Health and Safety Code, which includes regulations for building standards (as set forth in the California Building Code), fire protection and notification systems, fire protection devices such as extinguishers, smoke alarms, high-rise building, childcare facility standards, and fire suppression training.

Uniform Fire Code

The Uniform Fire Code (UFC) provides regulations involving construction, maintenance, and the use of buildings, and is the primary fire code throughout the United States. Topics addressed in the UFC include fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions intended to protect and assist fire responders, industrial processes, and many other general and specialized fire-safety requirements for new and existing buildings and the surrounding premises. The UFC contains specialized technical regulations related to fire and life safety. Sprinkler system standards and requirements for different types of buildings are provided in the UFC.

California Fire Code

State fire regulations are set forth in Section 13000 et seq. of the California Health and Safety Code. These regulations address building standards (as identified in CCR title 24, the California Building Code), fire protection and notification systems, fire protection devices (such as fire extinguishers and smoke alarms), high-rise building and childcare facility standards, and fire suppression training.

State Public Park Preservation Act

The primary instrument for protecting and preserving parkland is the State Public Park Preservation Act. Under the Public Resources Code, cities and counties may not acquire any real property that is in use as a public park for any non-park use unless compensation or land, or both, are provided to replace the parkland acquired. This provides no net loss of parkland and facilities.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies applicable to the evaluation of proposed project effects on public services are provided in **Table 3.15-1**.

TABLE 3.15-1
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – PUBLIC SERVICES

Element	Goals and Policies
Public Facilities and Safety Element	Goal PFS-1: Policies PFS-1.1, 1.5, 1.6, 1.7, 1.8; Goal PFS-2: Policies PFS-2.1, 2.2, 2.3, 2.4
Youth, Parks, Recreation, and Open Space Element	Goal YPRO-1: Policies YPRO-1.1, 1.17

SOURCES: City of Sacramento, 2024

3.15.4 Impacts and Mitigation Measures

Method of the Analysis

The analysis considered whether the proposed project would increase the demand for police or fire protection or increase demand on public facilities, such as schools and parks. The analysis considers how construction (short-term, temporary), and O&M (long-term, permanent) activities would result in changes to existing conditions. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Result in substantial unplanned adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:
  - Fire Protection

- Police Protection
- Schools
- Parks
- Other public facilities

Impacts and Mitigation Measures

Table 3.15-2 summarizes the impact conclusions presented in this section.

TABLE 3.15-2
SUMMARY OF IMPACT CONCLUSIONS – PUBLIC SERVICES

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.15-1: Implementation of the proposed project could result in substantial unplanned adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.15-1: Implementation of the proposed project could result in substantial unplanned adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which would cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services.

All Project Components

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. The proposed project would not involve the construction of any residential or employment opportunity uses that would result in a long-term population increase. During construction of the proposed project components, a maximum number of approximately 105 construction workers may be needed if there is overlap between work within the SRWTP property and at the Sacramento River water intakes. These construction personnel would be hired from the existing regional labor pool in and around the Sacramento region.

During the construction phase of each of the proposed project components, there is the potential for an increased need for police and fire protection services to address potential incidents at construction sites. However, the potential increase in demand for these services would result in only a short-term, temporary increase in the need for police and fire services, which would not elicit the demand or need for new or expanded government facilities or staffing to provide long-term public services. This type of demand increase could be accommodated by existing police and fire resources and acceptable levels of service and response times would not be anticipated to be significantly affected.

The proposed project does not involve the development of residential or employment opportunity land uses that would result in a long-term local population increase. Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). O&M activities for all other project components would be completed under existing maintenance programs.

The proposed project would therefore not contribute to an unplanned increased need or demand for construction of new or expanded government facilities for the provision of public services, such as fire, police, schools, or parks (see Section 3.16, *Recreation*, for additional discussion of the less-than-significant impacts related to the need for new or expanded parks or other recreational facilities). Temporary, minor increases in demand for police and fire services could be needed during construction, but these would be accommodated by existing facilities and staff. Therefore, implementation of the proposed project would not result in the need for additional public facilities that would result in substantial unplanned adverse physical impacts on the environment and this impact would be **less than significant**.

For discussion of how the proposed project would support planned population growth within the City's urban limits in accordance with the City's 2040 General Plan, and how the environmental effects of such growth, including those stemming from the need for new or physically altered governmental facilities, were evaluated in the Master EIR for the 2040 General Plan, please refer to Chapter 5, *Other CEQA Considerations*.

Mitigation Measures

Mitigation Measures (ALL): None required.

3.16 Recreation

3.16.1 Introduction

This section of the Draft EIR describes existing recreational uses in the vicinity of the proposed project areas and evaluates potential recreational impacts associated with construction and operation of the proposed project.

No comments specifically addressing recreation were received in response to the NOP. See Appendix A for NOP comment letters.

3.16.2 Environmental Setting

Parks

The City of Sacramento Department of Youth, Parks, and Community Enrichment maintains approximately 4,330 acres of developed parkland and manages more than 235 parks and numerous other community centers and recreational facilities within the City of Sacramento. In addition, there are several facilities within the City that are owned or operated by other jurisdictions, such as the County of Sacramento and the State of California.

There are four park facilities within and nearby the SRWTP project area. Vista Park, located adjacent to the southeast of the SRWTP, is an approximately 10-acre City owned and operated community park in the City's Railyards Specific Plan (City of Sacramento, 2016). Discovery Park, a County owned and operated 302-acre regional park, and Tiscornia Park, a City owned and County operated 14.4-acre regional park, are located at the confluence of the Sacramento and American Rivers, approximately a half mile and a quarter mile to the northwest of the SRWTP, respectively. Discovery Park is located along the left (east) and right (north) banks of the Sacramento and American Rivers, respectively, while Tiscornia Park, is located along the left (east) and left (south) banks of each river, respectively. In addition, further to the south is Robert T. Matsui Waterfront Park, a City owned and operated park 2.1-acre community park, located less than a quarter mile to the southwest of the SRWTP along the left (east) bank of the Sacramento River.

There are no County or City parks facilities within the FWTP project area. The American River Parkway is owned and operated by the County.

Open Space Areas

Along with parks, various open space areas exist in the vicinity of the SRWTP and FWTP project areas, including the Sacramento River Parkway and the American River Parkway. A description of each amenity is provided below.

Sacramento River Parkway

The Sacramento River is classified as an "urban" river, with limited natural habitat areas. Improvements such as picnic benches and restrooms can be found in riverside parks on the land side of the levee, and amenities such as public docks, terraces, and observation decks can be found on the waterside of the levee.

The Sacramento River is a popular location for recreational fishing and boating activities. Although access to the levee along urbanized portions is difficult due to the steep nature of the levees and proximity of adjacent uses, fishing and other natural recreational uses continue to be popular in the area. The Sacramento River Parkway currently exists as a walking and bicycling trail that runs from the confluence of the American River, where it connects with the Jedediah Smith Memorial Trail, in the north, and extends to Captains Table Road in the Little Pocket neighborhood to the south.

The Sacramento River Parkway shared use path runs uninterrupted for approximately 2.3 miles in the vicinity of the SRWTP. It can be accessed on foot or by bicycle, or by vehicle at Discovery Park or Miller Park (south of Pioneer Bridge), both of which also have boat launches. Minor river access points providing pedestrian access only are found at a variety of points throughout the Parkway, including Old Sacramento (which also provides boat launches), and the O Street Access.

American River Parkway

The American River Parkway is an open space greenbelt which extends approximately 29 miles from Folsom Dam at the northeast to the American River's confluence with the Sacramento River at the southwest. The lower American River is classified as a "Recreation" river within the State and Federal Wild and Scenic River Systems (County of Sacramento, 2008).

The Parkway contains several major developed parks along with parallel bike, pedestrian, and equestrian trails. Trail recreation is the most popular activity in the Parkway. The Jedediah Smith Memorial Trail is the primary recreational trail and runs along the entire length of the Parkway. It connects Discovery Park to Folsom Lake and provides an important bicycle commuter route. Although the trail is designated for bicycle and in-line skating use, it is a shared use path because it is also used by walkers and runners. Additional bicycle trail segments have been constructed to provide supplemental trail connections and access points (County of Sacramento, 2008).

The stretch of the American River Parkway near the FWTP is referred to as the Campus Commons area, which is approximately 152 acres in size. The FWTP is located adjacent to a protected area of the Parkway. Parkway facilities located in the vicinity of the FWTP project area include a paved shared use path at the base of the levee and the Howe River Access, located approximately 0.25 mile east of Howe Avenue, which provides a boat launch (County of Sacramento, 2008).

3.16.3 Regulatory Setting

Federal

Wild and Scenic Rivers Act

The Wild and Scenic Rivers Act (16 U.S. Code 1271−1287) established a method for providing Federal protection for certain free-flowing rivers, preserving them and their immediate environments for the use and enjoyment of present and future generations. Eligible rivers can be designated as Wild River Areas, Scenic River Areas, or Recreational River Areas. Recreational River Areas are those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past. The Wild and Scenic Rivers Act, under Section 10, includes management direction for designated rivers, with primary emphasis given to protecting their aesthetic, scenic, historic, archaeologic, and scientific features.

The American River from the Nimbus Dam to the confluence of the Sacramento River is designated as a Recreational River Area. The Sacramento River as it passes by the project area is not designated under the Wild and Scenic Rivers Act.

State

State Public Park Preservation Act

The primary instrument for protecting and preserving parkland is the State Public Park Preservation Act. Under the Public Resources Code, cities and counties may not acquire any real property that is in use as a public park for any non-park use unless compensation or land, or both, are provided to replace the parkland acquired. This provides no net loss of parkland and facilities.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies that are applicable to the evaluation of proposed project effects on recreation are provided in **Table 3.16-1**.

TABLE 3.16-1
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – RECREATION

Element	Goals and Policies
Youth, Parks, Recreation, and Open Space	Goal YPRO-1: Policies YPRO-1.16, 1.17, CC-YPRO-2, 3, ES-YRPO-3

SOURCE: City of Sacramento, 2024a

Sacramento Parks Plan 2040

The City of Sacramento Department of Youth, Parks, and Community Enrichment manages the City's park and recreation system, comprised of more than 4,300 acres of parks, parkways, and open space. They developed the Parks Plan 2040 (adopted August 20, 2024, Resolution No. 2024-0261) to inventory existing physical and programmatic assets; identify community needs and priorities; and refine policies, actions, and tools to guide its investment in parks, recreation facilities, programs, events, and services over the 20-year planning horizon (City of Sacramento, 2024b). Key needs identified as a focus in the plan are to:

- secure and sustain the assets, programs, staff, and resources needed to support equitable recreation benefits for all residents;
- enhance parks, recreation, and youth development opportunities as the City diversifies and grows; and

- address the increasing demand for parks and healthy lifestyles that have emerged during the COVID-19 pandemic and post-pandemic years.

The Parks Plan 2040 identifies the highest priority directions for plan implementation in Chapter 7, and in Chapter 8 describes the tools available for implementation of plan directions, policies, and guidelines. Appendix D includes policies related to Parks, Parkways, & Open Space; Recreation Facilities; Programs, Events, and Services; Maintenance & Stewardship; Administration and Management; and Financial Investment.

Sacramento River Parkway Plan

The City of Sacramento adopted the Sacramento River Parkway Plan on October 21, 1997 (City of Sacramento, 1997). The Sacramento River Parkway Plan is a policy guide for habitat preservation and restoration and recreational development for lands adjacent to the Sacramento River. The plan identifies current conditions, develops a vision for the future, and identifies programs and actions for achieving the vision. The plan includes the following goals for the Sacramento River Parkway:

- To recognize the multiple use aspect of the Sacramento River Parkway for recreation, habitat preservation, and flood control;
- To preserve, protect, and enhance the natural and cultural resources of the Parkway;
- To provide appropriate access and facilities for the enjoyment of the Parkway by present and future generations;
- To create a continuous, lineal on-river parkway with a bicycle and pedestrian trail along the Sacramento River from the City limits at I-80 and Garden Highway in South Natomas to the City limits at Freeport; until such time that all of the Parkway lands are under public ownership, the goal is to provide a continuous lineal parkway on and off-river by using an interim bypass trail; and
- To establish development policies and implementation measures for the development of the Sacramento River Parkway.

American River Parkway Plan

The County of Sacramento adopted the American River Parkway Plan on September 10, 2008 and the City of Sacramento approved Resolution 2008-731 on November 6, 2008, which recommended adoption of the Plan by the California State Legislature (acting under the Urban American River Parkway Preservation Act). The purpose of the plan is to provide a guide to land use decisions affecting the Parkway; specifically addressing its preservation, use, development, and administration (County of Sacramento, 2008). The plan also acts as the management plan for the Federal and State Wild and Scenic Rivers Act. The plan includes the following goals for the American River Parkway:

- To provide appropriate access and facilities so that present and future generations can enjoy the amenities and resources of the Parkway which enhance the enjoyment of leisure activities;
- To preserve, protect, interpret and improve the natural, archaeological, historical and recreational resources of the Parkway, including an adequate flow of high-quality water, anadromous and resident fishes, migratory and resident wildlife, and diverse natural vegetation;

- To mitigate adverse effects of activities and facilities adjacent to the Parkway; and
- To provide public safety and protection within and adjacent to the Parkway.

3.16.4 Impacts and Mitigation Measures

Method of the Analysis

Impacts to recreational resources are assessed based on the proposed project's level of direct and indirect physical impact on existing parks and recreational facilities in the vicinity. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

Impacts Not Further Evaluated

Increase use of existing neighborhood or regional parks such that substantial physical deterioration of the facility would occur.

Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. The proposed project would not involve the construction or operation of recreational facilities or residential or employment opportunity uses which would result in a long-term population increase. During construction of the proposed project components, construction crews would be anticipated to come from in and around the Sacramento region to their respective construction site(s). Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP).

It is anticipated that these new full-time employees would come from the existing labor pool. Therefore, construction and operation of the proposed project would not involve the construction or expansion of recreational facilities and would not increase the use of existing neighborhoods and regional parks such that substantial physical deterioration would result. Therefore, no impact would occur and this topic is not further evaluated.

Impacts and Mitigation Measures

Table 3.16-2 summarizes the impact conclusions presented in this section.

TABLE 3.16-2
SUMMARY OF IMPACT CONCLUSIONS – RECREATION

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.16-1: Implementation of the proposed project could increase the use of existing recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.16-1: Implementation of the proposed project could increase the use of recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

As described previously, the proposed project would not involve the construction or operation of residential or employment uses which would result in a long-term population increase. During construction of the proposed project components, construction crews would be anticipated to come from in and around the Sacramento region to their respective construction site(s). Once improvements are completed O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and the new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). It is anticipated that these new full-time employees would come from the existing labor pool. As a result, implementation of the proposed project would not result in an increased use of recreational facilities; however, construction activities could temporarily interfere with access to recreational uses that could result in increased use of adjacent recreation facilities, which could contribute to their deterioration.

Treatment Plant Improvements, Existing Utility Upgrades, and Potable Water Transmission Pipelines

The proposed project includes facility and treatment process improvements at both the FWTP and the SRWTP, as well as construction and operation of utility upgrades needed to serve both water treatment plants. The proposed project also includes installation of new water transmission pipelines needed to overcome hydraulic constrictions in the system and distribute treated water from the SRWTP to the City's service area. Construction activities would include establishment and use of staging areas; demolition of existing structures, facilities, and/or powerlines/poles; excavation and/or trenching to relocate or install buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs. These activities would occur within the existing plant boundaries and/or within existing public rights-of-way on paved or previously disturbed surfaces, within built environments surrounded by urban uses, and would therefore not directly impact or deteriorate the recreational resources in the vicinity of the project areas.

Sacramento River Water Intakes

The proposed project also includes improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP. Construction of these project components would require installation of sheet piling cofferdams within the river and river side of the levee to create a dewatered area for construction to occur. Installation of coffer dams could temporarily disrupt boating, fishing, and other water-based recreational activities in the Sacramento River in the vicinity of construction site. Although in-river recreation facilities could be temporarily disrupted, recreational activities could still occur within the Sacramento River and along the western bank of the river. At the proposed new water intake site, the Sacramento River is approximately 700 feet wide, allowing sufficient width for boats, kayaks, and other recreational water vessels to safely pass by the intake facility. In addition, there is ample shoreline upstream and downstream of the proposed new water intake site that would continue to provide river access for fishing, birding, photography, and other land-based recreational activities. The abundance of nearby recreation facilities would ensure that existing nearby facilities would not be deteriorated due to overcrowding and that no new or expanded facilities would be needed to accommodate this temporary change in access. After construction, warning signs and/or buoys would be used to make the public aware of submerged equipment and all boating, fishing, and other recreational activities could resume with no limit to access.

Construction associated with the conveyance pipelines from the water intakes to the SRWTP would require trenching, sheet piling, and microtunneling activities, and may require minor vegetation removal. These temporary activities could occur within the Sacramento River and levee, within the Museum of Science and Curiosity parking areas, and along existing public rights-of-way and/or previously paved or disturbed surfaces. Construction related to the new intake/pump station and conveyance lines may require temporary disruption of the bike and pedestrian pathway along the levee (within the Sacramento River Parkway) for approximately 3 years; however, a detour would be provided around the construction zone connecting the trail between Discovery Park and Tiscornia Park to the north and Matsui Waterfront Park to the south. There would be no permanent obstruction to the continuity of the trail or the Sacramento River Parkway (in accordance with the purpose of the Sacramento River Parkway Plan). After construction, the trail would be fully restored.

Operation of the proposed new water intake and pump station may involve additional periodic truck trips on top of the levee to access the facility. However, these trips would not occur at a high enough frequency that they would result in the physical deterioration of the levee trail or the levee itself.

Impact Conclusion

As described above, construction of the proposed project would not directly impact or deteriorate recreational facilities such that new facilities would be required or in such a way that would cause recreationists to overuse and potentially deteriorate other nearby facilities. Further, the project would not increase residential or employment opportunities or otherwise lead to an increase in the local population such that nearby recreational facilities would be overused or deteriorated, or such that new or expanded facilities would be required. For these reasons, this impact is considered **less than significant**.

For discussion of how the proposed project would support planned population growth within the City's urban limits in accordance with the City's 2040 General Plan, and how the environmental effects of such growth, including on recreational uses, were evaluated in the Master EIR for the 2040 General Plan, please refer to Chapter 5, *Other CEQA Considerations*.

Mitigation Measure

Mitigation Measures (ALL): None required.

3.17 Transportation

3.17.1 Introduction

This section of the Draft EIR addresses transportation impacts associated with implementation of the proposed project.

Comments addressing transportation were received in response to the NOP. Comments requested that the EIR fully analyze project consistency with the River District Specific Plan circulation measures, address restrictions to access, and address the project's potential to impact transportation connectivity in the River District Specific Plan Area due to its location, noting that transportation connectivity helps reduce criteria air pollutants and greenhouse gas emissions. Air Quality is addressed in Section 3.4, *Air Quality* and greenhouse gas emissions are addressed in Section 3.10, *Greenhouse Gas Emissions*. See Appendix A for NOP comment letters.

3.17.2 Environmental Setting

Regional Roadways

The City is bisected by a number of major freeways, including I-5, which traverses the state from north to south; I-80, which provides an east-west connection between San Francisco and Reno; and Highway 50 which provides an east-west connection between Sacramento and South Lake Tahoe.

Local Roadways in the FWTP Project Area

The FWTP project area (see Figure 2-3 in Chapter 2) includes the following roadways.

- ***State University Drive*** is a two-lane, north-south local roadway which traverses west/south of the American River and is located west of FWTP.
- ***College Town Drive*** is a four-lane, east-west major collector roadway that is located immediately south of FWTP. FWTP has two intersecting driveways into College Town Drive: one primary access to the facility and the other is used for access as needed.
- ***Howe Avenue*** is a four-lane, north-south arterial, located east of the FWTP. Howe Avenue crosses over the American River via a bridge.

Local Roadways in the SRWTP Project Area

The SRWTP project area (see Figure 2-2 in Chapter 2, *Project Description*) includes the following roadways.

- ***Richards Boulevard*** is a four-lane, east-west arterial which extends from the west adjacent to the Sacramento River to the east adjacent to the American River. Richards Boulevard is approximately 0.2 miles north of the SRWTP. The Richards Boulevard I-5 Interchange provides primary access to the Railyards and River District redevelopment areas from I-5. The proposed I-5/Richards Boulevard Interchange project would improve long-term traffic operations and circulation at the interchange and nearby local roads (including some of those described below) to address forecasted increases in travel demand anticipated from planned and approved developments.

- ***Bannon Street*** is a two-lane, east-west major collector roadway located directly north of the SRWTP. It intersects Bercut Drive to the west and extends southeast to its intersection with Water Street.
- ***Bercut Drive*** is a two-lane, north-south minor collector roadway which is located directly west of the SRWTP. There are three active driveways onto SRWTP from Bercut Drive, and an additional driveway is provided for the cell tower that supports communications for the plant and the region.
- ***North B Street*** is a two-lane, major collector which becomes Water Street as it extends westward beyond Sequoia Pacific Blvd. Water Street provides direct access to the SRWTP.
- ***Summit Tunnel Avenue*** is a two-lane, east-west, minor collector located directly south of the SRWTP and extends from Bercut Drive east to the current north terminus of 5th Street. Both Summit Tunnel Avenue and 5th Street are planned to be extended to the east and north respectively pursuant to buildout of the Railyards Specific Plan.
- ***Jibboom Street*** is a two-lane, north-south, major collector which is located between I-5 and the Sacramento River. This roadway intersects the location of the proposed new water intake and pump station as part of the SRWTP. A driveway from Jibboom Street provides the primary access for the existing intake and the proposed new intake.

Transit Service

Sacramento Regional Transit provides bus and light rail transit service to the City. The following services are located in proximity to the project areas.

- **Light Rail Transit –** The following light rail lines are in proximity to the project areas: the Green Line, which provides service to Richards Boulevard from North 7th Street near SRWTP, and the Gold Line, which provides service to Power Inn Road near FWTP.
- **Fixed Route Bus Service –** A wide array of bus routes operate in proximity to the project areas. The following bus stops are located near the SRWTP project area: Richards Blvd & Bercut Drive, Bannon Street & Bercut Drive, Richards Blvd & Sequoia Pacific Blvd, and Richards Blvd & North 5th Street. The following bus stops are located near the FWTP project area: La Riviera Drive & Howe Ave, La Riviera Drive & College Town Drive, State University Drive East & College Town Drive, and College Town Drive & Hornet Drive.
- **Capitol Corridor –** An intercity passenger train service run by Amtrak that serves Sacramento from the Intermodal Transportation Facility is located just north of I Street. The 168-mile route operates between San Jose and Auburn. The Intermodal Transportation Facility is located approximately 0.6 miles south of the SRWTP, and 4.8 miles northwest of the FWTP.

Bicycle and Pedestrian Circulation

Bicycle Circulation

Several types of bicycle facilities exist within the City (City of Sacramento, 2016):

- Class I Multi-use Off-Street paths – are paved trails that are separated from roadways, and allow for shared use by both cyclists and pedestrians.
- Class II On-Street Bike Lanes – are designated for use by bicycles by striping, pavement legends, and signs.

- Class III On-Street Bike Routes – are designated by signage for shared bicycle use with vehicles but do not necessarily include any additional pavement width for bicyclists.
- Class IV Protected Bikeways – are generally located within or adjacent to a roadway but are barrier-separated from vehicular travel lanes. They may be one-way or two-way.

FWTP Project Area

A Class I shared use path along the American River provides bicycle access directly to the FWTP. Additionally, there are Class II Bike Lanes located along Folsom Boulevard, State University Drive, and University Avenue in close proximity to the FWTP.

SRWTP Project Area

There are Class II bicycle lanes located near the SRWTP along Richards Boulevard, Bercut Drive, Railyards Boulevard, Summit Tunnel Avenue, and North B Street. There is also a Class II on Jibboom Street and a Class I path along the Sacramento River to the west of the SRWTP. However, direct bicycle access to the SRWTP is not provided.

Pedestrian Circulation

FWTP Project Area

Pedestrian access in the FWTP project area is provided via sidewalks along College Town Drive, Howe Avenue, as well as existing pathways along the American River.

SRWTP Project Area

Pedestrian access along Sacramento River pathways is provided in the vicinity, as well as along sidewalks on Bercut Drive, Bannon Street, and Summit Tunnel Avenue, which can be taken to the SRWTP entrances on Bercut Street.

Emergency Access

Critical evacuation routes in the City include I-5, I-80, Highway 50 and State Route 99.
As described in the City's Local Hazard Mitigation Plan, the City has recommended evacuation routes in the event of a hazardous incident requiring evacuation in proximity of the project areas, including routes in the vicinity of the FWTP project area (La Riveria Drive and Howe Avenue) and in the vicinity of the SRWTP project area (B Street and Richards Boulevard) (City of Sacramento, 2021).

There are roads into the FWTP and the SRWTP that provide O&M access. These roads also provide access to and from the water treatment plants in the event of an emergency. Access to the FWTP is provided via controlled access driveways at College Town Drive near the State University Drive/College Town Drive intersection and the Fairbairn Driveway access on the southeast side of the facility. Emergency access is also available via three access points with locked gates that can be accessed from the American River levee roads, on the north side of the facility. Access to the SRWTP is provided via three controlled access driveways on Bercut Drive near its intersection with Summit Tunnel Avenue, and at the western termination of Water Street.

3.17.3 Regulatory Setting

This section provides a discussion of applicable federal, state, and local regulations pertaining to transportation that may be applicable to the proposed project.

Federal

There are no applicable federal regulations which apply directly to the proposed project.

State

California Department of Transportation

The California Department of Transportation (Caltrans) manages interregional transportation, including management and construction of the California highway system. In addition, Caltrans is responsible for permitting and regulation of the use of state roadways. Within proximity of the project areas, there are three facilities that fall under Caltrans' jurisdiction: I-5, I-80, and Highway 50.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies applicable to the evaluation of transportation effects of the proposed project are provided in **Table 3.17-1**.

TABLE 3.17-1
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – TRANSPORTATION

Element	Goals and Policies
Land Use and Placemaking	Goal LUP-1: Policy LUP-1.1
Mobility	Goal M-4: Policy M-4.1; Goal M-5: Policies M-5.7, 5.9; Goal M-6: Policies M-6.4, M-A-5
Public Facilities and Safety	Goal PFS-1: Policies PFS-2.1, 2.3

SOURCES: City of Sacramento, 2024

Sacramento County Multi-Jurisdictional Local Hazard Mitigation Plan

Refer to Section 3.11, *Hazards and Hazardous Materials*, for description of the Sacramento County Multi-Jurisdictional Local Hazard Mitigation Plan.

3.17.4 Impacts and Mitigation Measures

Method of the Analysis

To evaluate whether implementation of the proposed project would result in transportation impacts, the analysis considers how construction (short-term, temporary) and O&M (long-term, permanent) activities would result in changes to existing conditions. This section discusses potential impacts on transportation associated with conflicts with existing regulations, substantial increase in Vehicle Miles Traveled (VMT), substantial increase in hazards related to physical features or incompatible uses, or inadequate emergency access.

The proposed project would be regulated by the various laws, regulations, and policies summarized above in Section 3.17.3, *Regulatory Setting*. Therefore, the impact analysis assumes that the proposed project would comply with existing applicable regulatory requirements. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
- Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b).
- Substantially increase hazards due to a geometric design feature (such as sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.

Impacts Not Further Evaluated

Substantially increase hazards due to a geometric design feature (such as sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City’s service area. The proposed project does not involve construction or modification of public roadways that would introduce geometric design features or incompatible uses. The existing public rotunda leading to the existing water intake would be stabilized through concrete repairs to minimize settling and thus not change from existing conditions. Therefore, there would be no impact associated with a substantial increase in hazards due to a geometric design feature or an incompatible use and this issue is not discussed further in the EIR.

Impacts and Mitigation Measures

Table 3.17-2 summarizes the impact conclusions presented in this section.

TABLE 3.17-2
SUMMARY OF IMPACT CONCLUSIONS – TRANSPORTATION

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.17-1: Construction of the proposed project could conflict with a program, plan, ordinance, or policy addressing the circulation system.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.17-2: Operation and maintenance of the proposed project could conflict with a program, plan, ordinance, or policy addressing the circulation system.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.17-3: Construction of the proposed project could conflict with CEQA Guidelines Section 15064.3(b).	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.17-4: Operation and maintenance of the proposed project could conflict with CEQA Guidelines Section 15064.3(b).	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.17-5: Construction of the proposed project could result in inadequate emergency access.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.17-6: Operation and maintenance of the proposed project could result in inadequate emergency access.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant
LSM: Less than Significant with Mitigation

Impact 3.17-1: Construction of the proposed project could conflict with a program, plan, ordinance, or policy addressing the circulation system.

All Project Components

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area.

As described in Chapter 2, *Project Description*, staging of construction materials and equipment for all proposed project components would generally occur on previously disturbed areas within the FWTP and SRWTP project areas (refer to the "area of work" depicted in Figures 2-2 and 2-3). For construction activities at the Sacramento River water intakes, a staging area for materials and equipment would be created along the shoulder of Jibboom Street and may coincide with within the paved Museum of Science and Curiosity (MOSAC) parking lot (see Figure 2-3). During construction of the pump station at the new intake, and of the conveyance pipelines from both the new intake and the existing intake that would cross over the levee, pedestrian and bicycle access (travel path) to a portion of the would be temporarily disrupted and detours would be provided. The temporary relocation of the travel path would likely occur on Jibboom Street on previously disturbed surfaces. In general, existing access roads and paved areas would be used for staging and access. However, construction of the project may also require a temporary access and/or haul road from the MOSAC parking lot to the levee. Should this occur, disturbance to the MOSAC property would be minimized and access would be maintained.

Additionally, daily maximum construction workers on site could range from 15 to 63 workers (see Table 2-5), and the total number of daily round-trip truck trips for materials, waste and vendors could range from 12 to 56 roundtrips per day (see Table 2-6). Construction activities could therefore be anticipated to temporarily increase vehicle circulation in the project area and have the potential to conflict with the applicable policies addressing the circulation system.

Construction activities would be short-term and temporary, and traffic associated with construction would occur along existing roadways. The temporary disruption of the travel path for construction of the pump station at the new intake would be offset through a detour to ensure continued access for pedestrians and bicyclists during the construction period. Further, construction activities would comply with the applicable General Plan policies listed above to ensure construction traffic occurs on streets designated as truck routes to support anticipated heavy vehicle use. Therefore, construction of the proposed project would not conflict with a program, plan, ordinance, or policy addressing the circulation system. This impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.17-2: Operation and maintenance of the proposed project could conflict with a program, plan, ordinance, or policy addressing the circulation system.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). In addition, there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions). Long-term O&M activities for all other project components would be completed under existing maintenance programs and no additional full-time employees or truck trips are anticipated.

While additional truck trips would be associated with O&M of the proposed project, the number of trips is minimal compared to existing conditions. Therefore, O&M of the proposed project would not conflict with a program, plan, ordinance, or policy addressing the circulation system. This impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.17-3: Construction of the proposed project could conflict with CEQA Guidelines Section 15064.3(b).

All Project Components

As described in Chapter 2, *Project Description*, daily average construction workers on site could range from 10 to 45 workers, with daily maximum construction workers on site ranging from 15 to 63 workers (see Table 2-5). Workers would travel an average of approximately 30 miles per day (round trip) in the Sacramento region to reach their respective construction site. Construction of the proposed project components (initial phase) would occur over approximately 11 years between July 2026 and July 2037 (see Table 2-7).

CEQA Guidelines Section 15064.3(b) provides criteria for analyzing transportation impacts of a proposed project. The Governor's Office of Planning and Research publication *Technical Advisory on Evaluating Transportation Impacts in CEQA* states that, "For the purposes of this section, 'vehicle miles traveled (VMT)' refers to the amount and distance of automobile travel attributable to a project, where the term 'automobile' refers to on-road passenger vehicles, specifically cars and light trucks" (OPR, 2018). Accordingly, heavy-vehicle trucks that would be used for construction activities would not be accounted for in the consideration of VMT impacts.

While additional vehicle trips resulting from construction workers would represent an increase in trips compared to existing conditions, the additional trips would be short-term and temporary. Therefore, these trips would not result in a long-term impact related to increased VMT. Therefore, impacts associated with construction of the proposed project related to VMT would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.17-4: Operation and maintenance of the proposed project could conflict with CEQA Guidelines Section 15064.3(b).

All Project Components

Once improvements are completed O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and the new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). It is anticipated that these new full-time employees would come from the existing labor pool. There would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions). Long-term O&M activities for all other project components would be completed under existing maintenance programs and no additional full-time employees or truck trips are anticipated.

As described in Impact 3.17-3, CEQA Guidelines Section 15064.3(b) provides criteria for analyzing transportation impacts of a proposed project. The Governor's Office of Planning and Research publication *Technical Advisory on Evaluating Transportation Impacts in CEQA* states that, "For the purposes of this section, 'vehicle miles traveled (VMT)' refers to the amount and distance of automobile travel attributable to a project, where the term 'automobile' refers to on-road passenger vehicles, specifically cars and light trucks" (OPR, 2018). Accordingly, heavy-vehicle trucks that would be used for O&M activities would not be accounted for in consideration of VMT impacts.

While additional full-time employees and additional truck trips would be associated with O&M of the proposed project, the number of trips would likely be negligible when compared with existing conditions. Therefore, O&M of the proposed project would not increase VMT. This impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.17-5: Construction of the proposed project could result in inadequate emergency access.

All Project Components

As described in Chapter 2, *Project Description*, during construction, construction vehicles would access the proposed project areas (including staging areas) using existing access roads for delivery of materials, water, and other equipment, as well as for waste disposal. As shown in Table 2-6 in Chapter 2, daily truck trips for materials, waste and vendors would range from 12 to 56 round trips per day. As described in Section 3.11, *Hazards and Hazardous Materials*, some of the roads in proximity to the proposed project areas are identified as emergency evacuation routes in the City's Local Hazard Mitigation Plan (City of Sacramento, 2021). This temporary increase in vehicular traffic associated with construction activities would temporarily increase traffic on designated evacuation routes which may result in inadequate emergency access.

The City of Sacramento Municipal Code requires the preparation of a Traffic Control Plan if work being performed could obstruct vehicle or pedestrian traffic on City streets (Sacramento Municipal Code Section 12.20.020 and 12.20.030). However, while compliance with the City Municipal Code would help minimize potential short-term interference during construction activities, the interference of existing emergency access could still occur. The impact would be **significant**.

Mitigation Measures

Mitigation Measure 3.17-1 (ALL): Implement Mitigation Measure 3.11-1.

Significance After Mitigation: Mitigation Measure 3.17-1 would ensure that a Traffic Control Plan would be developed, approved and provided to emergency response agencies prior to any road closures during construction to reduce potential interference with local emergency response plans, and to ensure adequate access for emergency responders. Implementation of this mitigation measure would reduce this impact to **less-than-significant with mitigation**.

Impact 3.17-6: Operation and maintenance of the proposed project could result in inadequate emergency access.

All Project Components

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and the new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). It is anticipated that these new full-time employees would come from the existing labor pool. In addition, there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions). Long-term O&M activities for all other project components would be completed under existing maintenance programs and no additional full-time employees or truck trips are anticipated.

While additional truck trips would be associated with O&M of the proposed project, the number of trips would be minimal compared to existing conditions and would not be anticipated to affect access to and from the water treatment plants and other project components or interfere with identified emergency evacuation routes in the City. Therefore, additional traffic associated with O&M of the proposed project would not result in inadequate emergency access. The impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

3.18 Tribal Cultural Resources

3.18.1 Introduction

This section identifies and evaluates potential impacts to tribal cultural resources (TCRs) in the context of the proposed project and alternatives. It includes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment.

Comments addressing TCRs were received in response to the NOP. The City received scoping comments from the Native American Heritage Commission (NAHC) that recommended, pursuant to Public Resources Code Section 21080.3 (AB 52), that the City conduct consultations with Tribes that are culturally affiliated with the proposed project areas. The NAHC also recommended that the City conduct a cultural resources records search of the California Historical Resources Information System (CHRIS) and that an archaeological inventory survey report be prepared along with a search of the NAHC's Sacred Lands File (SLF). See Appendix A for NOP comment letters.

3.18.2 Environmental Setting

Section 3.7, *Cultural Resources*, provides a comprehensive overview of the cultural setting including an archaeological, ethnographic, and historic overview of the proposed project areas. Section 3.7 also provides a review of the background research completed for the proposed project. This section focuses on contemporary tribal communities and TCRs as they pertain to AB 52.

This section analyzes and evaluates the potential impacts of the project on TCRs, both identified and undiscovered. TCRs, as defined by AB 52, Statutes of 2014, in PRC Section 21074, are sites, features, places, cultural landscapes, sacred places and objects, with cultural value to a Tribe. A tribal cultural landscape is defined as a geographic area (including both cultural and natural resources and the wildlife therein), associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

The unanticipated find of Native American human remains would also be considered a TCR and is therefore analyzed in this section.

The proposed project area is situated within the lands traditionally occupied by the Valley Nisenan, or Southern Maidu. Many descendants of Valley Nisenan throughout the larger Sacramento region belong to the United Auburn Indian Community (UAIC), Shingle Springs Band of Miwok Indians, Ione Band of Miwok Indians, Colfax-Todds Valley Consolidated Tribe, and Wilton Rancheria Tribes. The Tribes actively participate in the identification, evaluation, preservation, and restoration of TCRs.

Native American Communication

ESA contacted the NAHC on July 5, 2022, to request a search of their SLF and a list of Native American Tribes in the vicinity who may have an interest in the proposed project. On August 9, 2022, the NAHC responded that the search was positive for sacred sites. The NAHC also provided contact information for 14 tribal representatives from eight Tribes for additional information.

Under PRC Section 21080.3.1 and 21082.3, the City must consult with Tribes traditionally and culturally affiliated with the project area that have requested formal notification and responded with a request for consultation. The parties must consult in good faith. Consultation is deemed concluded when the parties agree to measures to mitigate or avoid a significant effect on a TCR when one is present or when a party concludes that mutual agreement cannot be reached. Mitigation measures agreed on during the consultation process must be recommended for inclusion in the environmental document.

In accordance with the requirements of PRC Section 21080.3, City staff conducted Native American outreach and consultation efforts. On April 1, 2022, the City sent tribal outreach letters to Native American representatives on the City's AB 52 consultation list of tribes that have previously requested to receive notification. This list consists of Wilton Rancheria, Shingle Springs Band of Miwok, Buena Vista Rancheria, and UAIC. UAIC responded on April 29, 2022, that the project area is sensitive for TCRs and requested consultation. Wilton Rancheria responded that they had no comments on the proposed project. No other Tribe responded to the outreach notification in accordance with PRC 21080.3.1.

Potential Tribal Cultural Resources Identified

Per Tremaine (Tremaine, 2018), the Sacramento River Tribal Cultural Landscape (TCL) was recorded to encompass the Sacramento River and much of the surrounding landscape, from Knights Landing to where the river meets Suisun Bay and San Joaquin River near Antioch. This TCL resource is called *Hoyo Sayo/Tah Sayo* by the Nisenan (as per UAIC) and *Waka-ce/Waka-Ly* by the Plains Miwok (as per Wilton Rancheria). Tremaine (Tremaine, 2018) recommended the Sacramento River TCL as eligible for the National Register and California Register, and a culturally significant natural landscape for its association with the cultural practices and beliefs of the Nisenan and Plains Miwok peoples. This TCL resource, while recorded on a Department of Parks and Recreation (DPR) 523 form set, is a TCR and not a cultural resource. The Sacramento River TCL includes developed and undeveloped areas. The proposed project is not anticipated to impact the Sacramento River TCL because implementation of the proposed project would not change the existing setting and the only new development that would occur in currently undeveloped areas is the construction of the new water intake structure and associated facilities (pump station and a raw water conveyance pipeline), which represents a change to a very small portion of the overall TCL.

Based on the results of consultation with the UAIC, the proposed project areas were identified as including a couple of areas that are potentially sensitive for TCRs as well as located in Sacred Lands.

3.18.3 Regulatory Setting

Federal

There are no federal laws or regulations specifically related to TCRs. Section 106 of the National Historic Preservation Act considers historic properties, which also include traditional cultural properties.[1] Section 3.7.3, *Cultural Resources, Regulatory Setting* provides a summary of Section 106 of the National Historic Preservation Act.

State

Public Resources Code Sections 21074, 21080, 21083 (Assembly Bill 52)

In September 2014, the California Legislature enacted AB 52, which added provisions to the PRC regarding the evaluation of impacts on TCRs under CEQA, and consultation requirements with California Native American Tribes. AB 52 requires lead agencies to analyze project impacts on TCRs (PRC Sections 21074 and 21083.09). The law defines tribal cultural resources in PRC Section 21074. AB 52 also requires lead agencies to engage in additional consultation procedures with respect to California Native American Tribes (PRC Sections 21080.3.1, 21080.3.2, and 21082.3).

PRC Section 21084.3 addresses mitigation for TCR impacts as follows:

a) Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.

b) If the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process provided in Section 21080.3.2, the following are examples of mitigation measures that, if feasible, may be considered to avoid or minimize the significant adverse impacts:

    1. Avoidance and preservation of the resources in place, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    2. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        - Protecting the cultural character and integrity of the resource.
        - Protecting the traditional use of the resource.
        - Protecting the confidentiality of the resource.
    3. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    4. Protecting the resource.

[1] A Traditional Cultural Property is a property that is eligible for inclusion in the National Register of Historic Places based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community.

Native American Heritage Commission

The NAHC identifies and manages a catalog of places of special religious or social significance to Native Americans. This database, known as the SLF, is a compilation of information on known graves and cemeteries of Native Americans on private lands and other places of cultural or religious significance to the Native American community. The NAHC also performs other duties regarding the preservation and accessibility of sacred sites and burials and the disposition of Native American human remains and burial items.

PRC Sections 5097.9 through 5097.991 describe the duties and role of the NAHC and requires the cooperation of State and local agencies in carrying out their duties with respect to Native American resources.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies applicable to the evaluation of TCR effects of the proposed project are provided in **Table 3.18-1**.

TABLE 3.18-1
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – TRIBAL CULTURAL RESOURCES

Element	Goals and Policies
Historic and Cultural Resources	Goal HCR-2.1: Policies HCR-1.1, 1.6, 1.13, 1.14, 1.15, 1.16, 1.17

SOURCE: City of Sacramento, 2024

3.18.4 Impacts and Mitigation Measures

Method of the Analysis

To evaluate the proposed project's potential impacts on significant TCRs, a Native American outreach effort was completed by the City of Sacramento. The purpose of this effort was to identify any TCRs that may be present within the proposed project areas and to determine if these resources would be significantly impacted by the proposed project.

Impacts on TCRs that are also archaeological resources could result from project-related ground-disturbing activities, including demolition, excavation, grading, trenching, vegetation clearance, the operation of heavy equipment, or other surface and sub-surface disturbance that could damage or destroy surficial or architectural resources, buried archaeological resources, including pre-contact and historic materials or human burials.

See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Cause a substantial adverse change in the significance of a TCR, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:
  - Listed or eligible for listing in the California Register, or in a local register of historical resources as defined in PRC Section 502.1(k); or
  - A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set for in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American Tribe.

Impacts and Mitigation Measures

Table 3.18-2 summarizes the impact conclusions presented in this section.

TABLE 3.18-2
SUMMARY OF IMPACT CONCLUSIONS – TRIBAL CULTURAL RESOURCES

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.18-1: Implementation of the proposed project may cause a substantial adverse change to tribal cultural resources	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM

LSM: Less than Significant with Mitigation

Impact 3.18-1: Implementation of the proposed project may cause a substantial adverse change to tribal cultural resources, as defined in Public Resources Code Section 20174.

All Project Components

The results of the records search indicate that no pre-contact archaeological resources have been documented within the FWTP or SRWTP project areas.

In accordance with the requirements of PRC Section 21080.3, City staff conducted Native American outreach and consultation efforts. UAIC responded on April 29, 2022, that the project area is sensitive for TCRs and requested consultation. Based on the results of consultation with the UAIC, the proposed project areas were identified as including a couple of areas that are potentially sensitive for tribal cultural resources as well as located in Sacred Lands.

While no known TCRs listed or determined eligible for listing in the California Register or included in a local register of historical resources as defined in PRC Section 5020.1(k), pursuant to PRC Section 21074 (a)(1) were identified in the proposed project areas, the potential to impact sensitive TCRs and Sacred Lands does exist.

In addition, if any previously unrecorded TCRs or resources of cultural significance to Native American Tribes were identified during ground-disturbing construction activities and were found to qualify as a tribal cultural resource pursuant to PRC Section 21074(a)(1) (determined to be eligible for listing in the California Register or in a local register of historical resources), any impacts of the proposed project on the resource could be potentially significant.

As described above in subsection 3.18.2, *Environmental Setting,* and in Section 3.7, Cultural Resources, subsection 3.7.4, *Cultural Resources Identified within the Proposed Project Areas*, the alignment of the potable water transmission pipelines are not finalized. As such, the potable water transmissions component of the proposed project may include indigenous or pre-contact cultural resources that are listed in or eligible for listing in the National Register, and/or the California Register, and resources that have not been evaluated for the National Register or California Register but are potentially eligible. Additionally, there may be previously unknown buried TCRs or resources of cultural significance to Native American Tribes that have not been recorded.

Construction of the proposed project could involve ground-disturbing activities that would damage or destroy TCRs. Therefore, the project is considered to have a **potentially significant** impact on tribal cultural resources.

Mitigation Measures

Mitigation Measures 3.18-1(a) (ALL): Prior to Ground-Disturbing Activities, the City shall require the contractor to provide a tribal cultural resources sensitivity and awareness training program (Worker Environmental Awareness Program [WEAP]) conducted by a qualified archaeologist or representative from a culturally affiliated tribe for all personnel involved in project construction, including field consultants and construction workers in conjunction with Mitigation Measure 3.7-2(b). The WEAP will be developed in coordination with the culturally affiliated Tribe. The WEAP shall be conducted before any project-related construction activities begin at the project site. The WEAP will include relevant information regarding sensitive tribal cultural resources, including applicable regulations, protocols for avoidance, and consequences of violating State laws and regulations.

The WEAP will also describe appropriate avoidance and impact minimization measures for tribal cultural resources that could be located at the project site and will outline what to do and who to contact if any potential tribal cultural resources are encountered. The WEAP will emphasize the requirement for confidentiality and culturally appropriate treatment of any discovery of significance to Native Americans and will discuss appropriate behaviors and responsive actions, consistent with Native American tribal values.

Mitigation Measure 3.18-1(b) (ALL): If any suspected TCRs or resources of cultural significance to Native American Tribes, including but not limited to features, anthropogenic/cultural soils, cultural belongings or objects (artifacts), shell, bone, shaped stones or bone, or ash/charcoal deposits are discovered by any person during construction activities including ground disturbing activities, all work shall pause immediately within 100 feet of the find, or an agreed upon distance based on the project area and nature of the find. Work shall cease in and within the immediate vicinity of the find regardless of whether the construction is being actively monitored by a qualified Tribal Monitor, cultural resources specialist, or professional archaeologist.

A representative from the culturally affiliated Tribe and the proposed project's City representative shall be immediately notified, and the representative from the culturally affiliated Tribe in coordination with the City's representative shall determine if the find is a TCR (PRC Section 21074) and the representative from the culturally affiliated Tribe shall make recommendations for further evaluation and treatment as necessary.

i. Further evaluation and treatment of an identified TCR may include but is not limited to:

   a. identification of the boundaries of the new TCR;

   b. recordation of the resource;

   c. if feasible, appropriate preservation in place and avoidance measures, including redesign or adjustments to the existing construction process, and long-term management; or

   d. if avoidance is infeasible, a reburial location in proximity of the find where no future disturbance is anticipated. Permanent curation of TCRs shall not take place unless approved in writing by the culturally affiliated Tribe.

ii. The construction contractor(s) shall provide secure, on-site storage for culturally sensitive soils or objects that are components of TCRs that are found or recovered during construction. Only representatives from the culturally affiliated Tribe shall have access to the storage. Storage size shall be determined by the nature of the TCR and can range from a small lock box to a conex box (shipping container). A secure (locked), fenced area can also provide adequate on-site storage if larger amounts of material must be stored.

iii. The construction contractor(s) and the City, in consultation with the culturally affiliated Tribe shall facilitate the respectful reburial of the culturally sensitive soils or objects. This includes providing a reburial location that is consistent with the culturally affiliated Tribe's preferences, excavation of the reburial location, and assisting with the reburial, upon request.

iv. Any discoveries shall be documented on a Department of Parks and Recreation (DPR) 523 form within 2 weeks of the discovery and submitted to the appropriate CHRIS center in a timely manner.

v. Work at the TCR discovery location shall not resume until authorization is granted by the City in coordination with the culturally affiliated Tribe.

vi. If articulated or disarticulated human remains, or human remains in any state of decomposition or skeletal completeness are discovered during construction activities, the City of Sacramento Coroner and the culturally affiliated Tribe shall be contacted immediately. Upon determination by the City of Sacramento County Coroner that the find is Native American in origin, the Native American Heritage Commission will assign the Most Likely Descendent who will work with the City to define appropriate treatment and disposition of the burials.

Mitigation Measure 3.18-1(c) (ALL): The following measures shall be implemented to assist with identification of TCRs at the earliest possible time during proposed project construction-related activities that involve ground disturbance:

i. The City of Sacramento, or the designated construction project manager, shall reach out to and retain the services of a qualified Tribal Monitor(s)in a reasonable amount of time prior to initiating any proposed project construction-related ground disturbing activities. The schedule of construction-related ground disturbing activities shall be made available to the identified qualified Tribal Monitor so that the monitoring schedule can be coordinated.

ii. Prior to initiating monitoring activities, the qualified Tribal Monitor(s) shall participate in all required on-site safety training and shall comply with all required safety measures, including wearing required safety gear while on the construction site.

iii. A qualified Tribal Monitor(s) shall monitor project construction-related ground disturbing activities including vegetation grubbing, stripping, grading, trenching, and other ground disturbing activities in the project area. All project construction related ground disturbing activities, including rebuild or previously disturbed, shall be subject to Tribal Monitoring unless otherwise determined unnecessary by the qualified Tribal Monitor.

iv. The qualified Tribal Monitor(s) in coordination with the City of Sacramento and the designated contracted construction project manager r shall have the authority to direct that work be temporarily paused, diverted, or slowed within 100 feet of the immediate impact area if sites, cultural soils, or objects of potential significance are identified. The temporary pause/diversion shall be of an adequate duration for the culturally affiliated Tribal representative to be notified and to examine the resource and determine the appropriate treatment of the identified TCR consistent with the measures included in Mitigation Measure 3.18-1(b).

Significance After Mitigation: Implementation of Mitigation Measures 3.18-1(a) through (c) would reduce the potential impact to TCRs to a less-than-significant level because prior to any ground disturbing activities, construction personnel would be provided TCR sensitivity and awareness training that would include what to do in the event that a potential TCR is encountered. In addition, the mitigation measures include the process for pausing work so that the potential TCR could be examined and a determination made, in consultation with the culturally affiliated Tribal representative, as to the appropriate further evaluation and/or treatment of the TCR. The measures also include engaging a qualified Tribal Monitor(s) to monitor construction-related earth disturbing activities to assist in the identification of potential TCRs. With implementation of these mitigation measures, any potential impacts to tribal cultural resources would be reduced to **less-than-significant with mitigation**.

3.19 Utilities and Service Systems

3.19.1 Introduction

This section of the Draft EIR addresses the potential impacts of the proposed project on utilities and service systems, including those associated with water supply, wastewater treatment and stormwater drainage, electric power and natural gas, telecommunications, and solid waste service systems. Impacts associated with the consumption of energy are addressed in Section 3.8, *Energy*. Impacts associated with water supply are addressed in Section 3.12, *Hydrology, Water Quality, and Water Supply*.

No comments specifically addressing the utilities and service systems listed above were received in response to the NOP. See Appendix A for NOP comment letters.

3.19.2 Environmental Setting

Water Supply

As described in Chapter 2, *Project Description,* the City owns and operates water treatment and distribution facilities that provide drinking water to nearly half a million customers in a 100-square-mile service area. These facilities include two surface water treatment plants, approximately 1,800 miles of distribution pipelines, and 30 permitted groundwater wells (City of Sacramento, 2021). The City's two surface water treatment plants, the FWTP and the SRWTP, currently have a combined maximum surface water supply and treatment capacity of 260 MGD[1] (City of Sacramento, 2021). The FWTP treats surface water diverted from the American River, and the SRWTP treats surface water diverted from the Sacramento River drawn through the existing Sacramento River Intake.

Refer to Section 3.12, *Hydrology, Water Quality, and Water Supply*, for additional description of surface and groundwater supply.

Wastewater and Storm Drainage Systems

Wastewater

The City collects fees for 54 sewer basins (53 separated basins and one combined sewer basin) that serve the community plan areas of North Sacramento, portions of Arden-Arcade, most of South Sacramento (e.g., Pocket, Airport, Meadowview, South Land Park), and most of East Sacramento. Thirteen separated basins flow directly into the City's downtown area's Combined Sewer System (CSS), a system in which both sanitary sewage and storm drainage are collected and conveyed in the same system of pipelines, before being conveyed to the Sacramento Regional Wastewater Treatment Plant (Sacramento Regional WWTP) for treatment.

[1] Currently, the SRWTP has a diversion and treatment capacity of 160 MGD. The FWTP is capable of operating at a treatment capacity 100 MGD for short periods of time but currently has a reliable capacity of 80 MGD due to the condition of certain plant facilities.

The other 40 separated basins flow into the Sacramento Area Sewer District (SacSewer) interceptors, which also convey flows to the Sacramento Regional WWTP via individually pumped basins (32 pumped basins) or by gravity flow (8 gravity basins).

Wastewater treatment in the City is provided by SacSewer. The Sacramento Regional WWTP is located approximately 5 miles south of the City in Elk Grove and is owned and operated by Sacramento Regional County Sanitation District (Regional San), now part of SacSewer.[2] The Sacramento Regional WWTP has a total capacity of 400 MGD. Currently, the WWTP receives an average of 165 MGD during dry weather conditions and 220 MGD during wet weather conditions (City of Sacramento, 2023). SacSewer operates all regional interceptors and wastewater treatment plants serving the City except for the CSS facilities discussed above, which are operated by the City. Local and trunk wastewater collection is provided by SacSewer and the City.

Storm Drainage

The City's storm drainage system and facilities consist of: streets, curbs, gutters, and storm drain inlets that collect and convey rainfall runoff to storm drains; storm drains (or underground pipes), creeks, drainage ditches, and channels that convey the runoff; detention basins that are excavated to store stormwater runoff; and pump stations that lift water from the storm drains and detention basins through or over the levees and into the City's creeks and the Sacramento and American rivers. The City is divided into 134 watersheds based on factors such as hydrology, drainage, and soil. These watersheds either drain by gravity into the creeks and rivers (with or without a pump station) or are pumped into the creeks and rivers. There are additional watersheds within Sacramento County that flow into these facilities, as well as state-owned storm drain systems that operate within the City's service area (e.g., at the California State University, Sacramento Campus).

FWTP and SRWTP Project Areas

Both the SRWTP and the FWTP are supported by dedicated onsite storm drainage collection systems, including pump stations, retention facilities, and storm drainage pipelines, which tie directly into the City's existing system. At the SRWTP, the storm drainage system ties into the existing storm drain line from the plant boundary to the Sacramento River. At the FWTP, the storm drainage system ties into the City's system in College Town Drive.

The sewage needs of the SRWTP are served and maintained by the City's CSS while the FWTP is served by SacSewer (SacSewer, 2021). At SRWTP, sewage is pumped to a gravity sewer line in Bercut Drive, or to an on-site booster pump that pumps plant wastewater to a dedicated force main, and then to a gravity main on Sequioa Pacific Boulevard. At the FWTP, sewage goes to a distribution gravity sewer system that supports mostly typical site sewage, or to a primary sewer transmission main, which supports only plant wastewater that is unable to go to the separated storm drainage system.

[2] Regional San and SacSewer legally merged into one district resulting in a consolidated sewer utility called the Sacramento Area Sewer District, effective January 1, 2024 (SacSewer, 2023).

Electricity, Natural Gas, and Telecommunications Service Systems

Electricity and Natural Gas

SMUD is responsible for the generation, transmission, and distribution of electrical power to its 900-square-mile service area, which includes the City. In 2022, SMUD obtained its electricity from the following sources: large hydroelectric (25.4 percent) and natural gas (45.6 percent). Around 3.6 percent of SMUD's energy resources are from "unspecified sources of power," which means it was obtained through transactions, and the specific generation source is not traceable. Approximately 23.7 percent of SMUD's energy portfolio is from eligible renewable resources, including biomass and waste (1.6 percent), geothermal (3.8 percent), eligible hydroelectric (0.8 percent), solar (2.8 percent), and wind (14.7 percent) (SMUD, 2022).

PG&E provides natural gas procurement and storage to the City, but neither SRWTP nor FWTP use natural gas.

Telecommunications

Telecommunication service in the City is provided by a variety of service providers including AT&T, Central Valley Broadband LLC, Comcast, and Consolidated Communications.

FWTP and SRWTP Project Areas

SMUD services electrical demands within the FWTP and SRWTP project areas. AT&T is the primary service provider at the SRWTP and the FWTP; additional services are provided through Comcast, CCI, and Astound broadband.

Solid Waste Collection and Disposal

The City collects all single-family residential solid waste for customers within the City of Sacramento. Refuse from the south region of the City is transported to the Sacramento Recycling and Transfer Station (SRTS) at 8491 Fruitridge Road; refuse collected in the north region is transported to the Sacramento County North Area Recovery Station. Refuse is then hauled from both locations to the Sacramento County Kiefer Landfill.

Commercial and multifamily residential solid waste collection and recycling is administered by the Sacramento Regional Solid Waste Authority and collection is provided by 15 different private franchised haulers. As presented in **Table 3.19-1**, commercial solid waste is disposed of at various facilities including Sacramento County Kiefer Landfill; Yolo County Landfill; Sacramento County North Area Recovery Station; Waste Management Recycling America, LLC; Florin Perkins Public Disposal Site T/P; South Area Transfer Station; Sierra Waste Recycling and Transfer Station; Elder Creek Transfer Station; and L and D Landfill. General contractors and industrial solid waste generators often haul solid waste directly to disposal facilities. In addition to collecting municipal refuse every week, the City collects garden refuse (green waste) on a weekly basis, expanded recently to include residential organic waste, and curbside recycling every other week.

TABLE 3.19-1
LOCAL ACTIVE LANDFILLS

Landfill	Location	Site Information
Sacramento County Kiefer Landfill	12701 Kiefer Blvd	Kiefer Landfill accepts municipal waste and industrial waste. It has a remaining capacity of 112,900,000 cubic yards as of 9/12/2005 and a ceased operation date of 1/1/2064.
Yolo County Landfill	County Road 28h & County Road 104	It has a remaining capacity of 33,544,909 cubic yards as of 6/1/2021 and a ceased operation date of 2/21/2124.
Sacramento County North Area Recovery Station	4450 Roseville Road	The North Area Recovery Station is permitted to accept household waste from the public, businesses, and private waste haulers. This facility also accepts some recyclable materials and some hard-to-handle materials.
Waste Management Recycle America, LLC	3562 Ramona Avenue	This site has both a Green Material Composting Facility and a Large Volume CDI Debris Processing Facility. There is no capacity information for the large debris processing facility, however the composting facility can accept 1,000 tons per day of compost waste.
Florin Perkins Public Disposal Site T/P	4201 Florin Perkins Road	This site has a capacity of 1,000 tons per day and can accept wood waste, tires, mixed municipal waste, industrial waste, green materials, construction/demolition waste, and asphalt shingles.
South Area Transfer Station	8550 Fruitridge Road	The South Area Transfer Station accepts tires, mixed municipal waste, and green materials of up to 348 tons per day.
Sierra Waste Recycling & Transfer Station	8260 Berry Avenue	The Sierra Waste Recycling & Transfer Station accepts wood waste, green materials, and construction/demolition waste of up to 1,000 tons per day.
Sacramento Recycling & Transfer Station	8491 Fruitridge Road	The Sacramento Recycling & Transfer Station accepts up to 2,500 tons per day of mixed municipal waste.
Elder Creek Transfer and Recovery	8642 Elder Creek Road	The Elder Creek Transfer and Recovery site accepts up to 2,500 tons per day of mixed municipal waste, green materials, wood waste, construction/demolition waste, and agricultural waste.
L and D Landfill	8635 Fruitridge Road	The L and D Landfill has two facilities: the Large Volume Transfer/ Processing Facility (4,125 tons per day) and a Solid Waste Landfill. The Solid Waste Landfill has a maximum permitted capacity of 20,500,000 cubic yards and accepts 4,125 tons per day. The remaining capacity of the facility as of July 2020 is 3,115,900 cubic yards.

SOURCES: CalRecycle, 2024; County of Sacramento, 2024

FWTP and SRWTP Project Areas

Solid waste and recyclable materials generated in the FWTP and SRWTP project areas are collected by USA Waste of California. Non-hazardous waste generated at the treatment plants, such as sludge and drying bed waste, is sent to Yolo County Central Landfill. Hazardous waste, including chemicals with pH levels outside of standard disposal ranges, used oil, and/or metal chips, is collected by a contracted hauler and sent to Clean Earth, a hazardous waste service center. This type of waste consists mainly of other metal waste such as steel, aluminum, and stainless steel from facility machine shops is hauled to Sims Metals for recycling. Chain and flights, fiberglass, and other larger maintenance materials are hauled by SRWTP and FWTP staff to L&D Landfill.

3.19.3 Regulatory Setting

Federal

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the U.S. Originally passed by Congress in 1974, this federal law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources. The SDWA authorizes the U.S. EPA to establish minimum standards to protect tap water and requires all owners or operators of public water systems to comply with these primary (health-related) standards. State governments, which can be approved to implement these rules for EPA, also encourage attainment of secondary standards (nuisance-related).

National Combined Sewer Overflow Control Policy

The U.S. EPA initiated its Combined Sewer Overflow (CSO) Control Policy (40 Code of Federal Regulations [CFR] 122) in April 1994. The CSO Control Policy provides a national level framework for the control and management of CSOs. The CSO Control Policy provides guidance regarding how to achieve Clean Water Act goals and requirements when faced with management of a CSO. Key components of the CSO Control Policy that are relevant to the proposed project include a requirement for Nine Minimum Controls, which apply to every CSS in the nation. The Nine Minimum Controls are minimum technology-based actions or measures that are designed to reduce CSOs and their effects on receiving water quality. The intent of the Nine Minimum Controls is to be implementable without extensive engineering studies or major construction. The policy requires that at least 85 percent of average annual CSS storm flow must be captured and routed to at least primary treatment with disinfection prior to discharge.

Resource Conservation and Recovery Act

Subtitle D of the Resource Conservation and Recovery Act (United States Code title 42, Section 6901 et seq.) contains regulations for municipal solid waste landfills and requires states to implement their own permitting programs incorporating the federal landfill criteria. The federal regulations address the location, operation, design, groundwater monitoring, and closure of landfills. The U.S. EPA's waste management regulations are listed in volume 40, parts 239–282 of the Code of Federal Regulations. Resource Conservation and Recovery Act subtitle D is implemented by title 27 of the Public Resources Code, approved by the U.S. EPA.

State

California Safe Drinking Water Act

The California SDWA provides for the operation of public water systems and imposes on the State Water Board various duties and responsibilities for the regulation and control of drinking water in California consistent with the federal SDWA.

The State Water Board's Division of Drinking Water regulates public water systems, oversees water recycling projects, permits water treatment devices, supports and promotes water system security, and performs a number of other functions. The Division of Drinking Water consists of three branches: The Northern California Field Operations Branch, the Southern California Field Operations Branch, and the Program Management Branch. The Northern California and Southern California field operations branches are responsible for enforcing the federal and California Safe Drinking Water Acts and conducting regulatory oversight of public water systems in California. In this undertaking, staff members perform field inspections, issue operating permits, review plans and specifications for new facilities, take enforcement actions for noncompliance with laws and regulations, review water quality monitoring results, and support and promote water system security. The Field Operations Branches also participate in funding infrastructure improvements, conducting source water assessments, overseeing water recycling projects, and supporting public water systems in drought preparation and water conservation.

Integrated Waste Management Act (Assembly Bill 939)

The regulations affecting solid waste disposal in California can be found in Title 14 of the California Public Resources Code, the Integrated Waste Management Act. Originally enacted in 1989 through AB 939, the law is designed to increase the life of landfills by requiring diversion of solid waste from landfills in the state and conservation of other resources through increased recycling programs and incentives.

AB 939 requires counties to prepare integrated waste management plans to implement landfill diversion goals and requires cities and counties to prepare and adopt source reduction and recycling elements. These elements must establish a program for managing solid waste generated within the City or county's jurisdiction. Each source reduction and recycling element must include, but is not limited to, all of the following components for solid waste generated within the plan's jurisdictional area:

- Waste characterization
- Source reduction
- Recycling
- Composting
- Solid waste facility capacity
- Education and public information
- Funding
- Special waste

Source reduction and recycling element programs are designed to achieve landfill diversion goals by encouraging recycling in the manufacture, purchase, and use of recycled products. AB 939 also requires California cities to implement plans designed to divert the total solid waste generated within each jurisdiction by 50 percent, based on a base year of 2000. The diversion rate is adjusted annually for population and economic growth when calculating the percentage achieved in a particular jurisdiction.

Public Resources Code Section 41780

The California Legislature set a policy goal that not less than 75 percent of solid waste generated in the state would be source reduced, recycled, or composted beginning by January 1, 2020. A 50 percent diversion rate is enforced for local jurisdictions.

Assembly Bill 1220

The California Department of Resources Recycling and Recovery (CalRecycle) and the State Water Board completed parallel rulemaking as a result of AB 1220 (chapter 656, Statutes of 1993). AB 1220 required clarification of the roles and responsibilities of CalRecycle and the State Water Board, the regional water boards, and CalRecycle's local enforcement agencies in regulating solid waste disposal sites. The approved regulations in California Code of Regulations Title 27 combine the prior disposal site/landfill regulations of CalRecycle and the State Water Board, which were maintained in CCR Title 14 and Title 23, Chapter 15 (which contains requirements for disposal of hazardous waste).

The purpose of CalRecycle's regulatory standards is to protect public health and safety and the environment. The regulations apply to active and inactive disposal sites, including facilities or equipment used there. These standards clarify that the local enforcement agency has primary responsibility for enforcing the state's minimum standards, working in cooperation with the regional water board or other oversight agencies.

The CCR Title 27 regulations also include the following operating criteria and requirements for landfills and disposal sites:

- Sufficient materials to cover waste to prevent a threat to human health and the environment.
- Proper handling of waste and the equipment needs of solid waste facilities.
- Control of activities on-site.
- Control of landfill gas is made from the decomposition of wastes on-site.
- Proper operation of the site to protect the site from fire threats.

Assembly Bill 341

To reduce greenhouse gas emissions from disposal of recyclables in landfills, AB 341 requires local jurisdictions to implement commercial solid waste recycling programs. Businesses that generate 4 cubic yards or more of solid waste per week or multifamily dwellings of five units or more must arrange for recycling services. To comply with AB 341, jurisdictions' commercial recycling programs must include education, outreach, and monitoring of commercial waste generators and must report on the process to CalRecycle. Jurisdictions may enact commercial recycling ordinances to outline how the goals of AB 341 will be reached.

To comply with AB 341, businesses must arrange for collection of recyclables by self-hauling, subscribing to a franchised hauler for collection, or subscribing to a recycling service that may include mixed waste processing that yields diversion results comparable to source separation (CalRecycle, 2024).

Assembly Bill 1826

To further reduce greenhouse gas emissions from disposal of organic materials in landfills, AB 1826 required certain businesses to recycle their organic waste beginning on April 1, 2016, with required recycling services dependent on the amount of solid waste generated per week. Similar to AB 341, jurisdictions must implement an organic waste recycling program that includes education, outreach, and monitoring of businesses that must comply. *Organic waste* refers to food waste, green waste, landscaping and pruning waste, nonhazardous wood waste, and food-soiled paper that is mixed with food waste.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies applicable to the evaluation of utilities and service systems effects of the proposed project are provided in **Table 3.19-2**.

TABLE 3.19-2
APPLICABLE ADOPTED GENERAL PLAN GOALS AND POLICIES – UTILITIES AND SERVICE SYSTEMS

Element	Goals and Policies
Environmental Resources and Constraints	Goal ERC-5: Policies ERC-5.1, 5.2, 5.3, 5.4, 5.7
Public Facilities and Safety	Goal PFS-3: Policies PFS-3.1, 3.2, 3.3, 3.4, 3.5, 3.10, 3.12, 3.13, 3.15, 3.16, 3.17; Goal PFS-4: Policies PFS-4.1, 4.2, 4.3; Goal PFS-5: Policies PFS-5.1, 5.5; Goal PFS-6: Policies PFS-6.3, 6.8

SOURCE: City of Sacramento, 2024

Combined System Development Fee

Sacramento Combined Sewer Development Fee

In order to support ongoing maintenance and upgrade efforts within the combined sewer system area, the City has adopted the Combined Sewer Development Fee. This fee is designed to be an impact mitigation fee that requires mitigation of any significant increase in wastewater flows over the baseline/present level. To the extent that a proposed development project or other project could have a significant impact on the combined sewer system, the City requires an acceptable mitigation plan. The mitigation plan generally requires payment of fees in order to mitigate that project's impact to the sewer system. Alternatively, a developer may mitigate impacts on the combined sewer system by getting City approval on a Mitigation Plan. Such a plan would be required to include on-site storage, retention, sewer main up-sizing, stormwater BMPs, diversion of flows, rerouting of pipelines, replacement of pipelines, connection to separated areas, or other upgrades as warranted.

Facility Impact Fee

In addition to the City's Combined Sewer Development Fee, SacSewer levies a fee for planning, designing, construction, and other costs related to wastewater conveyance, treatment, and disposal using SacSewer facilities. Fee amounts are determined in coordination with SacSewer, the project applicant, and Sacramento County.

Sacramento Municipal Code

Chapter 17.616 of the City of Sacramento Municipal Code outlines the recycling and solid waste disposal regulations. These regulations are necessary to lengthen the lifespan of landfills, encourage recycling, and meet State mandated goals for waste reduction and recycling. These policies provide guidelines regarding the location, size, and design features of recycling and trash enclosures in a manner by which adequate, convenient space for the collection, storage, and loading of recyclable and solid waste material is provided. In addition, developers are required to submit a "statement of recycling information" to the City's solid waste manager. The requirement for this statement includes: a site plan which includes design specifications, plans for demolition and construction, and any details of proposed education/public relations programs.

3.19.4 Impacts and Mitigation Measures

Method of the Analysis

To evaluate whether implementation of the proposed project would result in utilities and service system impacts, the analysis considers how construction (short-term, temporary) and O&M (long-term, permanent) activities associated with implementation of the proposed project would result in changes to existing water supply, wastewater treatment and stormwater drainage, electric power and natural gas, telecommunications, and solid waste service systems. The data used in this section includes inventories of utility and service system infrastructure and online resources, such as the City of Sacramento and CalRecycle websites. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.
- Have sufficient water supplies available to serve the project and reasonably foreseeable future developments during normal, dry and multiple dry years.
- Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
- Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.
- Comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Impacts and Mitigation Measures

Table 3.19-3 summarizes the impact conclusions presented in this section.

TABLE 3.19-3
SUMMARY OF IMPACT CONCLUSIONS – UTILITIES AND SERVICE SYSTEMS

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.19-1: Implementation of the proposed project could require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.19-2: Implementation of the proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future developments during normal, dry and multiple dry years.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.19-3: Implementation of the proposed project would result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.19-4: Implementation of the proposed project could generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant

Impact 3.19-1: Implementation of the proposed project could require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.

All Project Components

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. Potential environmental effects associated with the relocation, replacement, or installation of new utilities infrastructure that are part of the proposed project are evaluated in the other technical resource sections of this EIR, in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, as appropriate. The potential for construction and operations of the proposed project to require or result in the relocation or construction of new or expanded facilities, beyond those proposed by the project, are addressed in the following subsections.

Construction

Construction activities associated with the proposed project would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs.

As described in Chapter 2, *Project Description*, daily average construction workers on site could range from 10 to 45 workers, with daily maximum construction workers on site ranging from 15 to 63 workers (see Table 2-5). Portable restrooms would be brought on site at the treatment plants and along all storm drainage, electrical, and conveyance pipeline alignments for construction worker use and would therefore not increase service demand on the sewer system. Construction workers would have access to existing potable water infrastructure at the treatment plants, and water would be trucked in along other construction alignments. As needed, during construction, dust control measures would include the use of water trucks to spray down exposed dirt piles and trenches. For all project components, power would be provided for construction by on-site portable generators (i.e., diesel, gasoline). During construction, stormwater runoff from existing impervious surfaces would be routed to the existing stormwater drainage system. On-site retention structures would be installed to ensure any additional stormwater flows that are created due to new impervious surfaces are retained on site.

Utilities (i.e., electrical, water, sewer, and storm drainage) may be relocated to accommodate construction of the raw water conveyance pipeline and/or the proposed potable water transmission pipelines. Should an existing utility require removal and/or relocation, temporary services would be in place from a few days to a few weeks to ensure minimal disruption to customers.[3] Once construction is completed, utilities would be returned to their original location or be installed in a new location.

Construction activities for all project components would be short-term and temporary and would be accommodated by existing infrastructure or by temporary or portable infrastructure (such as generators and portable restrooms) and would not result in the need for new or expanded infrastructure. Therefore, construction of the proposed project would not require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, natural gas, or telecommunications facilities. While construction of the proposed project does involve upgrades to existing electrical service lines, construction activities associated with the proposed project would not require or result in the relocation of new or expanded electric power facilities.

Operation and Maintenance

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and the new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). It is anticipated that these new full-time employees would come from

[3] Service at the relocated utility would only be disrupted during the tie-in and removal (approximately 4 to 16 hours).

the existing labor pool. Existing SRWTP employees who perform daily inspections and maintenance at the existing water intake would also inspect and maintain the new water intake, pump stations, and conveyance pipelines. Long-term O&M activities for all other project components would be completed under existing maintenance programs. Therefore, the project would not cause an increase in the local population or demand for new development such that new or expanded utilities infrastructure related to water, wastewater treatment, electric power, natural gas, or telecommunications would be required.

Once constructed, additional impervious areas associated with the proposed project components could increase stormwater runoff. Stormwater runoff from existing and new impervious surfaces would be routed to the existing stormwater drainage system. Electricity usage at both the FWTP and SRWTP would increase primarily due to the new treatment processes (e.g., additional ozone generation and pumping). At project buildout, the power usage at each facility would be approximately double the current usage. At FWTP, this demand would be serviced through the upgraded electrical service proposed by the project and be met by a new on-site substation installed by SMUD (evaluated in this EIR). At SRWTP, this demand would also be serviced through upgraded electrical service proposed by the project and met by the Station J substation installed by SMUD (evaluated in the Station J EIR; SMUD, 2024).

Therefore, because O&M is not anticipated to result in a substantial increase in demand for water, wastewater treatment or stormwater drainage, electrical power, natural gas, or telecommunications, demand for these utilities would be accommodated by existing and/or new infrastructure and would not require or result in the need for new or expanded facilities (beyond those proposed by the project).

Impact Conclusion

As summarized above, the proposed project involves relocation and construction of new and expanded water treatment facilities (e.g., treatment plant improvements at FWTP and SRWTP), stormwater drainage facilities (e.g., existing utility upgrades of storm drainage at both treatment plants), and electric power facilities (e.g., existing utility upgrades at both treatment plants). Potential environmental effects associated with the relocation, replacement, or installation of new utilities infrastructure that are part of the proposed project are evaluated in the other technical resource sections in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, as appropriate. However, implementation of the proposed project would not require or result in the relocation or construction of new or expanded facilities for water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications (beyond those proposed by the project) to meet increased demands associated with construction and operation of the project. Impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.19-2: Implementation of the proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future developments during normal, dry and multiple dry years.

All Project Components

The general objective of the proposed project is to provide a reliable, resilient, and safe water supply for the City of Sacramento while meeting the City's projected potable water demand through 2050. Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. The proposed project would not involve the construction of any residential or employment opportunity uses which would result in a long-term population increase or use that would require water supplies beyond current supplies.

Construction

As summarized in Impact 3.19-1, construction activities associated with the proposed project would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs. Earth-disturbing activities that could produce dust (e.g., excavation, trenching, grading, etc.) would be minimized through dust control measures and would include the use of water trucks to spray down exposed dirt piles and trenches.

As described in Chapter 2, *Project Description*, daily average construction workers on site could range from 10 to 45 workers, with daily maximum construction workers on site ranging from 15 to 63 workers (see Table 2-5). Workers would be made available from the existing local population and would travel an average of approximately 30 miles per day (round trip) in the Sacramento region to their respective construction site. While it is possible that some construction workers might temporarily relocate from other areas, it is anticipated that any increase in water demand would be nominal compared to existing conditions and would be met by existing supplies. Therefore, increases in water demand associated with construction of the proposed project would be temporary and would be anticipated to be met by existing supplies.

Operation and Maintenance

Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and the new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). It is anticipated that these new full-time employees would come from the existing labor pool. Existing SRWTP employees who perform daily inspections and maintenance at the existing water intake would also inspect and maintain the new water intake, pump stations, and conveyance pipelines. Long-term O&M activities for all other project components would be completed under existing maintenance programs. Increases in water demand associated with O&M of the proposed project would be nominal compared to existing conditions and would be anticipated to be met by existing supplies.

Impact Conclusion

In summary, the temporary increase in demand during construction of the proposed project and the nominal increase in demand for O&M activities would be anticipated to be met by existing water supplies. The proposed project is being developed to maintain sufficient water supplies to support the City's planned growth and demand for water but would not induce such growth or demand. For discussion of how the proposed project would support planned population growth within the City's urban limits in accordance with the City's 2040 General Plan, and how the environmental effects of such growth, including water supply, were evaluated in the Master EIR for the 2040 General Plan, please refer to Chapter 5, *Other CEQA Considerations*.

Therefore, implementation of the proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future developments during normal, dry and multiple dry years. Impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.19-3: Implementation of the proposed project would result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

All Project Components

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area.

Construction

As presented in Impact 3.19-1, daily average construction workers on site could range from 10 to 45 workers, with daily maximum construction workers on site ranging from 15 to 63 workers (see Table 2-5). Portable restrooms would be brought on site for construction worker use at the treatment plants and all other construction alignments.

Operation and Maintenance

Once improvements are completed O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and the new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP). It is anticipated that these new full-time employees would come from the existing labor pool. Long-term O&M activities for all other project components would be completed under existing maintenance programs. The additional full-time employees would create only a nominal increase in demand for wastewater services.

Currently, the most significant sewer discharge from SRWTP is the dewatering centrifuges, with a maximum discharge volume of 280,000 gallons per day. The proposed dewatering work at SRWTP would result in an additional 1.1 MGD discharge rate to the existing sewer system. Additional wastewater would be treated at the Sacramento Regional WWTP which has a total capacity of 400 MGD and currently receives an average of 165 MGD. Because the Sacramento Regional WWTP has treatment capacity, there would be capacity to serve the minimal increase in wastewater associated with O&M of the proposed project.

Impact Conclusion

Implementation of the proposed project would result in a determination by the wastewater treatment provider (Sacramento Regional WWTP) that there is adequate capacity to serve the project's projected demand in addition to the provider's existing commitments. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.19-4: Implementation of the proposed project could generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.

All Project Components

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area.

Construction

Construction activities associated with the proposed project would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs. These activities would generate solid waste, including excavated and demolition materials, soil, and vegetation.

Solid waste would be managed consistent with the requirements of AB 939 and the City's municipal code. All generated material or debris would be hauled off site and disposed of at a suitable landfill.

As shown in Table 3.19-1, there are numerous landfills that have the capacity to accept waste associated with construction. The Yolo County Central Landfill, the primary landfill for waste generated by the City's treatment plants, has a future operation life of approximately 100 years with an expected closure date of 2124. Capacity within the Yolo County Central Landfill would be sufficient to meet proposed project non-hazardous waste disposal needs. Any hazardous waste would be disposed of at Clean Earth, a hazardous waste facility, and metal waste such as steel, aluminum, and stainless steel would be hauled to Sims Metals for recycling. Remaining waste would require disposal at a permitted site. Therefore, solid waste generated as a result of project construction would not be anticipated to be in excess of the landfill capacity.

Operation and Maintenance

Once construction is completed, O&M activities for the various project components at both the FWTP and SRWTP project areas would generally remain the same as existing conditions. The types of waste generated would be consistent with existing conditions, but there could be additional solid waste generated with the operation of new facilities (e.g., sludge and drying bed waste generated at the treatment plants). Solid waste would be disposed of at the appropriate site(s), consistent with existing conditions, and would not be anticipated to affect the capacity of the local landfill (i.e., Yolo County Central Landfill).

Impact Conclusion

Implementation of the proposed project would not exceed landfill capacity or violate any applicable solid waste statutes or regulations. Therefore, this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

3.20 Wildfire

3.20.1 Introduction

This section of the Draft EIR addresses existing wildfire conditions within the proposed project areas and evaluates the potential for the proposed project to exacerbate wildfire risk.

No comments specifically addressing wildfire were received in response to the NOP. See Appendix A for NOP comment letters.

3.20.2 Environmental Setting

Fire Hazard Severity Zones

CAL FIRE is responsible for managing and protecting California's natural resources and has been charged with classifying the severity of fire hazard in areas of California. The Fire Hazard Severity Zones (FHSZ) Maps assign a hazard score based on the factors that influence fire likelihood and fire behavior, including fire history, existing and potential fuel (natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area (CAL FIRE, 2023). FHSZs are categorized as Moderate, High, and Very High, which are defined as:

- **Moderate**: Wildland areas supporting areas of typically low fire frequency and relatively modest fire behavior or developed/urbanized areas with a very high density of non-burnable surfaces including roadways, irrigated lawn/parks, and low total vegetation cover (less than 30 percent) that is highly fragmented and low in flammability (e.g., irrigated, manicured, managed vegetation).
- **High**: Wildland areas that support medium- to high-hazard fire behavior and roughly average burn probabilities or developed/urban areas, typically with moderate vegetation cover and more limited non-burnable cover. Vegetation cover typically ranges from 30 to 50 percent and is only partially fragmented.
- **Very High:** Wildland areas that support high to extreme fire behavior or developed/urban areas with high vegetation density (greater than 70 percent cover) and associated high fuel continuity. Actions taken within Very High FHSZs are subject to additional restrictions and requirements by the State and local governments.

In 2022, CAL FIRE released updated FHSZ Maps for both State Responsibility Areas and Local Responsibility Areas. State Responsibility Areas are the official boundaries where the State of California (through CAL FIRE) has the primary legal and financial responsibility for the prevention and suppression of wildland fires. CAL FIRE provides a basic level of wildland fire prevention and protection services for these designated areas. Local Responsibility Areas include incorporated cities and densely populated areas. Fire protection in these areas is typically provided by city fire departments, fire protection districts, and counties, and by CAL FIRE under contract to local governments (CAL FIRE, 2023).

Within the County of Sacramento, there are Moderate, High and Very High FHSZs in the State Responsibility Areas. These areas are in the eastern part of the County, along the foothills of the Sierra Nevada, bordering El Dorado and Amador Counties. The proposed project areas are located in Local Responsibility Areas. Therefore, fire protection responsibility lies with the Sacramento Fire Department (City of Sacramento, 2023).

Existing Wildfire Risk

Wildfire risk is predominately associated with wildland urban interface areas, defined qualitatively as a place where humans and their development meet or intermix with wildland fuel (County of Sacramento, 2023). Areas within 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, along Garden Highway in the Natomas area, and along the Sacramento River from where Highway 80 crosses the Sacramento River to the confluence with the American River. A wildland fire that originates along the American or Sacramento rivers could spread into nearby neighborhoods (City of Sacramento, 2023).

The SRWTP project area, including the location of the existing and new Sacramento River water intake, is not classified as being in a fire threat area. The FWTP project area is near the American River Parkway which, as described above, is fairly susceptible to urban wildfire. However, there are multiple policies designed to mitigate and manage fire risk. For example, the Sacramento County American River Parkway Plan includes the limitation of campfires and stoves to permitted areas, the implementation of fire breaks, and vegetation management (County of Sacramento, 2008).

Fire Protection Services

The Sacramento Fire Department provides fire protection services within the City, including the proposed project areas. The closest fire departments to the SRWTP are Fire Stations 14, 2, and 1. The closest fire departments to the FWTP are Fire Stations 8 and 60. The County of Sacramento's Metro Fire maintains and operates an air operations program to increase accessibility to areas at risk of wildfire where vehicular City and County Fire Department equipment is limited in accessibility.

Refer to Section 3.15, *Public Services,* for additional description of fire protection services.

Emergency Planning and Response

The City, in conjunction with Sacramento County and other incorporated communities, has a variety of systems, plans, and procedures established to protect its residents from hazards, including wildfires. The City's Emergency Operations Plan provides guidance for those with emergency management responsibilities within the City, including actions taken by the Sacramento Fire Department to fight urban, rural, and wildland fires (City of Sacramento, 2018). The Sacramento County Multi-Jurisdictional Local Hazard Mitigation Plan includes measures to address potential hazards, including mitigation measures and other policies that can be implemented to reduce the impacts of wildfire (County of Sacramento, 2021).

Sacramento County's Office of Emergency Services provides evacuation zone maps for all cities and unincorporated areas in Sacramento County (County of Sacramento, 2023); the proposed project areas are located in Evacuation Zone 4 (SM4), but there are no evacuation routes or instructions linked to these zones. While there are no emergency or evacuation routes available specific to wildfire response, the City of Sacramento provides clearly defined emergency evacuation routes in the vicinity of the project areas based on hypothetical levee breaks for a 200-year flood event, though exact roadways used as evacuation routes would depend on the flood scenario, area of inundation, and other factors (City of Sacramento, 2024a). These evacuation routes include La Riveria Drive, Howe Avenue, and Watt Avenue in the vicinity of the FWTP, as well as North B Street and Richards Boulevard in the vicinity of the SRWTP.

3.20.3 Regulatory Setting

This section describes federal, state and local wildfire regulations as they pertain to the proposed project.

Federal

There are no federal regulations regarding wildfire that pertain to the proposed project.

State

Emergency Services Act

Under the Emergency Services Act, Government Code Section 8550, et seq., the State of California developed an emergency response plan to coordinate emergency services provided by federal, state, and local agencies. Rapid response to incidents involving wildfire and other natural and/or human-caused incidents is an important part of the plan, which is administered by the Governor's Office of Emergency Services. The office coordinates the responses of other agencies, including the California Environmental Protection Agency, the California Highway Patrol, regional water quality control boards, air quality management districts, and county disaster response offices.

California Fire Code

The California Fire Code (Fire Code) (CCR Title 24, Part 9) includes provisions and standards for emergency planning and preparedness, fire service features, fire protection systems, hazardous materials, fire flow requirements, fire hydrant locations and distribution, and the clearance of debris and vegetation within a prescribed distance from occupied structures in wildfire hazard areas. Fire Code Chapter 49, Requirements for Wildland-Urban Interface Fire Areas, prescribes construction materials and methods in fire hazard severity zones; requirements generally parallel California Building Code Chapter 7A. The Fire Code is updated on a 3-year cycle; the current 2016 Fire Code took effect in January 2017; the 2019 Fire Code took effect in 2020.

California Occupational Safety and Health Administration

In accordance with 8 CCR Section 1270, Fire Prevention, and 8 CCR Section 6773, Fire Protection and Fire Equipment, the Cal/OSHA has established minimum standards for fire suppression and emergency medical services. Among the standards are guidelines for the handling of highly combustible materials; requirements for the sizing of fire hoses; restrictions on the use of compressed air; access roads; and testing, maintenance, and use of all firefighting and emergency medical equipment.

California Health and Safety Code

State fire regulations are set forth in Section 13000 et seq. of the California Health and Safety Code. The code includes regulations for building standards (as established in the California Building Code), fire protection and notification systems, fire protection devices such as extinguishers, smoke alarms, and fire suppression training.

California Public Utilities Commission

Senate Bill 1028

Senate Bill 1028 (2016) requires each electrical corporation to construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire posed by those electrical lines and equipment, and makes a violation of these provisions by an electrical corporation a crime under state law. The bill also requires each electrical corporation to annually prepare a wildfire mitigation plan and submit it to the California Public Utilities Commission (CPUC) for review. The plan must include a statement of objectives, a description of preventive strategies and programs that are focused on minimizing risk associated with electric facilities, and a description of the metrics that the electric corporation uses to evaluate the overall wildfire mitigation plan performance and assumptions that underlie the use of the metrics.

Senate Bill 901

Senate Bill 901 expanded upon the wildfire mitigation plan requirements of Senate Bill 1028 and included several provisions related to wildfire risk and management in California including increasing the maximum penalties that can be issued by the CPUC to a public utility that fails to comply with the commission’s requirements. Additionally, the legislation added to the requirements for utilities’ wildfire mitigation plans, which must now include: consideration of dynamic climate change risks; protocols for disabling reclosers and de-energizing portions of the electrical distribution system that consider the associated impacts on public safety; protocols related to mitigating the public safety impacts of those disabling and de-energizing protocols, including impacts on critical first responders and on health and communication infrastructure; and particular risks and risk drivers associated with topographic and climatological risk factors throughout the different parts of the electrical corporation’s service territory. These wildfire mitigation plans are required to be reviewed by an independent evaluator.

Local

City of Sacramento General Plan

The City of Sacramento 2040 General Plan was adopted February 27, 2024. General Plan goals and policies applicable to the evaluation of the proposed project’s effects on wildfire risk are provided in **Table 3.20-1**.

TABLE 3.20-1
APPLICABLE 2040 GENERAL PLAN GOALS AND POLICIES – WILDFIRE

Element	Goals and Policies
Public Facilities and Safety	Goal PFS-1: Policies PFS-1.6, 1.7, 1.8; Goal PFS-2: Policies PFS-2.1, 2.3

SOURCES: City of Sacramento, 2024b

Weed and Rubbish Abatement Ordinance

The City's Weed and Rubbish Abatement Ordinance (Title 8, Health and Safety, Chapter 8.28 Weed and Rubbish Abatement) aims to reduce wildfire potential in the City with mitigation of excess weeds and rubbish. 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.

Sacramento Municipal Utility District Wildfire Mitigation Plan

Per SB 901 (described above), SMUD prepared a wildfire mitigation plan that describes how electrical lines and equipment are constructed, maintained, and operated in a manner that minimizes the risk of wildfire. The primary objectives of SMUD's 2023–2025 Wildfire Mitigation Plan (SMUD, 2023) are to:

1. Minimize the probability that SMUD's transmission and distribution system may be the origin or contributing source for the ignition of a wildfire;
2. Implement a wildfire mitigation plan that embraces safety, prevention, mitigation, and recovery as central priority for SMUD; and
3. Create a wildlife mitigation plan that is consistent with state law and objectives.

3.20.4 Impacts and Mitigation Measures

Method of the Analysis

Wildfire impacts from the proposed project were evaluated in terms of how construction and operation could affect the risk of wildfire. Existing wildfire conditions within the proposed project areas were identified through desktop review of CAL FIRE FHSZ Maps, the County of Sacramento's Multi-Jurisdictional Local Hazard Mitigation Plan, the City's Local Hazard Mitigation Plan, locations of any established evacuation routes, and various existing laws, regulations, and policies related to wildfire and fire prevention. See Section 3.1, *Approach to the Analysis* for further discussion of the approach to the analysis used for evaluating impacts of the proposed project.

Thresholds of Significance

In accordance with Appendix G of the CEQA Guidelines, an impact is considered significant if the proposed project would:

- Substantially impair an adopted emergency response plan or emergency evacuation plan.
- Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.
- Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.
- Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

Impacts and Mitigation Measures

Table 3.20-2 summarizes the impact conclusions presented in this section.

TABLE 3.20-2
SUMMARY OF IMPACT CONCLUSIONS – WILDFIRE

Impact Statement	Treatment Plant Improvements	Existing Utility Upgrades	Sacramento River Water Intakes	Potable Water Transmission Pipelines
3.20-1: Construction of the proposed project could potentially impair an adopted emergency response plan or emergency evacuation plan.	LSM (FWTP/ SRWTP)	LSM (FWTP/ SRWTP)	LSM (Existing/ New)	LSM
3.20-2: Operation and maintenance of the proposed project could potentially impair an adopted emergency response plan or emergency evacuation plan.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.20-3: Implementation of the proposed project could due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby exposure people or structures to pollutant concentrations from a wildfire or uncontrolled spread of a wildfire.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.20-4: Implementation of the proposed project would require the installation of utilities that may exacerbate fire risk or result in temporary impacts to the environment.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS
3.20-5: Implementation of the proposed project could expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.	LS (FWTP/ SRWTP)	LS (FWTP/ SRWTP)	LS (Existing/ New)	LS

LS: Less than Significant
LSM: Less than Significant with Mitigation

Impact 3.20-1: Construction of the proposed project could potentially impair an adopted emergency response plan or emergency evacuation plan.

All Project Components

Implementation of the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. During construction of the proposed project components, a maximum number of approximately 105 construction workers may be needed if there is overlap between work within the SRWTP property and the Sacramento River water intakes (Table 2-5 in Chapter 2, *Project Description*). It is anticipated that a maximum of approximately 72 daily round-trip construction truck trips would be required during this phase (Table 2-6), where construction vehicles would access the proposed project areas using existing access roads (i.e., paved and/or previously disturbed) for materials delivery, waste disposal, and vendors delivering water and other equipment. Construction of the conveyance pipelines from the Sacramento River water intakes to I-5 would also require temporary traffic diversions in the area of SMUD's Museum of Science and Curiosity and Jibboom Street.

Some of the roads in the proposed project areas are identified by the City as emergency evacuation routes (see Section 3.20.2, *Environmental Setting, Emergency Planning and Response*). Construction of the project would require traffic diversions, as well as an increase in truck trips for movement of materials, equipment, and waste removal within the project areas, as well as construction worker commute trips. The diversion of traffic and temporary increase in construction vehicle traffic going in and out of the project area could temporarily increase traffic on potential evacuation routes (although, as stated previously, evacuation routes used in an emergency would depend on the type of emergency, flood scenario, and other factors. Any increase in traffic could potentially impair a potential evacuation route, and therefore this impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.20-1 (ALL): Implement Mitigation Measure 3.11-1.

Significance After Mitigation: Implementation of Mitigation Measure 3.11-1 (see Section 3.11, *Hazards and Hazardous Materials*) would ensure that a Traffic Control Plan would be developed, approved and provided to emergency response agencies prior to any road closures during construction to reduce potential interference with local emergency response plans, and to ensure adequate access for emergency responders. Implementation of this mitigation measure would reduce this impact to **less than significant with mitigation**.

Impact 3.20-2: Operation and maintenance of the proposed project could potentially impair an adopted emergency response plan or emergency evacuation plan.

All Project Components

O&M activities would generally be similar to existing O&M activities. However, additional maintenance activities and the operation of new equipment at the water treatment plants and new intake would result in additional full-time employees (2 at FWTP and 10 at SRWTP), and there would be additional truck trips for chemical delivery to each treatment plant (one per day to one per week depending on plant operating conditions). Long-term O&M activities for all other project components would be completed under existing maintenance programs and no additional full-time employees or truck trips are anticipated. The additional truck trips would not be anticipated to affect identified emergency evacuation routes in the City. Therefore, no additional traffic associated with O&M activities would be anticipated such that it would impair an adopted emergency response plan or emergency evacuation plan and this impact would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.20-3: Implementation of the proposed project could, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose people or structures to pollutant concentrations from a wildfire or uncontrolled spread of a wildfire.

All Project Components

Construction activities would mostly occur in existing footprints of previously disturbed areas. Construction activities associated with the proposed project components would involve the use of vehicles and equipment that could ignite dry vegetation and result in a fire. Welding or grading activities also could result in an ignition that could expose people to pollutant concentrations (e.g., smoke).

O&M activities for the various project components at both the FWTP and SRWTP project areas would generally remain the same as existing conditions. A minimal number of new employees and additional truck trips may be required for certain components of the proposed project, but long-term O&M activities would mainly be completed under existing maintenance programs and would not introduce new maintenance activities or protocols with the potential to exacerbate wildfire risk.

As described in Section 3.20.2, *Environmental Setting*, the proposed project areas are primarily urbanized, and wildfire risk is low. When developing the FHSZ Maps, CAL FIRE considers localized factors such as fuel loading, slope, fire weather, and other relevant considerations, including areas where winds have been identified as a major cause of wildfire spread. Because CAL FIRE has accounted for slope, prevailing winds, and other factors that exacerbate wildfire risks and has determined that there are no Very High FHSZs within the City, it can be concluded that these conditions are not an issue. Additionally, given the relatively flat, urban, developed characteristics of the proposed project areas, an uncontrolled spread of wildfire would not be anticipated.

Therefore, construction and operation of the proposed project would not expose people or structures to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Compliance with the California Fire Code, California Building Code, and General Plan policies (e.g., Fire Hazards, Hazard Mitigation Planning), and ordinances (e.g., Weed and Rubbish Abatement Ordinance), would further reduce the extent to which the proposed project could increase fire risk. Impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.20-4: Implementation of the proposed project could require the installation or maintenance of associated infrastructure that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.

All Project Components

Several of the proposed project components involve the installation or maintenance of infrastructure that could enhance fire risk. At the FWTP and SRWTP this includes construction of electrical buildings with electrical generators, distribution equipment, and process lines. Some buried utilities (i.e., electrical, water, sewer and storm drainage) may be relocated on-site due to conflicts with new structures or for constructability needs for the improvements, as well as for installation of the transmission pipelines. SMUD would also replace overhead electrical service lines along the north side of North B Street from the SRWTP to North 7th Street in previously disturbed areas. Other project components, including the drainage improvements near the FWTP and new water intake would not require such infrastructure. No roads, fuel breaks or emergency water sources, or additional power lines are anticipated as part of the proposed project.

As described in Section 3.20.2, *Environmental Setting*, the proposed project areas are urbanized/ developed, and wildfire risk is low. Therefore, even though installation and maintenance of associated infrastructure that could pose a potential risk for ignition risk associated with fuel usage or equipment/facility failure, it would not exacerbate fire risk or result in temporary or ongoing impacts to the environment. Compliance with the California Fire Code, California Building Code, and General Plan policies (e.g., PFS-1.8: Fire Hazards and PFS-2.1: Hazard Mitigation Planning), and ordinances (e.g., Weed and Rubbish Abatement Ordinance), would further reduce the extent to which the proposed project could increase fire risk. Additionally, implementation of SMUD's Wildfire Mitigation Plan would minimize potential impacts associated with the existing utility upgrades (e.g., proposed overhead electrical service lines at both treatment plants).

O&M activities for the various project components at both the FWTP and SRWTP project areas would generally remain the same as existing conditions. A minimal number of new employees and additional truck trips may be required for certain components of the proposed project, but long-term O&M activities would mainly be completed under existing maintenance programs and would not require installation of new infrastructure that would exacerbate wildfire risk as compared to existing conditions. For these reasons, impacts associated with the construction and operation of the proposed project would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

Impact 3.20-5: Implementation of the proposed project could expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

All Project Components

Construction of the proposed project components would require a workforce (e.g., construction workers) and structures (e.g., improved facilities, pipelines, electrical service lines, etc.).

Construction activities would mostly occur in existing footprints of previously disturbed areas. As described in Chapter 2, *Project Description*, O&M of the proposed project components would generally remain the same as existing conditions.

As discussed in Section 3.9, *Geology, Soils, Paleontological Resources, and Mineral Resources,* the proposed project areas are situated on a level/flat floodplain. These areas are urbanized with very low landslide potential given there are no steep slopes or hillsides. Additionally, based on geologic mapping, no landslides are mapped in this area. As discussed in Section 3.12, *Hydrology and Water Quality*, construction and operation of the proposed project components would not substantially alter the existing drainage pattern of the site or area compared to existing conditions; runoff would be routed to the existing stormwater drainage system.

As described in subsection 3.20.2, *Environmental Setting*, the proposed project areas are primarily urbanized, and wildfire risk is low. The Sacramento County Multi-Jurisdictional Local Hazard Mitigation Plan recognizes the American River Parkway as a wildfire hazard area (City of Sacramento 2023). Portions of this areas run alongside the American River Parkway on parcels near the FWTP. The SRWTP, new water intake, and transmission pipeline project areas are not classified as being in a fire threat area. Because CAL FIRE has determined that there are no Very High FHSZs within the City, this suggests that there are no (or few) areas of post-fire slope instability.

O&M activities for the various project components at both the FWTP and SRWTP project areas would generally remain the same as existing conditions. A minimal number of new employees and additional truck trips may be required for certain components of the proposed project, but long-term O&M activities would mainly be completed under existing maintenance programs. The operation of the project would not introduce new maintenance activities or protocols with the potential to exacerbate wildfire risk nor exacerbate the risk of downstream flooding or landslides resulting from wildfires.

Given that the proposed project areas are relatively level/flat, there are no landslides having known to occur, the existing drainage patterns would not be altered, and wildfire risk is low, construction and operation of the proposed project would not expose people or structures to significant risks as a result of runoff, post-fire slope instability, or drainage changes. Compliance with the California Fire Code, California Building Code, and general plan policies (e.g., Fire Hazards, Hazard Mitigation Planning), and ordinances (e.g., Weed and Rubbish Abatement Ordinance), would further reduce the extent to which the proposed project could increase fire risk. Impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures (ALL): None required.

CHAPTER 4
Cumulative Impacts

4.1 Introduction

This chapter describes the CEQA requirements for the analysis of cumulative impacts, the geographic scope and time frame for cumulative analysis, the existing-conditions context for past activities, related projects, and the potential cumulative impacts of the proposed project. As discussed in Chapter 2, *Project Description*, the general objective of the proposed project is to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand. Implementation of the proposed project includes facility and treatment process improvements at both the FWTP and the SRWTP; upgrades to existing utilities that serve the FWTP and SRWTP (i.e., storm drainage systems and electrical service line connections); construction of a new Sacramento River water intake, pump station and conveyance pipeline; improvements to the existing Sacramento River water intake and associated facilities; and improvement of the potable water transmission system in vicinity of the SRWTP.

CEQA requires that an EIR assess the cumulative environmental impacts of a project when the project's incremental effect is "cumulatively considerable." An EIR must assess the cumulative impacts of a project with respect to past, current, and probable future projects in the region. Section 15355 of the CEQA Guidelines defines "cumulative effects" as "two or more individual effects that, when considered together, are considerable or which compound or increase other environmental impacts." According to CEQA Guidelines Section 15130(b), the purpose of the cumulative impacts discussion is to reflect "the severity of the impacts and their likelihood of occurrence," and the discussion shall "be guided by the standards of practicality and reasonableness."

The CEQA Guidelines further indicate that the discussion of cumulative impacts should include all of the following information:

- Either (a) a list of past, present, and probable future projects producing related cumulative impacts or (b) a summary of projections in an adopted general plan or similar document, or an adopted or certified environmental document, that described or evaluated conditions contributing to a cumulative impact.
- A discussion of the geographic scope of the area affected by the cumulative effect.
- A summary of the environmental effects expected to be produced by these projects.
- Reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

4.2 Cumulative Context and Approach

4.2.1 Geographic Scope

The cumulative context considers both the geographical scope, and the timing of other projects related to the proposed project. The geographic scope of analysis varies depending on the type of environmental issue being considered, but in general the geographic scope is defined by the proposed project areas described in Section 2.3, Project Areas, of Chapter 2, *Project Description* and as shown in Figures 2-2 and 2-3. In addition, when the proposed project's impacts are considered in combination with those other past, present, and reasonably foreseeable future projects presented in subsection 4.4 to identify cumulative impacts, the other projects considered also may vary, depending on the type of environmental effects being assessed. Some impacts would be site specific or localized so that they would not combine with the impacts of other projects and therefore, would not be cumulative.

4.2.2 Criteria for Identifying Related Projects in the Study Area

Projects were considered for inclusion in the cumulative impact analysis based on whether they could affect resources in the project areas that implementation of the proposed project could also affect. A list of such past, present, and reasonably foreseeable future projects was developed based on the following criteria:

(1) The project would affect a portion of the physical environment that could also be affected by implementation of the proposed project.

(2) Sufficiently detailed information about the project is available to allow meaningful analysis without undue speculation.

(3) The project meets all of the following criteria:

- The project is actively under development (i.e., an identified sponsor is actively pursuing project development or construction).
- An NOP or a notice of intent has been released and/or environmental clearance documentation has been completed, or substantial progress has been made toward completion.
- The project is "reasonably foreseeable" given other considerations, such as site suitability, funding availability and economic viability, and regulatory limitations (e.g., the project has required regulatory permits).

(4) The project is not considered part of the proposed action.

This cumulative impact discussion considers projects and plans identified under existing conditions (which include the current effects of past projects) and reasonably foreseeable and probable future projects. The criterion used by this Draft EIR analysis for considering whether a project is reasonably foreseeable and probable is whether the project has been defined in adequate detail to assess potential impacts, through the completion of either publicly available preliminary evaluations, feasibility studies, or draft environmental and engineering documents. The availability of funding and regulatory permits are also considerations for whether a project is reasonably foreseeable. Projects that were only in the development phase without detailed descriptions, operations criteria, or general locations, or that were not funded or permitted at the time that this cumulative impact assessment was written, are considered speculative. Thus, those projects are not considered further in this evaluation.

4.3 Cumulative Projects

Table 4-1 summarizes the projects determined to meet the four criteria listed in subsection 4.2.2 for past, present, and reasonably foreseeable future projects and were selected for inclusion in the cumulative impact analysis.

TABLE 4-1
PROJECTS INCLUDED IN THE CUMULATIVE IMPACT ANALYSIS

Name	Type
RiverArc Project The RiverArc Project would divert water through existing modern intakes from the Sacramento River, convey to a new regional water treatment plant, and distribute potable water through a mix of new and existing pipelines to local water agencies. The RiverArc Project would increase the sustainability of regional groundwater supplies and provide additional environmental protection in the American River watershed.	Water Supply Reliability and Resiliency
El Dorado Water Reliability Project The El Dorado County Water Agency (Agency) proposes to implement the El Dorado Water Reliability Project to secure the reassignment of surface water rights (State Filed Applications 5644 and 5645) of up to 40,000 acre-feet per year (afy) from the upper American River and its tributaries. The surface water would be put to reasonable and beneficial use to help meet projected water demand associated with the anticipated land use capacity identified in the adopted 2004 El Dorado County General Plan, as amended for the West Slope area of El Dorado County. No new diversion, storage, treatment, or distribution facilities would be built or operated.	Water Supply Reliability and Resiliency
Delta Conveyance Project The Delta Conveyance Project proposes to modernize aging State Water Project (SWP) infrastructure in the Delta to restore and protect the reliability of SWP water deliveries consistent with the State's Water Resilience Portfolio. The Delta Conveyance Project will also allow DWR to address sea level rise and climate change, minimize water supply disruption due to seismic risk and provide operational flexibility to improve aquatic conditions in the Delta.	Water Supply Reliability and Resiliency
Sites Reservoir The Sites Reservoir Project proposes a new surface storage reservoir located in Colusa County in the Sacramento Valley west of the town of Maxwell. Sites would be an off-stream 1.5 million acre-feet reservoir that would impound Funks Creek and Stone Coral Creek and provide storage capacity for Sacramento River diversions. The project also includes exchanges with upstream reservoirs to preserve cold water releases for fishery benefits.	Water Supply Reliability and Resiliency
Interstate 5 / Richards Boulevard Interchange Project The Interstate 5 (I-5) / Richards Boulevard Interchange Project will address long-term solutions including improvements related to congestion and accommodations for future traffic volume as the area continues to grow.	Traffic
Sacramento Municipal Utility District Station J Substation Project The Sacramento Municipal Utility District (SMUD) is proposing to develop a new substation in Sacramento on a 10.3-acre site at 1220 North B Street in a developed area of downtown Sacramento. The project would consist of demolition of existing on-site structures and construction on new infrastructure to support up to five 40 MVA (megavolt amperes) 115/21kV transformers for a total of up to 200 MVA.	Electrical Utility

Name	Type
Kaiser Permanente Medical Center Kaiser Foundation Hospitals, a California nonprofit public benefit corporation is applying for land use entitlements for the development of a new, state-of-the-art approximately 1.3 million square foot Kaiser Permanente Medical Center campus in the City (south of the SRWTP). The Kaiser Permanente Medical Center would bring a comprehensive range of health care services to Kaiser Permanente members in the City and surrounding communities. It is estimated to be complete and operational by 2030.	Public Services
American River Common Features The American River Common Features (ARCF) 2016 Project is a cooperative effort between U.S. Army Corps of Engineers (USACE), Sacramento Area Flood Control Agency (SAFCA), and the Central Valley Flood Protection Board (Board). The levee system along the Sacramento River does not meet current federal standards for flood control. The ARCF 2016 Project proposes to construct a levee improvements consisting of an approximately 400-foot-long stability berm against the landside slope of the Sacramento River east levee in Sacramento, California to reinforce and reduce seepage through this section of the levee.	Flood Control
Agreements to Support Healthy Rivers and Landscapes Under the Agreements to Support Health Rivers and Landscapes, State, federal and local agencies are working to advance a transformational, watershed-wide approach to increase river flows, restore ecosystems and strengthen water supply reliability across the state. The agreements, if approved by the State Water Resources Control Board as an implementation pathway for an updated Bay-Delta Plan, would help meet requirements to protect beneficial uses in the Sacramento and San Joaquin watersheds.	Multi-benefit

SOURCES: Data compiled by Environmental Science Associates, 2024.

4.4 Approach to the Cumulative Impact Analysis

To determine the significance of the proposed project's cumulative impacts, a three-step process was followed:

- First, the extent of the cumulative impacts without the proposed project was evaluated to determine whether a significant cumulative impact on a resource would exist in the future. To do so, the combined effects of the past, present, and probable future projects listed in Table 4-1 were evaluated to determine whether there would be a significant cumulative impact.
- Second, a determination was made regarding whether the proposed project's incremental contribution to any significant cumulative impact would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past, current, and probable future projects (CEQA Guidelines Section 21083).
- Third, a determination was made as to whether mitigation measures would be required to reduce the proposed project's contribution to the cumulative impact to a less-than-considerable level, thus resulting in a less-than-significant cumulative impact. If not, then the cumulative impact would remain significant and unavoidable.

4.5 Cumulative Impact Analysis

The cumulative impact analysis is presented by resource and in the same order as the technical resource sections in Chapter 3, *Environmental Settings, Impacts, and Mitigation Measures*. All impacts of the proposed project discussed in this chapter are described in detail in Chapter 3, Sections 3.2 through 3.20. For each issue area addressed in this Draft EIR, the criteria applied to evaluate the significance of the overall cumulative effect are the same criteria used to evaluate direct and indirect impacts for that issue area.

4.5.1 Aesthetics

The proposed project areas lie within the City which is characterized by a downtown urban core surrounded by suburbs and agricultural land. The proposed project areas are visually characterized as: an urban industrial complex (i.e., FWTP and SRWTP); an urban street corridor flanked by low- and medium-rise industrial, residential, and commercial buildings, and associated landscaping and mature trees (i.e., FWTP drainage upgrades); and a combination of developed and undeveloped parcels within a predominantly commercial and industrial setting (e.g., surrounding the SRWTP property for the existing utility upgrades and potable water transmission pipelines). The SRWTP project area also includes the existing Sacramento River water intake and the site of the proposed new water intake, which is visually characterized by developed commercial businesses (e.g., hotels) and public recreational facilities adjacent to the confluence of the American and Sacramento rivers. Construction and operation of projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could result in a change to visual quality, affect scenic vistas and scenic resources, and introduce new sources of light and glare. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (operation and maintenance [O&M] of new structures). This could result in a cumulatively significant impact.

Construction of proposed project components could result in temporary, short-term loss of visual quality and cohesion within the project areas for sensitive viewers (e.g., recreationists and residents), but these transient and temporary effects would not result in permanent or substantial effects to the existing visual character or quality. Temporary construction lighting could be used during winter months and/or nighttime work for project construction activities and would be directed downward and shielded to ensure that no fugitive light spills out into adjacent areas. O&M of the proposed project would not include any new sources of light or glare above existing conditions.

The proposed project is required to obtain a site plan and design review permit as a condition of approval pursuant to the requirements set forth in Chapter 17.808 of the Planning and Development Code. The scope of site plan and design review extends to all aspects of the physical characteristics of development, including lighting and building materials that may cause glare impacts. In addition, the 2040 General Plan includes Policy LUP-8.10 (Responsiveness to Context), which requires appropriate building and site design that considers and reflects the existing character of neighborhoods and corridors.

With adherence to the required City regulations and policies, implementation of the proposed project would not result in permanent or substantial effects to the existing visual character or quality of the project areas or create a new source of substantial light or glare. Therefore, the proposed project's contribution to this potentially significant cumulative impact would not be considerable and this would be a **less-than-significant** cumulative impact.

4.5.2 Agriculture Resources

The City itself is mostly urbanized, with limited amounts of active commercial agricultural lands remaining that support large-scale operations. Neither project areas contain designated Important Farmland. Land uses in the project areas are not used for agricultural production and are zoned as Parks and Recreation, Public/Quasi-Public, and Residential Mixed Use in the adopted General Plan (City of Sacramento 2024).

Construction and operation of projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could result in the permanent conversion of agricultural lands (i.e., Important Farmland), including Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, to nonagricultural use, or cause conflicts with a Williamson Act contract. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Given the nature and location of proposed project components and the lack of Important Farmland or other agricultural resources within or nearby the project areas, the physical changes from construction and operational needs of the proposed project would not cause any direct or indirect impacts to, or conversion of, agricultural lands to non-agricultural use. Therefore, the proposed project's contribution to this potentially significant cumulative impact would not be considerable and this would be a **less-than-significant** cumulative impact.

4.5.3 Air Quality

The project areas are located within Sacramento County, California, in the Sacramento Valley Air Basin (SVAB), which is under the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD). Criteria air pollutants of concern in the SVAB include O_3, PM_{10}, and $PM_{2.5}$, as concentrations of these pollutants are above state and/or national ambient air quality standards. In developing thresholds of significance for air pollutants, air districts consider the emissions levels at which a project's individual emissions would be cumulatively considerable. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could result in emissions of criteria air pollutants currently designated nonattainment (e.g., O_3, PM_{10}, and $PM_{2.5}$ relative to the National Ambient Air Quality Standards and California Ambient Air Quality Standards), or other emissions that create odors that would exceed the identified significance thresholds and could result in significant adverse impacts on the region's existing air quality. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Construction of proposed project components would require site preparation, use of equipment, and other associated activities that would result in temporary emissions that are regulated by applicable air quality plans. Due to the temporary nature of the construction, low levels of emissions, and lack of sensitive receptors in the vicinity of the proposed project areas, health risk that would result from construction related diesel particulate matter emissions would be minimal. Construction of the proposed project would not result in odorous emissions that would adversely affect a substantial number of people. However, construction activities would be considered to generate emissions that conflict with or obstruct implementation of SMAQMD's air quality plans. Once improvements are completed, O&M activities would generally be similar to existing O&M activities. Emissions would primarily be generated from employee vehicle trips to and from the treatment plants for intermittent O&M activities. Because of the limited increase in activities associated with O&M and negligible increases in emissions, such activities would not be anticipated to result in a conflict with or obstruct implementation of an applicable air quality plan; result in a considerable increase of criteria pollutants that would exceed SMAQMD's thresholds for operational emissions, expose sensitive receptors to substantial pollutant concentrations and health risk impacts to sensitive receptors in the vicinity of proposed project components.

Implementation of Mitigation Measure 3.4-1(a) (TPI-SRWTP/EUU– SRWTP) would reduce SRWTP treatment plant improvements and existing utility upgrades construction emissions of NOx to be below SMAQMD thresholds for construction in 2027 and 2028. Implementation of Mitigation Measure 3.4-1(b) (ALL) would ensure compliance with the requirements of SMAQMD Rule 403 to reduce fugitive dust emissions. Therefore, implementing these mitigation measures would reduce the contribution of the proposed project to potentially significant cumulative impacts on air quality to less than cumulatively considerable, and this cumulative impact would be **less than significant**.

4.5.4 Biological Resources – Aquatic

The project areas are located within two different environments related to fish communities and habitat types: (1) the Lower American River; and (2) the Lower Sacramento River and Sacramento-San Joaquin Delta (Delta). Two special-status species have high potential to occur and seven special-status species have moderate potential to occur in the project areas. Six species have low or no potential to occur in the project areas. Five designated critical habitats are present in the project area and include the North American Green Sturgeon, Delta Smelt, Sacramento River winter-run Chinook Salmon, Central Valley spring-run Chinook Salmon, and the Central Valley Steelhead Critical Habitats. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American Rivers Common Features projects) would introduce new structures and development in the City, including the proposed project areas. Construction, operations, or maintenance in-water or adjacent to a waterway could result in impacts on listed fish species and their associated habitat or interfere with movement of native resident or migratory fish. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Construction and O&M associated with the treatment plant improvements at FWTP and SRWTP, existing utility upgrades at both treatment plants, and potable water transmission pipelines project components would not occur in-water. Therefore, there would be no direct or indirect impacts of construction activities to listed fish species or interference with movement of native resident or migratory fish. Additionally, O&M of these project components would not result in near-field direct or indirect impacts to listed fish species and their associated habitat or interfere with movement of native resident or migratory fish or result in far-field indirect impacts to listed fish species and their associated habitat.

With regards to the existing Sacramento River water intake project component, construction activities would not occur in-water but would be located near the Sacramento River. With adherence to the NPDES CGP, construction would not result in direct or indirect impacts to listed fish species or interfere with movement of native resident or migratory fish. Operation of the existing water intake would be consistent with existing conditions, and therefore, O&M of this project component would not result in near-field direct or indirect impacts to listed fish species and their associated habitat or interfere with movement of native resident or migratory fish, or result in far-field indirect impacts to listed fish species and their associated habitat.

Construction activities associated with the new water intake could result in modification to fish habitat in the Sacramento River in the vicinity of the intake, with potential indirect effects including physiological stress; disruption of spawning or foraging behavior; reduction of the availability or quality of spawning and foraging habitat; and potential exposure to predation when temporarily displaced from their preferred habitats. Operation of the new water intake would not result in near-field or far-field indirect impacts to listed fish species and their associated habitat. Therefore, construction of the new water intake could result in a considerable contribution to significant cumulative impacts on aquatic biological resources.

Implementation of Mitigation Measures 3.5-1 (SRWI-New), 3.5-2 (SRWI-New), 3.5-3 (SRWI-New), and 3.5-4 (SRWI-New) would ensure that construction associated with the new water intake avoids or mitigates for impacts to listed fish species and their associated habitat through implementation of a sound attenuation monitoring plan, incorporation of best practices for in-water construction, development of a fish salvage and relocation plan, and purchase of compensatory mitigation credits. Adherence to the CGP and in-water construction BMPs would further reduce potential impacts to listed fish species. Furthermore, while listed fish species are likely to avoid the work area due to increased sound and activity, implementing an in-water work window would further reduce potential impacts to the movement of native resident and migratory fish. Therefore, implementing these mitigation measures would reduce the contribution of the proposed project to potentially significant cumulative impacts on aquatic biological resources to less than cumulatively considerable, and this cumulative impact would be **less than significant**.

4.5.5 Biological Resources - Terrestrial

The project areas are located within the Sacramento Valley floristic province of the Great Central Valley (Baldwin et al. 2012). Historically, the region supported extensive marshes, riparian woodland intermixed with oak woodland, vernal pool complexes, and native grasslands. Intensive agricultural and urban development has resulted in substantial changes and conversions of these habitats. The remaining native vegetative communities exist now as isolated remnant patches within urban and agricultural landscapes. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could affect sensitive habitats and special-status species. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact on those terrestrial biological resources.

Activities associated with construction of proposed project components, including increased noise and vibrations, structure demolition, and vegetation removal, could result in direct mortality to nesting migratory birds or birds of prey, impact valley elderberry longhorn beetle, impact riparian habitat, result in net reduction of waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters, or conflict with local policies protecting trees. Once improvements are completed, O&M activities would generally be similar to existing O&M activities. However, there would be additional maintenance activities and the operation of new equipment at the water treatment plants and new intake. O&M activities for all other project components would be completed under existing maintenance programs. Therefore, O&M of the proposed project would not be anticipated to result in direct mortality to nesting migratory birds or birds of prey, impact valley elderberry longhorn beetle, impact riparian habitat, result in net reduction of waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters, or conflict with local policies protecting trees.

Implementation of Mitigation Measures 3.6-1 (ALL), 3.6-2(a) (TPI-FWTP/SRWTP, EUU-FWTP/SRWTP, SRWI-Existing/New), 3.6-2(b) (TPI-FWTP/SRWTP, EUU-FWTP/SRWTP, SRWI-Existing/New), 3.6-2(c) (TP), 3.6-3(a) (SRWI-Existing/New), 3.6-3(b) (SRWI-Existing/New), 3.6-4(a) (SRWI-New), 3.6-4(b) (TP), and 3.6-5 (ALL) would ensure that construction of the proposed project avoids or mitigates for impacts on nesting migratory birds, valley elderberry longhorn beetle, riparian habitat, waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters, or trees protected by local policies. Therefore, implementing these mitigation measures would reduce the contribution of the proposed project to potentially significant cumulative impacts on biological resources to less than cumulatively considerable, and this cumulative impact would be **less than significant**.

4.5.6 Cultural Resources

The project areas include historic architectural and archaeological resources, as determined by previously recorded cultural resources within the area of potential effects and the pedestrian surface survey of accessible portions of the FWTP and SRWTP project areas. The proposed project areas have historically experienced heavy urban development, including residential and commercial sprawls and infrastructure to accommodate a growing population and escalating settlement patterns. Continued development in the region runs the inherent risk of damaging or destroying unknown significant cultural resources that could yield information important to history or prehistory or previously unidentified human remains, resulting in a significant cumulative impact. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/ Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could potentially affect architectural resources that qualify as historical resources and/or archaeological resources, as defined in CEQA Guidelines Section 15064.5, or disturb or damage any human remains. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Activities associated with construction of proposed project components in the SRWTP project area could potentially affect architectural resources that qualify as historical resources and could potentially affect archaeological resources or disturb or damage any human remains in both the FWTP and SRWTP project areas. O&M activities would generally remain the same once construction is complete, and therefore, would not result in any additional alterations of the facility structures, or potential ground disturbing impacts to historical resources, archaeological resources, or disturbance of human remains. Construction activities could therefore result in a considerable contribution to significant cumulative impacts on cultural resources.

Implementation of Mitigation Measures 3.7-1(a) (TPI-SRWTP), 3.7-1(b) (TPI-SRWTP), 3.7-1(c) (TPI-SRWTP), 3.7-1(d) (TPI-SRWTP), and 3.7-1(e) (TP) would reduce the proposed project’s contribution to cumulative impacts to historic resources through pre-construction survey and evaluation, design review, and vibration monitoring and damage repair, but not to a less than significant level. Therefore, the proposed project’s contribution to potentially significant cumulative impacts to historic resources would remain considerable and the cumulative impact would be **significant and unavoidable**.

Implementation of Mitigation Measures 3.7-2(a) (ALL), 3.7-2(b) (ALL), and 3.7-2(c) (ALL) would reduce the proposed project’s contribution to cumulative impacts to archeological resources to less than considerable through identification and treatment of archaeological and/or cultural resources discovered during the course of preconstruction cultural resource studies and other protective measures. Implementation of Mitigation Measure 3.7-3 (ALL) would reduce the proposed project’s potential impacts to human remains. Therefore, the proposed project’s contribution to potentially significant cumulative impacts to archeological and human remains would be less than cumulatively considerable, and this cumulative impact would be **less than significant**.

4.5.7 Energy

California's energy system includes electricity, natural gas, and petroleum fuels. SMUD is a community owned electricity utility that serves Sacramento County and adjoining parts of Placer and Yolo County. PG&E also provides natural gas services to the City of Sacramento. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could require the use of fuels and direct and indirect energy use. These effects could be short-term and temporary (construction-related) as well as long-term and permanent (O&M of new structures), and could result in wasteful, inefficient, or unnecessary consumption of energy resources, or conflict with or obstruct state and local plans for renewable energy or energy efficiency. This could result in a cumulatively significant impact.

Construction of the proposed project components would result in the consumption of energy in the form of transportation fuels (i.e., diesel and gasoline fuel) from a variety of sources, including off-road construction equipment and on-road workers, vendors, and hauling vehicles. O&M activities would generally remain the same at the FWTP and SRWTP, except for additional O&M required for the new ozone treatment. All relevant provisions that are designed to conserve and reduce energy consumption would be implemented (refer to Section 3.8, *Energy*, Impact 3.8-2). Therefore, implementation of the proposed project would not result in inefficient consumption of energy and energy use during construction and operation and maintenance activities would not be considerable, nor would any sources or activities conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Therefore, the proposed project's contribution to potentially significant cumulative impacts related to energy would not be considerable and this would be a **less-than-significant** cumulative impact.

4.5.8 Geology, Soils, Paleontological Resources, and Mineral Resources

The project areas are located in the Sacramento Valley which is part of the Great Valley geomorphic province of California, a relatively flat alluvial plain composed of a deep sequence of sediments in a bedrock trough. Soils in the proposed projects areas are moderately susceptible to erosion with some soils in the SRWTP project area susceptible to shrink-swell (expansive soils). While the proposed project areas are not located in a Seismic Hazard Zone, there exists potential exposure to geologic hazards as a result of seismic activity in the vicinity. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could directly and/or indirectly cause potential substantial adverse effects due to rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, or landslides; result in substantial soil loss or the loss of topsoil; result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse in unstable or expansive soils; or directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Activities associated with construction of proposed project components would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hardscaping for access and maintenance needs. Once construction is completed, O&M activities associated with the proposed project would generally remain similar to existing activities.

Compliance with existing regulations and policies would address geology, soils and paleontological resource impacts. Specifically, compliance with existing regulations and policies that address seismic-related safety issues (2040 General Plan Policy ERC-7.1: Expansive Soils and Liquefaction, and Policy ERC-7.2: Seismic Stability), and required adherence to requirements of the California Building Code (CBC) and City design standards, would ensure implementation of the proposed project would not directly or indirectly cause potential substantial adverse effects due to fault rupture, seismic ground shaking, seismic related ground failure or landslides; or result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. Compliance with existing regulations (e.g., CGP, City ordinances) would ensure that earth-disturbing construction activities (e.g., excavation, trenching, grading) would not result in substantial soil erosion or the loss of topsoil. Additionally, compliance with the CBC and City requirement for geotechnical investigation, would ensure implementation of the proposed project would not result in substantial direct or indirect risk to life or property due to potential effects of expansive soils on such occupancies. Given compliance with existing regulations and City policies (e.g., Section 5097.2, 2040 General Plan Policy HCR-1.1, Preservation of Historic and Cultural Resources Site Features and Landscaping), implementation of the proposed project would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Therefore, the proposed project's contribution to this potentially significant cumulative impact would not be considerable and this would be a **less-than-significant** cumulative impact.

4.5.9 Greenhouse Gas Emissions

Climate change is a global problem and the effects of GHG emissions are experienced globally. Therefore, in the context of CEQA, impacts of GHG emissions on global climate change are inherently cumulative. No single project could generate enough GHG emissions to contribute noticeably to a change in the global average temperature. However, GHG emissions from present and future projects, including those listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas, and combined could contribute substantially to the phenomenon of global climate change and its associated environmental impacts.

Activities associated with construction of proposed project components could result in GHG emissions. Projects are required to implement the SMAQMD's identified Basic Construction Emissions Control Practices (BCECPs), which are considered by the SMAQMD to be the applicable construction BMPs. Implementation of the SMAQMD's identified BCECPs, which are considered by the SMAQMD to be the applicable construction BMPs, construction emissions associated with the proposed project would not exceed the SMAQMD GHG significance threshold of 1,100 MTCO2e. Once construction is completed, O&M activities would generally remain the same, with the exception of additional O&M needed for the new ozone treatment. Emissions would primarily come from employee vehicle trips to and from the treatment plants for intermittent O&M activities. These trips would occur very infrequently and would have negligible GHG emissions. The operations of the proposed project would be consistent with the 2022 Scoping Plan, SMUD 2030 Zero Carbon Plan and would not obstruct the goals in the City's CAAP. Therefore, implementation of the proposed project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, or conflict with any applicable GHG reduction plans. The proposed project's contribution to the global cumulative impact would not be considerable and this would be a **less-than-significant** cumulative impact.

4.5.10 Hazards and Hazardous Materials

The project areas and vicinity (defined as within 0.5 mile of the project areas) include both active/open and inactive/closed clean-up sites with suspected and confirmed releases of hazardous materials to the subsurface soil and/or groundwater. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could involve the routine transport, use, or disposal of hazardous materials that, if released, could create a hazard to the public or the environment, or within one-quarter mile of a school; could be located on a hazardous materials site; could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or could expose people or structures to loss, injury, or death involving wildland fires. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Construction of proposed project components may involve the use routinely used hazardous materials including but not limited to petroleum products (i.e. oil, gasoline, and diesel fuels), automotive fluids (i.e. antifreeze and hydraulic fluids), and other chemicals (i.e. adhesives, solvents, and other chemicals). Additionally, asphalt and coatings, and/or concrete materials would be used. Once constructed, O&M activities for the various project components at both the FWTP and SRWTP project areas would generally be similar to existing activities. However, the ozone generation and treatment system improvements at both water treatment plants would remove storage of chlorine gas and add liquid oxygen and chemicals associated with ozone generation (to be produced as needed versus stored onsite). All hazardous materials used on-site would be stored, handled, and disposed of in accordance with the manufacturers' specifications and consistent with all applicable regulatory requirements through Hazardous Materials Business Plans (HMBPs) specific to each project area.

Compliance with existing regulations (e.g., HMBPs, NPDES permit, City ordinances dewatering permit, etc.) would ensure that hazardous materials associated with O&M activities would be properly stored, handled, transported and disposed. For construction activities located adjacent to or located in active hazardous material clean-up sites, adherence to existing regulatory requirements set by the Department of Toxic Substances Control, Central Valley Regional Water Board, and/or Sacramento County Environmental Management Department, and compliance with General Plan policy EJ-1.8 would ensure that potential exposure of people and the environment to existing contaminated soils would be reduced. As detailed in Section 3.20, *Wildfire*, compliance with the California Fire Code, California Building Code, and General Plan policies (e.g., PFS-1.8: Fire Hazards and PFS-2.1: Hazard Mitigation Planning), and ordinances (e.g., Weed and Rubbish Abatement Ordinance), would further reduce the extent to which the proposed project could increase fire risk.

The temporary increase in vehicular traffic associated with construction activities would temporarily increase traffic on designated evacuation routes which could impair an adopted emergency response plan or emergency evacuation plan. Implementation of Mitigation Measure 3.10-1 (ALL) would ensure that a Traffic Control Plan would be developed, approved and provided to emergency response agencies prior to any road closures during construction to reduce potential interference with local emergency response plans, and to ensure adequate access for emergency responders. Therefore, implementing this mitigation measure would reduce the contribution of the proposed project to this cumulative impact to less than cumulatively considerable, and the cumulative impact would be **less than significant**.

4.5.11 Hydrology, Water Quality, and Water Supply

The project areas are located near the confluence of the Sacramento and American rivers in the southern portion of the Sacramento River Basin. The American River flows west past the FWTP project area to join the Sacramento River north of the SRWTP and ultimately flows south to the Delta. The project areas overly the South American Subbasin, part of the Sacramento Valley Groundwater Basin. Flood control in the vicinity of the proposed project areas are provided by a comprehensive system of dams, levees, overflow weirs, drainage pumping plants, and flood control bypass channels provided by the Sacramento River Flood Control Project and the American River Flood Control Project.

Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could: violate surface and groundwater quality standards; degrade surface or groundwater quality; alter existing drainage patterns (e.g., resulting in substantial erosion or siltation on- or off-site, increasing the rate or amount of surface runoff, creating or contributing runoff water, or impeding or redirecting flood flows); risk releases of pollutants due to project inundation; or conflict with or obstruct implementation of a water quality control and/or sustainable groundwater management plan. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). Additionally, like the proposed project, these projects could involve increased diversion from the Sacramento River (e.g., RiverArc) which could potentially violate water quality standards or results in substantial decreases in water supply deliveries because of changes in surface water flows and/or changes in water supply system operations. This could result in cumulatively significant impacts.

Construction of proposed project components would include establishment and use of staging areas and access routes; demolition of existing structures, facilities, and/or utilities; excavation and/or trenching to relocate buried utilities and existing storm drain pipelines; and clearing and grubbing of vegetated areas in order to construct future facilities and associated hard scaping for access and maintenance needs. Compliance with existing regulations (e.g., CGP, dewatering permit, NPDES permit, City ordinances), and the incorporation of BMPs, would ensure that construction of the proposed project would: avoid impacts related to violation of applicable water quality standards, applicable water quality control plans (Regional Water Board, 2019; State Water Board, 2018), or waste discharge requirements, or other substantial degradation of surface water or groundwater quality; not alter the existing drainage pattern of the site or area; and minimize release of pollutants due to project inundation.

Once improvements are completed, O&M activities would generally be similar to existing O&M activities, and regulated according to the applicable existing regulations, permits and City ordinances (e.g. Phase I MS4 Permit and waste discharge requirement permits issued by the Central Valley Regional Water Board). Implementation of the proposed project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the South American Subbasin consistent with the subbasin's GSP (LWA, 2021). Operation of the new water intake in the Sacramento River would not result in violation of water quality standards. Operation of the new water intake would adhere to all applicable regulations, including the City's 1957 permanent water rights operating contract with the U.S. Bureau of Reclamation; however, modeling results indicated that increased diversion by the City could result in substantial reductions in water supply deliveries during dry and critically dry years to SWP and CVP water contractors that have water rights junior to those of the City. Therefore, adhering to the regulatory measures would not reduce the contribution of the proposed project to this cumulative impact to less than cumulatively considerable, and the cumulative impact would be **significant and unavoidable**.

4.5.12 Land Use and Planning

The FWTP project area is located within the East Sacramento Community Plan area as defined in the City of Sacramento 2040 General Plan. The SRWTP project area is located within the River District Specific Plan area (City of Sacramento, 2011) and the Sacramento Railyards Specific Plan Area (City of Sacramento, 2016), which are both located in the Central City Community Plan area of the City's 2040 General Plan. These are built environments surrounded by urban uses, within in a mix of zoning designations including: Standard Single Family–Parkway Corridor Overlay (R-1-PC), Heavy Industrial (M-2), Residential Multi-Family (R-5), American

River Parkway Floodplain (ARP-F), Limited Commercial (C-1), Central Business District (C-3), Hospital (H), Residential Mixed Use (RMX), Office Building (OB), and Agriculture-Open Space (A-OS). Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

No changes to existing land uses (i.e., water treatment and distribution), land use designations, or zoning are proposed or required for implementation of the proposed project. The proposed project is required to obtain a site plan and design review permit as a condition of approval pursuant to the requirements set forth in Chapter 17.808 of the City's Planning and Development Code. Issuance of a site plan and design review permit would require a finding that the proposed project is consistent with applicable General Plan policies, design guidelines, and any other applicable planning-related documents prior to approval of the proposed project. Therefore, the proposed project's contribution to this potentially significant cumulative impact would not be considerable and this would be a **less-than-significant** cumulative impact.

4.5.13 Noise and Vibration

Noise sources in the proposed project areas include vehicle traffic associated with the mostly urbanized environment. Noise-sensitive land uses in the vicinity of the proposed project areas include residential apartments, lodging facilities, and a future hospital. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could temporarily contribute to the noise environment, expose nearby sensitive receptors to noise levels in excess of the applicable noise standards, or generate temporary groundborne vibration or groundborne noise levels. If these activities were to occur simultaneously with other nearby projects in the proposed project area, the resulting cumulative increase in noise levels could exceed established thresholds, resulting in a cumulatively significant impact.

Noise and vibration levels from construction activity at nearby sensitive receptors would fluctuate depending on the nature of the construction and the particular type, number, and duration of use of various pieces of construction equipment. Construction (daytime and/or nighttime) of the proposed project could generate a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the City's General Plan or noise ordinance, or applicable standards of other agencies, and/or generate a substantial temporary vibration effect resulting in a considerable contribution to the potential significant cumulative impact. Once improvements are completed at the FWTP and SRWTP, O&M activities would generally be similar to existing O&M activities and therefore would not generate a substantial permanent increase in ambient noise levels in excess of established standards or generate excessive groundborne vibration or groundborne noise levels.

Implementation of Mitigation Measures 3.14-1 (ALL) would reduce temporary increases in noise generated by construction activities during daytime hours in the FWTP and SRWTP project areas. However, it is unlikely these measures would reduce nighttime noise below sleep interference levels during nighttime hours at the SRWTP. Therefore, although temporary and short-term, these impacts at the SRWTP would remain significant and unavoidable. Therefore, implementing these mitigation measures would not reduce the contribution of the proposed project to this cumulative impact to less than cumulatively considerable, and the cumulative impact would be **significant and unavoidable**.

Implementation of Mitigation Measure 3.14-2 (EUU-FWTP - storm drainage improvements only, SRWI-Existing/New, TP) would reduce the impacts of construction vibration generated from construction equipment and allocate the most substantial vibration-generating activities to avoid hours when nearby residents would reasonably be expected to sleep which is the basis for the FTA's vibration criterion for human annoyance. Therefore, the proposed project's contribution to potentially significant cumulative impacts to excessive groundborne vibration or groundborne noise levels would be less than cumulatively considerable, and this cumulative impact would be **less than significant**.

4.5.14 Public Services

The proposed project areas have public services that include police protection, fire protection, public schools, and parks. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/ Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could result in the need for additional public services including fire protection, police protection, schools, parks or other public facilities that would result in substantial unplanned adverse physical impacts associated with the provision of new or physically altered governmental facilities in order to maintain acceptable service ratios, response times, and other performance objectives. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Temporary, minor increases in demand for police and fire services could be needed during construction of proposed project components, but these would be accommodated by existing facilities and staff. The proposed project does not involve the development of residential or employment opportunity land uses that would result in a long-term local population increase. The proposed project would therefore not contribute to an unplanned increased need or demand for construction of new or expanded government facilities for the provision of public services, such as fire, police, schools, or parks (see Section 3.16, *Recreation*, for additional discussion of the less-than-significant impacts related to the need for new or expanded parks or other recreational facilities). Therefore, the proposed project's contribution to this potentially significant cumulative impact would not be considerable and this would be a **less-than-significant** cumulative impact.

4.5.15 Recreation

Several park facilities and various open space areas exist in the vicinity of the proposed project areas, including the Sacramento River Parkway and American River Parkway. These areas are popular for recreational uses including fishing, boating, walking, and biking. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility or area would occur or be accelerated or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Construction of proposed project components would not directly impact or deteriorate recreational facilities such that new facilities would be required or in such a way that would cause recreationists to overuse and potentially deteriorate other nearby facilities. Further, the project would not increase residential or employment opportunities or otherwise lead to an increase in the local population such that nearby recreational facilities would be overused or deteriorated, or such that new or expanded facilities would be required. Therefore, the proposed project's contribution to this potentially significant cumulative impact would not be considerable and this would be a **less-than-significant** cumulative impact.

4.5.16 Transportation

The proposed project areas are surrounded by a variety of regional (e.g., freeways) and local roadways, transit services, and areas for bicycle and pedestrian circulation. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could degrade conditions for transit, roadway, bicycle, or pedestrian facilities such that they would conflict with applicable programs, plans, ordinances, or policies addressing the circulation system for those areas or result in inadequate emergency access. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Activities associated with construction of proposed project components would be short-term and temporary, and traffic associated with construction would occur along existing roadways. While additional truck trips would be associated with O&M of the proposed project, the number of trips is minimal compared to existing conditions. Therefore, implementation of the proposed project would not conflict with a program, plan, or ordinance, or policy addressing the circulation system, or CEQA Guidelines Section 15064.3(b). The temporary increase in vehicular traffic associated with construction activities would temporarily increase traffic on designated evacuation routes which may result in inadequate emergency access. Once improvements are completed, the number of trips required for O&M activities would be minimal compared to existing conditions and would not be anticipated to affect access to and from the water treatment plants and other project components or interfere with identified emergency evacuation routes in the City. Implementation of Mitigation Measure 3.17-1 (ALL), which requires implementation of Mitigation Measure 3.11-1 (ALL), would ensure that a Traffic Control Plan would be developed, approved and provided to emergency response agencies prior to any road closures during construction to reduce potential interference with local emergency response plans, and to ensure adequate access for emergency responders. Therefore, implementing this mitigation measure would reduce the contribution of the proposed project to this cumulative impact to less than cumulatively considerable, and the cumulative impact would be **less than significant**.

4.5.17 Tribal Cultural Resources

Per Tremain (2018), the Sacramento River Tribal Cultural Landscape was recorded to encompass the Sacramento River and much of the surrounding landscape, from Knights Landing to where the river meets Suisun Bay and San Joaquin River near Antioch. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could cause a substantial adverse change in the significance of a tribal cultural resource (TCR), as defined in Public Resources Code Section 21074. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This would result in a potentially significant cumulative impact on those tribal cultural resources.

While results of the records search indicate that no pre-contact archaeological resources have been documented within the FWTP or SRWTP project areas, consultation with the United Auburn Indian Community found that the proposed project areas include a couple of areas that are potentially sensitive for TCRs as well as located in Sacred Lands. Additionally, there may be previously unknown buried TCRs or resources of cultural significance to Native American Tribes that have not been recorded. Therefore, implementation of the proposed project could involve ground-disturbing activities that would damage or destroy tribal cultural resources, resulting in a considerable contribution to significant cumulative impacts on TCRs.

Implementation of Mitigation Measures 3.18-1(a) (ALL), 3.18-1(b) (ALL), and 3.18-1(c) (ALL) would reduce the potential impact to TCRs to a less-than-significant level because prior to any ground disturbing activities, construction personnel would be provided TCR sensitivity and awareness training that would include what to do in the event that a potential TCR is encountered. In addition, the mitigation measures include the process for pausing work so that the potential TCR could be examined and a determination made, in consultation with a Tribal Representative, as to the appropriate further evaluation and/or treatment of the TCR. The measures also include engaging a qualified Tribal Monitor to monitor construction-related earth disturbing activities to assist in the identification of potential TCRs. Therefore, implementing these mitigation measures would reduce the contribution of the proposed project to cumulative impacts on TCRs to less than cumulatively considerable, and the cumulative impact would be **less than significant**.

4.5.18 Utilities and Service Systems

The proposed project areas are serviced by a variety of providers for surface water and groundwater supply, wastewater, electricity, natural gas, telecommunications and solid waste disposal. Providers include the City for drinking water supply and storm drainage, SacSewer for wastewater treatment, SMUD for electrical power, PG&E for natural gas, a variety of telecommunications providers, and Sacramento Regional Solid Waste Authority for solid waste disposal. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American Rivers Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could involve the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities; require sufficient water supplies for construction and operation activities; require additional wastewater treatment capacity; or generate solid waste in excess of federal, state, and local standards. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

The proposed project involves relocation and construction of new and expanded water facilities (e.g., treatment plant improvements at FWTP and SRWTP), stormwater drainage facilities (e.g., existing utility upgrades of storm drainage at FWTP and SRWTP), and electric power facilities (e.g., existing utility upgrades of electrical service in the SRWTP project area). However, implementation of the proposed project would not require or result in the relocation or construction of new or expanded facilities for water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications (beyond those proposed by the project) to meet increased demands associated with construction and operation of the proposed project.

The temporary increase in demand during construction of the proposed project and the nominal increase in demand for O&M activities would be anticipated to be met by existing water supplies, which would be sufficient to serve the project and reasonably foreseeable future developments during normal, dry and multiple dry years. Implementation of the proposed project would result in a determination by the wastewater treatment provider (Sacramento Regional WWTP) that there is adequate capacity to serve the project's projected demand in addition to the provider's existing commitments and would not exceed landfill capacity or violate any applicable solid waste statutes or regulations. Therefore, the proposed project's contribution to this potentially significant cumulative impact would not be considerable and this would be a **less-than-significant** cumulative impact.

4.5.19 Wildfire

Wildfire risk is predominately associated with wildland urban interface areas, defined qualitatively as a place where humans and their development meet or intermix with wildland fuel (Sacramento County 2023). The SRWTP project area, including the location of the existing and new Sacramento River water intake, is not classified as being located a fire threat area. The FWTP project area is near the American River Parkway which, as described above, is fairly susceptible to urban wildfire. Construction and operation of the projects listed in Table 4-1 (e.g., I-5/Richards Boulevard, SMUD Station J Substation, Kaiser Permanente Medical Center and American River Common Features projects) would introduce new structures and development in the City, including the proposed project areas. This development could potentially impair an adopted emergency response plan or emergency evacuation plan; exacerbate wildfire risks; or expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope stability, or drainage changes. These effects could be short-term and temporary (construction-related activities) as well as long-term and permanent (O&M of new structures). This could result in a cumulatively significant impact.

Compliance with the California Fire Code, CBC, and General Plan policies (e.g., Fire Hazards, Hazard Mitigation Planning), and ordinances (e.g., Weed and Rubbish Abatement Ordinance), would further reduce the extent to which the proposed project could increase fire risk. While no additional traffic is associated with operations and maintenance activities that would impair an adopted emergency response plan or emergency evacuation plan, temporary traffic diversions associated with construction of the proposed project (i.e., construction activities associated with the SRWTP project area) could potentially impair an adopted emergency response plan or emergency evacuation route resulting in a considerable contribution to the potential significant cumulative impact. Implementation of Mitigation Measure 3.20-1 (ALL), which requires implementation of Mitigation Measures 3.11-1 (ALL), would ensure that a Traffic Control Plan would be developed, approved and provided to emergency response providers to ensure adequate access for emergency responders. Therefore, implementing this mitigation measure would reduce the contribution of the proposed project to cumulative impacts on wildfire to less than cumulatively considerable, and the cumulative impact would be **less than significant**.

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CHAPTER 5
Other CEQA Considerations

CEQA Guidelines Section 15126 requires that all phases of a project must be considered when evaluating its impact on the environment, including planning, acquisition, development and operation. As part of this analysis, an EIR must also identify: (1) significant environmental effects of the proposed project; (2) significant environmental effects that cannot be avoided if the proposed project is implemented; (3) significant irreversible environmental changes that would result from implementation of the proposed project; and (4) growth-inducing impacts of the proposed project.

Specifically, CEQA Guidelines include the following requirements:

- *Section 15126:* An evaluation of environmental impacts must consider all aspects of a project, including planning, acquisition, development, and operation. As part of this analysis, the EIR must also identify all of the following elements:
  - Significant environmental effects of the proposed project.
  - Significant environmental effects that cannot be avoided if the proposed project is implemented.
  - Significant irreversible environmental changes that would result from implementation of the proposed project.
  - Growth-inducing impacts of the proposed project.
- *Section 15126.2(b):* An EIR must mitigate energy use if analysis of the project's energy use reveals that the project may result in significant environmental effects due to wasteful, inefficient, or unnecessary consumption use of energy, or wasteful use of energy resources. The analysis of the proposed project's energy use is contained in Section 3.8, *Energy* and Chapter 4, *Cumulative Impacts*.
- *Section 15126.2(c):* An EIR must describe any significant impacts that cannot be avoided, even with implementation of feasible mitigation measures. Chapter 3 of this Draft EIR presents the effects of the proposed project on various aspects of the environment. Section 5.1 of this chapter identifies any significant and unavoidable impacts identified in the technical resource sections in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*.
- *Section 15126.2(d):* An EIR must discuss any significant and irreversible environmental changes that would be caused by the proposed project. This analysis is included in Section 5.2 of this chapter.
- *Section 15126.2(e):* An EIR must evaluate the growth-inducing impacts of a project. This analysis is presented in section 5.3 of this chapter.
- *Section 15130(a):* An EIR must assess the cumulative impacts that could be associated with project implementation. This assessment is included in Chapter 4, *Cumulative Impacts*.

5.1 Significant and Unavoidable Impacts

CEQA Guidelines Section 15126.2(c) states that an EIR must describe the impacts identified as significant and unavoidable should a proposed project be implemented. Impacts are determined to be significant and unavoidable when either no mitigation, or only partial mitigation, is feasible to reduce impacts to less-than-significant levels. The City of Sacramento will make the final determination of impact significance and of the feasibility of mitigation measures as part of the certification action. The environmental impacts that would result from implementation of the proposed project are presented in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, and are summarized in the *Executive Summary*. Significant and unavoidable impacts were identified for the proposed project related to: substantial adverse changes in the significance of a historical resource (see Section 3.7, *Cultural Resources*); substantial decreases in water supply deliveries as a result of the new water intake (see Section 3.12, *Hydrology, Water Quality, and Water Supply*); increases in ambient noise levels in excess of applicable standards (see Section 3.14, *Noise and Vibration*); and the associated cumulative impacts (see Chapter 4, *Cumulative Impacts*).

5.2 Significant Irreversible Environmental Changes

The CEQA Guidelines (Section 15126.2[d]) require an evaluation of the significant irreversible environmental changes that would be caused by a project if implemented, as described below:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse there after unlikely. Primary impacts, and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

In general, the CEQA Guidelines refer to the need to evaluate and justify the consumption of nonrenewable resources and the extent to which a project would commit future generations to similar uses of nonrenewable resources. In addition, CEQA requires the evaluation of irreversible damage resulting from an environmental accident associated with the project.

As described in Chapter 2, *Project Description*, the proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area.

Implementation of the proposed project could result in the commitment of nonrenewable, and slowly renewable, natural resources used in the construction process and during O&M activities, including the use of materials such as gravel, petroleum products, steel, and wood products. Construction of the proposed project is anticipated to occur over approximately 25 years with some periods of more intensive activities. As a result, use of resources would still be temporary and would occur intermittently over the whole construction period. Construction activities would result in the commitment of energy resources such as fossil fuels. As discussed in Section 3.8, *Energy*, construction activities could require direct and indirect use of energy resources. Direct energy use during construction would involve using petroleum products and electricity to operate equipment, and indirect energy use would involve consuming energy to extract raw materials, manufacture items, and transport the goods and people necessary for construction activities. The level of energy consumption would fluctuate depending on the type of construction activities underway during any particular time period. Estimated annual average diesel and gasoline use associated with proposed project construction activities were estimated to be a very small fraction (less than 0.001 percent) of the gasoline sold in Sacramento County annually and would not result in a long-term increase in demand for fuel or be of sufficient magnitude to require new infrastructure be constructed or commit future generations to similar consumption of construction-phase nonrenewable resources.

General O&M activities necessary to support the implementation of the proposed project could require use of electricity for all processes, equipment, and operational lights; most of these activities would be similar to existing conditions, however the implementation of new ozone treatment processes is anticipated to require an increase in energy use over existing conditions, equating to approximately 10 and 15 percent of the total plant electrical demand at FWTP and SRWTP, respectively. While O&M activities would generally remain the same at the FWTP and SRWTP, changes in energy consumption would stem from an increase in employee vehicle trips for commuting and maintenance activities, all of which would occur locally and require minimal energy use, as well as increased electrical demands associated of the new ozone treatment process, intermediate pump station at FWTP, new intake at the Sacramento River, and the new high lift pump station at SRWTP.

Compliance with all applicable state, county, and local plans, policies, and regulations pertaining to energy standards would ensure that natural resources are conserved to the maximum extent possible. It is therefore concluded that the rate and amount of energy consumed during construction and O&M activities would not result in the unnecessary, inefficient, or wasteful use of energy resources; the increase in energy demand at the water treatment plants is necessary to achieve the overarching project goal, which is to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand.

Finally, construction activities have the potential to result in accidental release of hazardous materials (discussed in Impact 3.11-1 in Section 3.11, *Hazards and Hazardous Materials*), which may lead to irreversible damage. Compliance with existing regulations (e.g., 8 CCR Section 5194, 29 CFR Section 1910.120, Department of Toxic Substances Control's applicable regulations, Construction General Permit, dewatering permit, etc.) would ensure that hazardous materials associated with construction activities would be properly stored, handled, transported and disposed of.

5.3 Growth-Inducing Impacts

CEQA Guidelines require that an EIR evaluate the growth-inducing impacts of a proposed project (Section 15126.2[e]). A growth-inducing impact is described by the CEQA Guidelines as:

> *[T]he way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have direct and/or indirect growth inducement potential. Direct growth inducement would result if a project involved construction of substantial new housing or commercial development, as this would directly result in a demand for new public services, facilities, or infrastructure. A project would have indirect (or secondary) growth inducement potential if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises) or if it would involve a short or long-term construction effort with substantial employment opportunities. These types of employment opportunities attract new residents to the area and indirectly stimulate the need for additional housing and services to support the new employment demand. As explained in the CEQA Guidelines, a project would also indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint or increasing the capacity of a required public service, such as increased water supply capacity.

As identified in CEQA Section 15126.2(e), growth inducement is not in and of itself an “environmental impact”; however, growth can result in adverse environmental consequences. Growth inducement may constitute an adverse impact if the growth is not consistent with or accommodated by the land use plans and policies for the affected area. Local land use plans, typically general plans, provide for land use development patterns and growth policies that allow for the “orderly” expansion of urban development supported by adequate urban public services, such as water supply, sewer service, and new roadway infrastructure. A project that would induce “disorderly” growth (i.e., a project conflicting with local land use plans) could indirectly cause adverse environmental impacts: for example, the loss of agricultural land that has not been addressed in the planning process. To assess whether a project with the potential to induce growth is expected to result in significant impacts, it is important to assess the degree to which the growth associated with a project would or would not be consistent with applicable land use plans.

5.3.1 Approach to the Analysis

Based on the CEQA discussion above, assessing the growth-inducement potential of the proposed project, which involves increasing reliable water supplies, involves addressing the following question: “Would implementation of the proposed project directly or indirectly support economic or population growth or residential construction?” A variety of factors influence new development or population growth in the City of Sacramento, including economic conditions (e.g., changes in regional real estate and labor markets), adopted growth management policies, and the availability of adequate infrastructure (e.g., water service, sewer service, public schools, and roadways, etc.). While the provision of water service is only one of many factors affecting growth potential of a community, it is one of the chief public services needed to support urban development, and lack of a reliable water supply can sometimes constrain future development.

The following steps were taken to evaluate the proposed project’s growth-inducement potential and to characterize the secondary effects on the environment resulting from such growth.

- **Identify the Study Area.** For the purposes of the growth-inducement analysis, the study area (the area in which impacts may occur) is the City’s combined retail and wholesale water service area, because this is the area producing demand for which the City must plan and accommodate water supply. The City’s service area includes the area within City limits, as well as areas bordering the City served by other water agencies. The City currently delivers wholesale water to four customers (Sacramento Suburban Water District, Natomas Unified School District, Cal American Water Company, and Sacramento County Water Agency [which serves the Sacramento International Airport and Zone 50 Metro Air Park]).
- **Characterize Water Use and Growth Trends in the City of Sacramento.** Subsection 5.3.2 summarizes urban development trends and projected water demand and supplies summarized from the City’s 2020 Urban Water Management Plan (City of Sacramento, 2021).
- **Summarize the Secondary Effects of Planned Growth Evaluated in the City of Sacramento 2040 General Plan.** The City of Sacramento plans for growth and development within its land use planning area as presented in the City’s 2040 General Plan (City of Sacramento, 2024). The environmental impacts, or secondary effects, that would result from planned growth have been evaluated in the Master EIR for the Sacramento 2040 General Plan and Climate Action & Adaptation Plan (2040 General Plan Master EIR) (City of Sacramento, 2023). As the proposed project could help the City receive more reliable water supplies to meet the water demands of planned growth within their service area, it is useful to look at the 2040 General Plan Master EIR to summarize the expected effects of planned growth, which is included in section 5.3.3.

5.3.2 City of Sacramento Growth Trends Included in 2020 Urban Water Management Plan

The Urban Water Management Planning Act requires every urban water supplier to prepare an Urban Water Management Plan (UWMP) for the purpose of “actively pursuing the efficient use of available supplies.” In preparing the UWMP, the water supplier is required to coordinate with other appropriate agencies, including other water suppliers that share a common source, water management agencies, and relevant public agencies. The Urban Water Management Planning Act requires urban water suppliers, as part of their long-range planning activities, to make every effort to ensure the appropriate level of reliability in their water service sufficient to meet the needs of their various categories of customers during normal, dry, and multiple dry water years.

The City's current 2020 UWMP, finalized in June 2021, projected that the City's 2040 retail population (within City limits) would be 695,830. According to the 2020 UWMP, the City's projected 2050 retail water demand is 155,219 af and wholesale water demand is 97,060 af, or a total projected 2050 water demand of approximately 252,279 af (225 MGD) (City of Sacramento, 2021).

5.3.3 Planned Growth Evaluated in City of Sacramento 2040 General Plan Master EIR

Pursuant to state law,[1] each city and county is required to adopt a comprehensive, long-term general plan for the physical development of the jurisdiction. The general plan is a statement of development policies and is required to include land use, circulation, housing, conservation, open space, noise, and safety elements. The land use element designates the proposed general distribution, location, and extent of land uses and includes a statement of the standards of population density and building intensity recommended for lands covered by the plan. The housing element is required to plan for the jurisdiction's share of housing, allocated for the City of Sacramento by Sacramento Area Council of Governments. Water resource topics, including water supply, are to be addressed in general plan conservation and/or open space elements.

The City's current general plan includes a planning horizon and projected growth estimates through the year 2040. The 2040 General Plan Land Use map accommodates 69,012 new housing units; 76,612 new jobs; and a population increase of 165,740 residents, as compared to a 2018 baseline. The total population at projected 2040 citywide buildout is 638,433. These estimates were based upon the Sacramento Area Council of Governments regional growth allocation for the City as well as a 2019 market study (City of Sacramento, 2020). The 2040 General Plan includes a number of goals and policies designed to support a compact urban footprint and infill development, as well as balance future housing, office, retail, commercial, and industrial uses to accommodate projected employment growth. It supports development of a range of housing types, including rural residential, neighborhood, residential mixed-use, and commercial mixed-use such that full buildout of the Planning Area in the 2040 General Plan Land Use diagram would accommodate projected population growth within the City.

The 2040 General Plan Master EIR acknowledges that buildout of the plan would require extension of public service infrastructure and would include policies that improve water treatment capacity and infrastructure, among others, which would remove an obstacle to growth. The environmental and growth-inducing impacts of general plan policies, such as those related to providing reliable water, wastewater, and stormwater drainage utility services to facilitate growth, are evaluated in Chapter 4 (Environmental Analysis) and Section 5.3 (Growth Inducing Impacts) of the 2040 General Plan Master EIR. The analysis concludes that while the 2040 General Plan would contribute to direct, indirect, and induced growth in the area, it would also provide residential and employment opportunities for existing and future residents of the city while preventing urban sprawl and improving transit and active transportation.

[1] California Government Code, section 65300-65362.

5.3.4 Direct Growth Inducement

The proposed project includes construction and operation of facility and treatment improvements at both the FWTP and the SRWTP; upgrades to existing utilities serving both water treatment plants; improvements to the existing Sacramento River water intake and associated facilities; construction and operation of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of potable water transmission pipelines to distribute treated water from the SRWTP to the City's service area. The proposed project does not involve the development of residential or employment land uses that would result in a local population increase. As the project would not directly attract additional population to the area, it would not directly result in the demand for new public services, facilities, or infrastructure.

5.3.5 Indirect Growth Inducement

As discussed previously, a project may indirectly induce growth if it establishes new permanent or substantial short-term employment opportunities that would attract new residents and result in a need for additional public services or infrastructure. During construction of the proposed project components, construction crews would be anticipated to commute from in and around the Sacramento region to their respective construction site(s). Once improvements are completed, additional maintenance activities and operation of new equipment at the water treatment plants and the new intake would result in additional full-time employees (two at FWTP and ten at SRWTP), but it is anticipated that these new full-time employees would come from the existing labor pool. As such, the proposed project would not require a substantial new workforce and no new homes, businesses, or public roads would be constructed as a result of the project.

A project may also be considered to have indirect growth-inducing effects if it removes an obstacle to additional growth and development, such as removing a constraint or increasing the capacity of a required public service, such as increased water supply capacity. As described in Chapter 2, *Project Description*, Section 2.2, *Proposed Project Objectives*, one of the main objectives of the proposed project is to increase reliable water supplies and treatment capacities to meet anticipated future water demands. As such, the proposed project would provide an additional source of water that could support development and remove an obstacle to growth. However, the treated water capacity developed by the proposed project is intended to support and facilitate growth planned for and approved in the City's 2040 General Plan and growth of a similar nature, pattern, and intensity extending through 2050. The increased water capacity developed by the proposed project would be used only if and when the demand is present, as a result of the planned population growth and development reflected in the City's 2040 General Plan and evaluated in the General Plan Master EIR.

While the planning horizon for the General Plan is 2040, there is significant uncertainty when it comes to projecting future water demand; therefore, with the proposed project, the City intends to proactively prepare for potential demand to 2050, as projected in the City's UWMP, accounting for uncertainty particularly around new regulatory frameworks, climate change, and the demand for wholesale water. As discussed previously, the City currently delivers wholesale water to four customers, meeting a portion of water demand within adjacent water agencies' jurisdictions. Each of these jurisdictions plans for and evaluates the interconnected effects of water supply, water demand, and growth in their own planning documents and associated EIRs.

5.3.6 Conclusion

The 2020 UWMP projected a 2050 total water demand (retail and wholesale) for the City in 2050 of 252,279 af, or 225 MGD (City of Sacramento, 2021). As described in Chapter 2, *Project Description*, the City currently has a maximum surface water supply and treatment capacity of approximately 291,237 af per year, or 260 MGD. The proposed project would increase reliable water supplies and treatment capacities to meet anticipated future water demands through 2050, while considering and planning around uncertainty associated with those projected demands. Therefore, while the proposed project could remove an obstacle to growth by providing an additional source of water that could support development, this growth would be consistent with the 2040 General Plan and growth of a similar nature, pattern, and intensity extending through 2050. The increased water capacity developed by the proposed project would be used only if and when the demand is present, as a result of the planned population growth and development reflected in the City's 2040 General Plan and evaluated in the 2040 General Plan Master EIR. Therefore, the proposed project is not expected to foster unplanned economic or population growth or the construction of additional housing, either directly or indirectly, in the surrounding environment, or encourage or facilitate other activities that could significantly affect the environment, either individually or cumulatively.

CHAPTER 6
Project Alternatives

6.1 Introduction

This chapter describes alternatives to the proposed project and compares the environmental impacts of those alternatives. This chapter also describes alternatives that were considered for further consideration but rejected.

The principles used to guide selection of the alternatives analyzed in this Draft EIR are provided by Section 15126.6 of the CEQA Guidelines, which specifies that an EIR must do all of the following:

- Describe a reasonable range of potentially feasible alternatives to the project that could feasibly attain most of the basic objectives of the project.
- Consider alternatives that could reduce or eliminate any significant environmental impacts of the proposed project (in this case, the proposed project), including alternatives that may be costlier or could otherwise impede the project's objectives.
- Evaluate the comparative merits of the alternatives.

The focus and definition of the alternatives evaluated in this Draft EIR are governed by the "rule of reason," in accordance with CEQA Guidelines Section 15126.6(f). That is, the range of alternatives presented in this Draft EIR must permit a reasoned choice by the City. The CEQA Guidelines (Section 15126.6) require that an EIR evaluate at least one "No-Project Alternative," evaluate a reasonable range of alternatives to the project, identify alternatives that were considered during the scoping process but eliminated from detailed consideration, and identify the "environmentally superior alternative."

Although the CEQA Guidelines (Section 15126.6[d]) require that alternatives be evaluated, they permit the evaluation to be conducted in less detail than for the proposed project (i.e., proposed project). Consistent with CEQA Guidelines Section 15126.6(d), the information provided in this Draft EIR about each alternative is sufficient to allow for a meaningful evaluation, analysis, and comparison of the alternatives with the proposed project.

The alternatives considered but rejected are discussed in subsection 6.3.3, *Alternatives Considered but Rejected*. The alternatives carried forward for analysis are discussed in Section 6.4, *Alternatives to the Proposed Project*. The CEQA Guidelines also require that the EIR identify the environmentally superior alternative. Section 6.5, *Environmentally Superior Alternative*, identifies the environmentally superior alternative and summarizes the impacts of the alternative, and its ability to meet project objectives, as compared to the proposed project.

6.2 Objectives

As presented in Chapter 2, *Project Description*, Section 2.2, *Proposed Project Objectives*, the general objective of the proposed project is to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand. Specific proposed project objectives include:

- Increase treatment flexibility to address changing water quality in the American and Sacramento Rivers while continuing to meet changing drinking water regulations.
- Improve safety, reliability, and resiliency of both FWTP and SRWTP facilities.
- Provide for consistent treatment and distribution of potable water to the City's service area.
- Increase reliable water supplies and treatment capacities to meet anticipated water demands.

6.3 Alternatives Considered and Screening Criteria

This section describes the development of a reasonable range of alternatives to the proposed project, the method used to screen the alternatives, and the alternatives considered but eliminated from detailed consideration in this document.

6.3.1 Development of a Reasonable Range of Alternatives

CEQA requires that an EIR describe and evaluate a reasonable range of alternatives to a project or to the location of a project that would feasibly attain most of the basic project objectives and avoid or substantially lessen significant project impacts. The alternatives to the proposed project considered in this Draft EIR were developed based on information gathered during development of the proposed project.

6.3.2 Method Used to Screen Alternatives

Potential alternatives were screened based on their ability to feasibly attain most of the basic project objectives, their feasibility within the limits of the City's jurisdiction, and its ability to reduce or eliminate any significant environmental impacts of the proposed project.

- **Meeting project objectives—**The project objectives are listed above in Section 6.2. The CEQA Guidelines state that alternatives must feasibly attain most of the basic objectives of the project. Alternatives that do not meet the majority of the objectives of the proposed project were screened out and not carried forward for further evaluation in the Draft EIR.
- **Feasibility—**Alternatives that do not meet the requirements of applicable laws and regulations were not carried forward for further evaluation in the Draft EIR.
- **Avoiding or lessening any potentially adverse environmental effect of the proposed project—**Consistent with the CEQA Guidelines, alternatives should avoid or substantially lessen one or more of the significant environmental effects of the proposed project. Alternatives that would not lessen or avoid a potentially significant environmental impact may be eliminated from detailed evaluation in the Draft EIR.

6.3.3 Alternatives Considered but Rejected

The CEQA Guidelines require an EIR to identify any alternatives that were considered by the lead agency but were rejected as infeasible, and to briefly explain the reasons underlying the lead agency's determination. Section 15126.6(c) of the CEQA Guidelines states the following:

> *The EIR should identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination…Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts.*

The alternatives that were considered but rejected include:

- Alternate treatment processes
- Alternate treatment plant layouts
- Alternate options to meet future water demand
- Alternate water intake location and type

Each of these is described below along with the reasons why they were rejected from further consideration.

Alternate Treatment Processes

This alternative considered alternate treatment processes from those identified for the proposed project at both the FWTP and the SRWTP. These alternate treatment processes are described below, along with the reasons they were rejected from further consideration.

In order to meet the City's water treatment goals, multiple treatment processes were considered at both water treatment plants that would improve distribution system byproduct concentrations and control the production of cyanobacterial metabolites (e.g. microcystins, anatoxin-a, cylindrospermopsin, geosmin, 2-methylisoborneol). Specific process improvements considered included granular activated carbon, ozone with biologically active filters, powdered activated carbon, enhanced coagulation, alternative preoxidants, ion exchange, and aeration. Combinations of these processes were rejected due to additional costs. In addition, enhanced coagulation, alternative preoxidants, ion exchange, and aeration would not meet the desired water treatment goals. Powdered activated carbon was rejected due to the additional operational challenges associated with handling this material, and increased the residuals handing system capacity, operational frequency, and the necessary amount of maintenance. Granular activated carbon was rejected because of the large footprint associated with the process and associated intermediate pump station.

As a part of the resiliency improvements the form of chlorine storage and feed was evaluated. The current liquified chlorine gas storage and feed system was compared to bulk sodium hypochlorite delivery, storage, and feed and on-site sodium hypochlorite (0.8%) generation. Because of potential risks and consequences to staff and the public associated with chlorine gas, the City rejected use of this form of chlorine gas and the associated expansion of the existing liquified chlorine gas storage system. On-site sodium hypochlorite was not further considered due to the electrical load and capital costs.

At the SRWTP, alternatives for the additional pretreatment capacity were compared, including conventional flocculation-sedimentation basins, conventional flocculation-with plate settlers, and ballasted flocculation-sedimentation. Conventional sedimentation basins would not provide enough space to account for the addition of ozone and other desired process improvements. Ballasted flocculation-sedimentation would provide the necessary space on the SRWTP site; however, it would result in different treatment processes at each water treatment plant and potentially within SRTWP (during construction phases approaching the buildout capacity). To maintain the required space on site and maintain process similarity between both the FWTP and the SRWTP this alternative was not considered further.

For the reasons described above, these alternative treatment processes at both the FWTP and SRWTP were rejected from further consideration.

Alternate Treatment Plant Layouts

Alternative layouts at both the FWTP and the SRWTP were considered. At the FWTP, the existing grit basin requires rehabilitation. Replacement of the existing grit basin was rejected from additional consideration to reduce the work in the levee and facilitate the continued use of the existing flash mixing, raw water piping, and raw water flume.

At the SRWTP, treatment processes are located to generally sequentially flow from south to north to help reduce construction complexity and its related impacts, and control future operational and maintenance costs. Providing additional treatment capacity and related support facilities require additional space, which is limited within the SRWTP. Alternatives at SRWTP were developed to best avoid using areas of the site with structures listed on the historical register. To avoid conflicts with these structures at the SRWTP, alternative configurations (i.e., footprint and alignment/rotation within the site) were examined for a given treatment process. Where applicable, alternative treatment processes with different spatial requirements were reviewed to determine impact on site restrictions. In some cases, these treatment alternatives to address water quality goals (e.g., ion exchange and granular activated carbon contactors) were discarded from further consideration due to increased footprint requirements and lack of available space to site these processes. Treatment alternatives that could result in substantial footprint reductions and associated environmental effects to historic resources were advanced for consideration (e.g., high-rate sedimentation plates) even though there would be potential increased capital costs. A grit separation basin to receive solids from routine cleaning of the existing and future Sacramento River intakes was sited where the Coagulation Building is located. This basin was eliminated to preserve the structure listed on the City’s historical register, accepting a reduction in operational flexibility and an increased piping distance and complexity to take the intake grit to the southernmost solids basin.

For the reasons described above, these alternative treatment plant layouts at SRWTP and FWTP were rejected from further consideration. The final proposed site layout at the SRWTP was developed based on the primary objectives of meeting treatment needs and protecting existing listed structures. Concessions were made to physical complexity of the proposed structures, connecting utilities, and general ease of access to meet these primary objectives.

Alternate Options to Meet Future Water Demand

As a part of the Long-Term Water Treatment Capacity Evaluation Project (Carollo Engineers, 2015) the City evaluated several options to select a preferred approach to support the City's future increases in anticipated water demands (West Yost Associates, 2013). This evaluation considered several options, included developing a new (North Natomas) water treatment plant, expanding SRWTP capacity, expanding FWTP capacity using water pumped back from a new intake constructed near the confluence of the American and Sacramento Rivers ("Pump Back" option), and a combination of these options to achieve the total desired capacity. Expanding capacity at the FWTP is capped based on the Hodge decision that limits the maximum amount of water extracted from the American River. Pumping raw Sacramento River water to FWTP (Pump Back option) and rehabilitating treatment process capacity nearing the end of its anticipated life at the FWTP to supply the future water demands is technically possible, however, new ozone improvements to meet regulatory needs would not be able to support treatment capacities without expansion of the FWTP property boundary. In addition, anticipated City resident impacts, environmental impacts, and cashflow/capacity relationship associated with construction of new pipelines to convey the water makes construction of a new treatment plant in North Natomas, and the Pump Back option infeasible and therefore these options were rejected from further consideration.

Alternate Water Intake Location and Type

Numerous raw water supply locations were evaluated to support the expanded treatment capacity at SRWTP. The Long-Term Water Treatment Capacity Evaluation Project (Carollo Engineers, 2015) the City evaluated potential intake locations at the Sacramento River above and below the confluence with the American River, and the American River downstream of the FWTP. The evaluation included consideration of a location that would afford a deep and stable river channel for the intake structure, and that would be relatively close to the SRWTP. The Risk Analysis of Alternative Sites (Schnabel Engineering and Carollo Engineers, 2020) evaluated intake locations based on historical and contemporary river bathymetry, and identified and evaluated options including: (1) construction of a new intake at Discovery Park; (2) replacing the original SRWTP intake; (3) expanding the current SRWTP intake: (4) construction of a new bank intake at SRWTP: and (5) construction of a new intake at I-street bridge. The evaluation compared water quality, regulatory and permitting, perceived public perception/acceptance, anticipated operational and maintenance needs, and relative costs. While multiple factors were identified for discarding these options, key highlights are summarized below. In addition, depending on the location, the alternate site could result in new or more severe impacts than those identified for the proposed project.

An intake located in Discovery Park would increase piping distance, require a river crossing, increase infrastructure required to support an intake in this location and protect it from regular flooding in the area, increase the distance of vehicle traffic in perpetuity for regular monitoring, operation, and maintenance of the facility, and increase SRWTP operational complexity or capital costs as the current and new intake would likely draw different river water qualities from above and below the confluence to the SRWTP. This would require different operational treatment strategies or a new process and space on the site to homogenize the two sources before initiating treatment.

Replacing the original SRWTP intake was rejected from further consideration based on potential impacts to perceived public perception/acceptance associated with removing a structure on the City's historical register. Expanding the current SRWTP intake was rejected as it does not provide deeper water access to improve the resiliency of SRWTP during low river conditions, as a single structure fails to improve the resiliency of water supply as it continues to be a single point of failure for the SRWTP, increases construction phasing complexity and limitations, and risks water quality excursions during construction that could impact the production of the City's high quality drinking water. The bank intake at SRWTP would not provide access to deep water, risking the supply during low river conditions. The I-street bridge location is situated just downstream of a large river outfall that would significantly impact water quality during storm events.

An alternate intake site immediately downstream of the original SRWTP intake was selected, providing similar deep water (a bed elevation of approximately 20 ft) of the original SRTWP intake, provides protection to the submerged screens from marine traffic and to a lesser degree from floating debris, and does not require the historic intake structure to be removed or modified.

In addition to intake location, the City considered and evaluated alternative intake types, including a pier intake similar to the existing Sacramento River water intake. However, based on the higher costs, environmental effects, and potential of a new offshore pier style intake to block the view or diminish the presence of the existing intake, a pier style intake was not further considered. The existing intake had been constructed with the intention of being a point of interest with public access along the bridge and deck around the intake. A future intake adjacent to the existing intake could detract and diminish from this current arrangement. The proposed intake is not intended to have the same prominence as the existing but rather integrated discretely along the bank with the intakes submerged and out of view.

Associated with the proposed intake location and type, the City considered locations for the associated pump station and raw water alignments that would be required to be installed and operated as part of the proposed project. Pump station locations were evaluated in the Tee Screen Intake Alternative – Preliminary Location Assessment Summary (Schnabel Engineering and Carollo Engineers, 2023). Options for the pump station were initially narrowed down the following four options, including siting on the adjacent riverbank, on land immediately north of MOSAC, within the original SRWTP Treated Water Pump Station, and within the SRWTP site near the future pretreatment basins. Based on the advantages and disadvantages associated with each option, including length of suction pipeline, anticipated conflicts with existing infrastructure and other constructability elements, maintaining future accessibility for O&M activities, and other factors, the City determined in the Sacramento River Intake Siting and Conceptual Design (Schnabel Engineering and Carollo Engineers, 2023) that the pump station should be located on the bank of the river adjacent to the proposed project tee screens intake (river side of levee) and other intake pump station locations were not considered further. Conceptual analysis of the raw water pipeline alignment was performed spanning the area from the existing intake (parallel to the existing raw water pipelines) north to Richards Boulevard (to leverage the underpass and potentially maintain open trench installation for the pipeline). Due to the additional pipeline length and impacts of open trenching along or in Richards Boulevard, this alternative alignment was not considered further.

6.4 Alternatives to the Proposed Project

Two alternatives were identified for further evaluation in the Draft EIR as a result of the alternatives development and screening process described above. These alternatives are:

- No Project Alternative
- Initial Phase Only Alternative

Each alternative is described below, including an evaluation of the alternative's ability to achieve the proposed project objectives presented in subsection 6.2. A comparison of the potential impacts of the alternatives to the impacts of the proposed project is presented in subsection 6.5.

6.4.1 No Project Alternative

Description of Alternative

CEQA Guidelines Section 15126.6(e) requires consideration of a "no project" alternative. The purpose of this alternative is to allow the decision makers to compare the impacts of the proposed project (i.e., proposed project) with the impacts of not approving the proposed project. The No Project Alternative consists of existing conditions at the time the NOP is published, and what would be reasonably expected to occur in the foreseeable future if the proposed project were not approved, based on current plans and consistent with available infrastructure.

Under the No Project Alternative, none of the proposed project components would be constructed or operated. Specifically, proposed facility and treatment process resiliency improvements at both FWTP and SRWTP including replacement of aging infrastructure; upgrades to existing utilities (e.g., storm drainage systems and electrical service systems); integration of ozone into the treatment processes; and conversion from chlorine gas to sodium hypochlorite as the primary chemical for disinfection of the water; would not be constructed or operated. In addition, for SRWTP, modification of the existing Sacramento River raw water intake; construction of a new raw water intake, new raw water pump station, and associated new raw water conveyance; addition of treatment process capacity with phased construction; and the addition of potable water transmission pipelines would not be implemented.

Relationship to Project Objectives

The No Project Alternative would not achieve the general objective of the proposed project to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand because no facility and treatment improvements at FWTP or SRWTP would be constructed and operated. Because the No Project Alternative would not construct and operate any of the proposed project components, it would also not achieve any of the specific project objectives. There would be no consistent enhancement of treatment resiliency at both FWTP and SRWTP to address changing river water qualities impacting the City's ability to meet safe drinking water regulations. There would be no reduction in risk to the community associated with the replacement of chlorine gas with sodium hypochlorite for the primary disinfection of the water. There would be no increase in the ability for SRWTP to reliably access the widening range of river levels. There would be no improvement in the reliable treatment capacity at FWTP and

SRWTP to continuously meet anticipated potable water demand. There would be no reduction of critical hydraulic constrictions in the potable water transmission system impacting the City's ability to economically distribute potable water across the City's service area.

6.4.2 Initial Phase Only Alternative

Description of Alternative

As described in Chapter 2, *Project Description,* the proposed project is designed to achieve the project objectives through two phases of work relating to the City's water treatment plants, raw water supply, and potable water transmission pipelines: an "initial phase" to occur between 2026 and 2037, followed by a "project buildout" to occur between 2040 and 2050. Under the Initial Phase Only Alternative, only the initial phase of the proposed project would be constructed and operated (refer to Table 2-2 in Chapter 2 for a list of proposed improvements under the initial phase and project buildout).

As detailed in subsection 2.4 of Chapter 2, the initial phase of the proposed project would improve treatment reliability at both the FWTP and SRWTP plants by replacing facilities that have reached the end of their effective lives. The initial phase would also provide resiliency within each treatment system through the addition of ozone treatment, to help address changing water quality in the Sacramento and American rivers, and the conversion from chlorine gas to sodium hypochlorite, a safer and more reliably available chemical for disinfection. The project buildout phase that proposes to further increase the capacity of the SRWTP to treat water diverted from the Sacramento River to meet the increase water demands in the service areas through 2050 would not be constructed or operated.

Table 6-1 presents the construction schedule, including the approximate duration of construction for each project component under the Initial Phase Only Alternative. The schedule does not include the project buildout phase from 2040 through 2050 proposed under the project which includes additional improvements to the SRWTP and installation of three additional pumps at the new water intake pump station in the Sacramento River. Therefore, construction under the Initial Phase Only Alternative would be completed by July 2036.

Relationship to Project Objectives

The Initial Phase Only Alternative would advance towards the general objective of the proposed project to provide a reliable, resilient, and safe water supply, but would not address projected future potable water demand the buildout phase of the project addresses. Under the Initial Phase Only Alternative, there would be: consistent enhancement of treatment resiliency at both FWTP and SRWTP to address changing river water qualities that can impact the City's ability to meet safe drinking water regulations; a reduction in risk to the community associated with the replacement of chlorine gas with sodium hypochlorite for the primary disinfection of the water; an increase in the ability for SRWTP to reliably access the widening range of river levels; and a reduction of critical hydraulic constrictions in the potable water transmission system that impact the City's ability to economically distribute potable water across the City's service area. Therefore, under the Initial Phase Only Alternative, there would be an improvement in the treatment capacity reliability at FWTP and SRWTP to continuously meet near-term potable water demands. However, because the Initial Phase Only Alternative does not provide the complete buildout capacity of SRWTP, it does not include future phased construction of additional treatment capacity to meet the anticipated future potable water demands.

TABLE 6-1
ANTICIPATED CONSTRUCTION SCHEDULE BY PROJECT COMPONENT FOR THE INITIAL PHASE ONLY ALTERNATIVE

Project Component	Anticipated Start	Anticipated Finish of Intensive Construction	Anticipated Completion	Estimated Total Duration (years)
FWTP Project Area				
Treatment Plant Improvements and Existing Utility Upgrades	July 2026	July 2028	July 2031	5
SRWTP Project Area				
Initial Phase (235 MGD)	*January 2027*		*July 2037*	
Treatment Plant Improvements and Existing Utility Upgrades	January 2027	January 2031	January 2035	8
Sacramento River Water Intakes	January 2031	July 2035	July 2037	6
Potable Water Transmission Pipelines	July 2032	July 2035	July 2036	4

6.5 Comparative Analysis of Alternatives

Consistent with CEQA Guidelines Section 15126.6(d), the information provided in this Draft EIR about the alternatives is sufficient to allow for a meaningful evaluation, analysis, and comparison of the alternatives with the proposed project. **Table 6-2** presents a comparison of the environmental impacts of the proposed project, the No Project Alternative, and the Initial Phase Only Alternative. In the resource sections of Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*, the potential impacts of implementation of the proposed project were evaluated for each project component (i.e., treatment plant improvements at both FWTP and SRWTP, existing utility upgrades at both FWTP and SRWTP, existing and new Sacramento River water intake, and potable water transmission pipelines). In some cases, the significance determination varied across each project component (e.g., no impact for treatment plant improvements at FWTP and SRWTP, but less than significant with mitigation for the existing and new Sacramento River water intakes). The impacts of the alternatives are therefore compared against the most conservative significance determination for each impact threshold, to be representative of the potential impact of implementation of the proposed project as a whole.

TABLE 6-2
COMPARISON OF THE ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT AND ALTERNATIVES

Resource Topic		Proposed Project	No Project Alternative	Initial Phase Only Alternative
3.4 Air Quality	**3.4-1:** Construction of the proposed project could conflict with or obstruct implementation of an applicable air quality plan.	**Less than Significant with Mitigation** Construction activities associated with the treatment plant improvements and existing utility upgrades at the SRWTP would generate emissions of NO_x that could conflict with or obstruct implementation of the SMAQMD's air quality plans. Construction activities associated with all project components would generate PM_{10} and $PM_{2.5}$ emissions that could conflict with or obstruct with implementation of the SMAQMD's air quality plans.	**No Impact**	**Reduced** Construction activities would be lesser in magnitude and shorter in duration in the SRWTP project area. However, construction activities would likely still generate emissions of NO_x and/or PM_{10} and $PM_{2.5}$ emissions that could conflict with or obstruct implementation of the SMAQMD's air quality plans. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
	3.4-3: Construction of the proposed project could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.	**Less than Significant with Mitigation** Construction activities associated with the treatment plant improvements and existing utility upgrades at the SRWTP would result in a cumulatively considerable net increase of NO_x, resulting in an exceedance of the applicable SMAQMD threshold.	**No Impact**	**Reduced** Construction activities would be lesser in magnitude and shorter in duration in the SRWTP. However, construction activities would likely still result in a cumulatively considerable net increase of NO_x, resulting in an exceedance of the applicable SMAQMD threshold. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
3.5 Biological Resources – Aquatic	**3.5-1:** Construction of the proposed project could result in direct or indirect impacts to listed fish species and their associated habitat and could interfere with movement of native resident or migratory fish.	**Less than Significant with Mitigation** Construction associated with the new Sacramento River water intake would result in direct and indirect impacts to listed fish species and their associated habitat and could interfere with movement of native resident or migratory fish.	**No Impact**	**Same** Given that construction associated with the new Sacramento River water intake and would be the same, direct and indirect impacts to listed fish species and their habitat, and interference with movement of native resident and migratory fish would still occur and would be identical to the proposed project. Proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.

Resource Topic		Proposed Project	No Project Alternative	Initial Phase Only Alternative
3.6 Biological Resources - Terrestrial	**3.6-1:** Construction of the proposed project could impact nesting migratory birds and birds of prey.	**Less than Significant with Mitigation** Construction associated with all project components could impact nesting migratory birds and birds of prey.	**No Impact**	**Reduced** Construction activities in the SRWTP project area would be lesser in magnitude and shorter in duration therefore potentially reducing this impact. However, the majority of construction occurs during the initial phase and would likely still impact nesting migratory birds and bird of prey. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
	3.6-3: Construction of the proposed project could impact valley elderberry longhorn beetle.	**Less than Significant with Mitigation** Construction associated with all project components could impact valley elderberry longhorn beetle.	**No Impact**	**Reduced** Construction activities in the SRWTP project area would be lesser in magnitude and shorter in duration therefore potentially reducing this impact. However, the majority of construction occurs during the initial phase and would likely still impact valley elderberry longhorn beetle. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
	3.6-5: Construction of the proposed project could impact riparian habitat.	**Less than Significant with Mitigation** Construction associated with the existing and new Sacramento River water intakes could impact riparian habitat.	**No Impact**	**Same** Given that the construction associated with the existing and new Sacramento River water intakes would be the same, impacts to riparian habitat would still occur and would be identical to the proposed project. Proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
	3.6-7: Construction of the proposed project could result in net reduction of waters of the U.S. as defined in Section 404 of the Clean Water Act and State jurisdictional waters.	**Less than Significant with Mitigation** Construction associated with the new Sacramento River water intake and potable water transmission pipelines could result in a net reduction in waters of the U.S.	**No Impact**	**Same** Given that construction associated with the new Sacramento River water intake and potable water transmission pipelines would be the same, a net reduction in waters of the U.S. would still occur and would be identical to the proposed project. Proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
	3.6-9: Construction of the proposed project could conflict with local policies protecting trees.	**Less than Significant with Mitigation** Construction associated with all project components could conflict with local policies protecting trees.	**No Impact**	**Reduced** Construction activities in the SRWTP project area would be lesser in magnitude and may therefore impact fewer protected trees. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.

Resource Topic		Proposed Project	No Project Alternative	Initial Phase Only Alternative
3.7 Cultural Resources	**3.7-1:** Construction of the proposed project could cause a substantial adverse change in the significance of a historical resource.	**Significant and Unavoidable** Construction activities associated with the treatment plant improvements at SRWTP would cause a substantial adverse change in the significance of a historic resource.	**No Impact**	**Same** Construction activities in the SRWTP project area associated with initial-phase treatment plant improvements at SRWTP would be the same, and therefore would still result in a substantial adverse change in the significance of a historic resource, identical to the proposed project. Proposed project mitigation measures would be required but the impact would remain significant and unavoidable.
	3.7-2: Construction of the proposed project could cause a substantial adverse change in the significance of an archaeological resource.	**Less than Significant with Mitigation** Construction activities associated with all project components could potentially disturb or destroy previously undiscovered archaeological resources.	**No Impact**	**Reduced** Construction activities in the SRWTP project area would be lesser in magnitude and shorter in duration and thus have reduced potential to disturb previously undiscovered archeological resources. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
	3.7-3: Construction of the proposed project may disturb human remains, including those interred outside of designated cemeteries.	**Less than Significant with Mitigation** Construction activities associated with all project components could disturb human remains, in the event that human remains are discovered.	**No Impact**	**Reduced** Construction activities in the SRWTP project area would be lesser in magnitude and shorter in duration and thus have reduced potential to disturb human remains. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
3.11 Hazards and Hazardous Materials	**3.11-6:** Construction of the proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	**Less than Significant with Mitigation** Construction associated with all project components would temporarily increase traffic and could obstruct an evacuation route.	**No Impact**	**Reduced** Construction activities that would temporarily increase traffic and/or obstruct an evacuation route would be shorter in duration in the SRWTP project area. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
3.12 Hydrology, Water Quality, and Water Supply	**3.12-11:** Increased diversions associated with operation of the proposed new intake could result in substantial decreases in water supply deliveries because of changes in surface water flows and/or changes in water supply system operations, as measured by substantial changes in reservoir storage or timing or rate of river flows.	**Significant and Unavoidable** Increased diversions associated with operation of the new intake would result in substantial decreases in water supply deliveries during dry and critically dry years to SWP and CVP water contractors that have water rights junior to those of the City.	**No Impact**	**Reduced** While the new water intake would be constructed, the SRWTP would only be able to treat an additional 75 MGD. The significant and unavoidable impact is based on the modeling results that suggest that during dry and critically dry years, increased diversion by the City could result in decreased water supply deliveries, including under the +75 MGD scenario. Therefore, the significant and unavoidable impact would be less in magnitude under the Initial Phase Only alternative.

Resource Topic		Proposed Project	No Project Alternative	Initial Phase Only Alternative
3.14 Noise and Vibration	**3.14-1:** Construction of the proposed project could generate a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	**Significant and Unavoidable** Construction activities associated with all project components would generate a substantial temporary increase in ambient noise levels established in the City's General Plan or noise ordinance, and applicable standards of other agencies. The impacts of nighttime construction in the SRWTP project area would remain significant and unavoidable after implementation of mitigation measures.	**No Impact**	**Reduced** Construction activities associated with a substantial temporary increase in ambient noise levels would be lesser in magnitude and shorter duration in the SRWTP. While less in magnitude, this impact would be significant. Proposed project mitigation measures would be required to reduce this impact to a less-than-significant level, but it would remain significant and unavoidable.
	3.14-3: Construction of the proposed project could generate excessive groundborne vibration or groundborne noise levels.	**Less than Significant with Mitigation** Construction activities associated with the treatment plant improvements, and existing utility upgrades at SRWTP would not generate excessive groundborne vibration levels. However, nighttime construction of the storm drainage improvements at the FWTP; improvements to the existing Sacramento River water intake and associated facilities; construction of a new water intake, pump station and associated conveyance pipelines to the SRWTP; and installation of the new portable water transmission pipelines could generate excessive groundborne vibration levels.	**No Impact**	**Same** Construction activities associated with the storm drainage improvements at FWTP, and the new and existing Sacramento River water intakes, and the new portable water transmission pipelines would be the same, and therefore would still generate excessive groundborne vibration levels identical to the proposed project. Proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
3.17 Transportation	**3.17-5:** Construction of the proposed project could result in inadequate emergency access.	**Less than Significant with Mitigation** Construction associated with all project components would result in an increase in construction traffic that could interfere with existing emergency access.	**No Impact**	**Reduced** Construction activities that would temporarily increase traffic and/or interfere with existing emergency access would be shorter in duration in the SRWTP project area. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
3.18 Tribal Cultural Resources	**3.18-1:** Implementation of the proposed project may cause a substantial adverse change to tribal cultural resources.	**Less than Significant with Mitigation** Construction associated with all project components would involve ground-disturbing activities that could damage or destroy tribal cultural resources.	**No Impact**	**Reduced** Construction activities in the SRWTP project area would be lesser in magnitude and shorter in duration, involving less ground-disturbing activities that could damage or destroy tribal cultural resources. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.
3.20 Wildfire	**3.20-1:** Construction of the proposed project could potentially impair an adopted emergency response plan or emergency evacuation plan.	**Less than Significant with Mitigation** Construction activities could increase traffic that could potentially impair a potential evacuation route.	**No Impact**	**Reduced** Construction activities that would temporarily increase traffic and/or impair a potential evacuation route would be shorter in duration in the SRWTP project area. While this significant impact would be less in magnitude, proposed project mitigation measures would be required to reduce this impact to a less-than-significant level.

Impacts in this section are described with respect to whether they are likely to be similar to, more severe than, or reduced compared to the corresponding impacts of the proposed project. Note that an impact may be reduced by an alternative as compared to the proposed project but remain at the same level of severity (e.g., the Initial Phase Only Alternative may reduce a particular impact that remains Significant and Unavoidable). Also note that Table 6-2 focuses on an evaluation of the comparative merits of the alternatives related to significant effects of the proposed project (i.e., impacts determined less than significant with mitigation or significant and unavoidable), per CEQA Guidelines Section 15126.6. Impacts of the proposed project determined to be less than significant have not been included, because a reduction in already less-than-significant impacts would not offer meaningful contributions to an evaluation of the alternatives' comparative merits. For such impacts, Table 6-2 provides an explanation as to whether the impact determination would be the same or different for the alternative as compared to the proposed project.

Comparison of the No Project Alternative to the Proposed Project

The No Project Alternative would not result in any construction or additional O&M compared to existing conditions. Activities associated with construction of the proposed project components would include earth-disturbing activities (e.g., excavation, trenching, grading, etc.), demolition of existing structures, staging of materials and equipment, and additional vehicle trips associated with the construction workforce. Because under the No Project Alternative none of the proposed project components would be constructed, impacts associated with earth-disturbance, such as temporary fugitive dust emissions, disturbance to nesting bird and riparian habitat, and disturbance or destruction of previously undiscovered archaeological resources would not occur. Impacts associated with demolition of existing structures, such as removal of historic resources and excess noise and vibration would also not occur. Lastly, impacts associated with temporary increases of construction-related traffic on designated evacuation routes would not occur. Therefore, compared to the proposed project, there would be no impact of the No Project Alternative.

Comparison of the Initial Phase Only Alternative to the Proposed Project

The Initial Phase Only Alternative would have some reduction in construction-related impacts in the SRWTP project area compared to the proposed project. Construction associated with the treatment plant improvements at SRWTP would be of lesser magnitude and shorter duration compared to the proposed project, because the Initial Phase Only Alternative does not include the treatment plant improvements or timeline required for the project buildout phase. Therefore, the comparison generally assumes that by reducing the magnitude and duration of construction, there would be a reduced impact.

For example, reduced earth-disturbing activities called for under the Initial Phase Only Alternative, such as excavation, trenching, and grading could reduce potential impacts associated with NOx and fugitive dust emissions, and the potential disturbance to nesting bird and riparian habitats. As another example, potential impacts of increased construction traffic on evacuation routes would be reduced to a shorter duration under the Initial Phase Only Alternative (i.e., they would not occur from 2040 through 2050 as planned under proposed project buildout). Similarly, without the additional improvements at the SRWTP planned under proposed project buildout, there would likely be reduced O&M under the Initial Phase Only Alternative compared to the proposed project because fewer improvements would be constructed and need to be operated (refer to Table 2-2 in Chapter 2, *Project Description*).

However, under the Initial Phase Only Alternative, the majority of project construction proposed under the project would occur and be operated and maintained. Therefore, many environmental impacts associated with the proposed project would be the same under the Initial Phase Only Alternative. For example, potential impacts on cultural resources under the proposed project would remain the same under the Initial Phase Only Alternative, as the same historic features would be demolished.

6.6 Environmentally Superior Alternative

CEQA requires identification of the environmentally superior alternative, that is, the alternative that would have the least significant impact on the environment. CEQA Guidelines Section 15126.6(e)(2) states: "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives."

As shown in Table 6-2, and as discussed in the alternatives analysis above, the Initial Phase Only Alternative would result in construction-related impacts similar to or less than those of the proposed project, given that construction activities would still occur but for a shorter duration. The No Project Alternative would not result in any construction impacts. However, the No Project Alternative would not achieve the general objective of the proposed project to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand because no facility and treatment improvements at FWTP or SRWTP would be constructed and operated.

Due to the reduced magnitude and duration of impacts, the Initial Phase Only Alternative is the environmentally superior alternative. However, the Initial Phase Only Alternative does not provide the complete buildout capacity of the SRWTP to treat water diverted from the Sacramento River to meet increasing water demands in the City's service area. Therefore, it would not fully achieve the objectives of the proposed project.

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CHAPTER 7
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CHAPTER 8
References

Executive Summary

Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in the Central Valley*.

USFWS (United States Fish and Wildlife Service). 2017. *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*).* U.S. Fish and Wildlife Service, Sacramento, CA. May 2017.

Chapter 1, Introduction

No references are cited in this chapter.

Chapter 2, Project Description

CDFW (California Department of Fish and Wildlife). 2010. *California Salmonid Stream Habitat Restoration Manual, 4th Edition*. July 1. Prepared by: G. Flosi, S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. Available online at: https://wildlife.ca.gov/Grants/FRGP/Guidance#580983477-guidance-documents. Accessed October 2023.

City of Sacramento. 2021. *City of Sacramento 2020 Urban Water Management Plan*. Final Report. June. Available online at: http://www.cityofsacramento.org/-/media/Corporate/Files/DOU/Reports/Sacramento-2020-UWMP---Final-w-Ltr-of-Acceptance.pdf. Accessed October 2023.

City of Sacramento. 2022. *Water Treatment Process – Where Your Water Comes From*. Available online at: https://www.cityofsacramento.org/Utilities/Water/Water-Quality/Where-Your-Water-Comes-From. Accessed October 2023.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed October 2023.

NMFS (National Marine Fisheries Service). 2011. *Anadromous Salmonid Passage Facility Design*. Northwest Region. July. Available online at: https://www.dfw.state.or.us/fish/passage/docs/fish_passage_design_criteria.pdf. Accessed October 2023.

Reclamation (United States Bureau of Reclamation). 1957. *Operating Contract Relating to Folsom and Nimbus Dams and Their Related Works and To Diversions of Water by the City of Sacramento*. Available online at: https://www.waterboards.ca.gov/waterrights/

water_issues/programs/bay_delta/california_waterfix/exhibits/docs/Sacramento/citysac_17.pdf. Accessed October 2023.

SMUD (Sacramento Municipal Utility District). 2024. *Station J Bulk Transmission Substation Project*. Final Environmental Impact Report. March 2024. State Clearinghouse No. 2023020549. Available online at: https://www.smud.org/Corporate/About-us/Reliability/Station-J-substation. Accessed June 2024.

Chapter 3, Environmental Setting, Impacts, and Mitigation Measures

Section 3.1, Approach to Analysis

SMUD (Sacramento Municipal Utility District). 2024. *Station J Bulk Transmission Substation Project*. Final Environmental Impact Report. March 2024. State Clearinghouse No. 2023020549. Available online at: https://www.smud.org/Corporate/About-us/Reliability/Station-J-substation. Accessed June 2024.

Section 3.2, Aesthetics

Caltrans (California Department of Transportation). 2023. *California Scenic Highway Program*. Available online at: https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways. Accessed October 2023.

City of Sacramento. 1997. *Sacramento River Parkway Plan*. Adopted October 21, 1997. Available online at: https://www.cityofsacramento.gov/content/dam/portal/pw/Engineering/Projects/Sac-River-Pkwy/1997-Sacramento-River-Parkway-Plan.pdf. Accessed October 2023.

City of Sacramento. 2011. *River District Specific Plan*. Adopted February 15, 2011. Available online at: https://www.cityofsacramento.gov/content/dam/portal/cdd/Planning/Specific-Plans/River-District-Specific-Plan_Adopted-02-15-2011.pdf. Accessed October 2023.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

County of Sacramento. 2008. *American River Parkway Plan*. Adopted September 10, 2008. Available online at: https://planning.saccounty.gov/LandUseRegulationDocuments/Documents/AmericanRiverParkwayPlan.pdf. Accessed October 2023.

Section 3.3 Agriculture Resources

City of Sacramento. 2023. *Public Review Draft Master Environmental Impact Report for the Sacramento 2040 General Plan and Climate Action & Adaptation Plan*. State Clearinghouse No. 2019023048. August 2023. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Environmental-Impact-Reports/2040-GPU-and-CAAP/Sacramento-2040-Project-MEIR-8242023.pdf?la=en. Accessed June 2024.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

DOC (California Department of Conservation). 2022a. California Important Farmland Finder. Available online at: https://maps.conservation.ca.gov/DLRP/CIFF/. Accessed September 2023.

DOC. 2022b. California Williamson Act Enrollment 2022. Available online at: https://gis.conservation.ca.gov/portal/home/webmap/viewer.html?webmap=18f7488c0a9d4d299f5e9c33b312f312. Accessed September 2023.

Section 3.4, Air Quality

Cairn Technology Ltd. 2022. *What Air Filtration Systems Are Used in Hospitals?* April 22, 2022. Available online at: cairntechnology.com/what-air-filtration-systems-hospitals/. Accessed April 2024.

CARB (California Air Resources Board). 2016. *Overview: Diesel Exhaust and Health*. Available online at: https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health. Accessed October 2023.

CARB. 2017. *Inhalable Particulate Matter and Health (PM2.5 and PM10)*. Available online at: https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health. Accessed October 2023.

CARB. 2019a. *Nitrogen Dioxide & Health*. Available online at: https://ww2.arb.ca.gov/resources/nitrogen-dioxide-and-health. Accessed March 2023.

CARB. 2019b. *Summary: Diesel Particulate Matter Health Impacts*. Available online at: https://ww2.arb.ca.gov/resources/summary-diesel-particulate-matter-health-impacts. Accessed October 2023.

CARB. 2022. Area Designation Maps. Available online at: http://www.arb.ca.gov/desig/adm/adm.htm. Accessed October 2023.

CARB. 2023a. *California Ambient Air Quality Standards (CAAQS)*. Available online at: https://ww2.arb.ca.gov/resources/california-ambient-air-quality-standards. Accessed October 2023.

CARB. 2023b. *Summaries of Air Quality Data, 2020–2022*. Available online at: http://www.arb.ca.gov/adam/index.html. Accessed October 2023.

CARB. 2024. *Naturally Occurring Asbestos*. Available online at: https://ww2.arb.ca.gov/our-work/programs/naturally-occurring-asbestos/about#. Accessed September 2024.

CEC (California Energy Commission). 2018. *Sacramento Valley Region Report*. Available online at: https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUM-CCCA4-2018-002_SacramentoValley_ADA.pdf. Accessed October 2023.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

DOC (California Department of Conservation). 2000. *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos*. August 2000. Available online at: https://www.placerair.org/DocumentCenter/View/1433/General-Location-Guide-PDF. Accessed October 2023.

IARC (International Agency for Research on Cancer). 2015. *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Volume 109 (2016) *Outdoor Air Pollution*. Available online at: https://monographs.iarc.fr/iarc-monographs-on-the-evaluation-of-carcinogenic-risks-to-humans-7/. Accessed October 2023.

OEHHA (Office of Environmental Health Hazards Assessments). 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments*. Adopted February 2015. Available online at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed October 2023.

SMAQMD (Sacramento Metropolitan Air Quality Management District). 2004. *2004 Revision to the California State Implementation Plan for Carbon Monoxide*. July 22, 2004. Available online at: http://www.airquality.org/ProgramCoordination/Documents/1)%202004%20CO%20Maintenance%20Plan.pdf. Accessed October 2023.

SMAQMD. 2010. *PM 10 Implementation/Maintenance Plan and Redesignation Request for Sacramento County*. October 28, 2010. Available online at: https://ww2.arb.ca.gov/sites/default/files/classic/planning/sip/planarea/sacsip/sacpm10staffreport.pdf. Accessed October 2023.

SMAQMD. 2013. *PM 2.5 Implementation/Maintenance Plan and Redesignation Request for Sacramento PM 2.5 Nonattainment Area*. October 24, 2013. Available online at: https://www.airquality.org/ProgramCoordination/Documents/PM2.5%20Imp%20and%20Redesignation%202013.pdf. Accessed October 2023.

SMAQMD. 2015. *Triennial Report and Air Quality Plan Revision*. May 28, 2015. Available online at: https://www.airquality.org/ProgramCoordination/Documents/11)%20%202015TriennialReportandProgressRevision.pdf. Accessed October 2023.

SMAQMD. 2016. *CEQA Guidance and Tools, Odors*. Available online at: https://www.airquality.org/LandUseTransportation/Documents/Ch7Odors%20FINAL6-2016.pdf. Accessed October 2023.

SMAQMD. 2017. *Sacramento Regional 2008 8-Hour Ozone Attainment and Reasonable Further Progress Plan*. July 24. Available online at: http://www.airquality.org/ProgramCoordination/Documents/Sac%20Regional%202008%20NAAQS%20Attainment%20and%20RFP%20Plan.pdf. Accessed October 2023.

USEPA (United States Environmental Protection Agency). 2016. *Nitrogen Dioxide (NO_2) Pollution*. Available online at: https://www.epa.gov/no2-pollution/basic-information-about-no2, last updated August 2, 2022. Accessed October 2023.

USEPA. 2022a. *Ozone Basics*. Available online at: https://www.epa.gov/ozone-pollution/ozone-basics#effects. Accessed October 2023.

USEPA. 2022b. *Basic Information about Carbon Monoxide (CO) Outdoor Air Pollution*. Available online at: https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#Effects. Accessed October 2023.

USEPA. 2022c. *Particulate Matter (PM) Basics*. Available online at: https://www.epa.gov/pm-pollution/particulate-matter-pm-basics#effects. Accessed October 2023.

USEPA. 2022d. *Basic Information about* NO_2. Available online at: https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects. Accessed October 2023.

USEPA. 2023. *Outdoor Air Quality Data – Monitor Values Report*. Available online at: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report. Accessed October 2023.

Section 3.5, Biological Resources - Aquatic

Anchor Environmental. 2003. *Literature Review of Effects of Resuspended Sediments Due to Dredging Operations*. Prepared for Los Angeles Contaminated Sediments Task Force, Los Angeles, California.

ARWA (American River Water Agencies). 2017. *Modified Flow Management Standard Proposed Water-Right Terms and Conditions*. Available online at: https://www.waterforum.org/wp-content/uploads/2017/12/ARWA-502-Modified-Flow-Management-Standard-Proposed-Water-Right-Terms-and-Conditions_-November-2017-_00022797-3xE2E14_.pdf. Accessed May 2025.

Baerwald, M., V. Bien, F. Feyrer, and B. May. 2007. *Genetic analysis reveals two distinct Sacramento splittail (*Pogonichthys macrolepidotus*) populations*. *Conservation Genetics* 8, 159–167. Available online at: https://doi.org/10.1007/s10592-006-9157-2. Accessed May 2025.

Bashevkin, S.M., T.X. Nguyen, E.J. Tham, J.W. Gaeta, L. Mitchell, and S. Khanna. 2024. *Fish abundance in the San Francisco Estuary (1959–2024), an integration of 10 monitoring surveys*. Ver 2. Environmental Data Initiative. Available online at: https://doi.org/10.6073/pasta/a29a6e674b0f8797e13fbc4b08b92e5b. Accessed May 2025.

Baxter, R D. 1999. "*Osmeridae*." In: Report on the 1980 to 1995 Fish, Shrimp and Crab Sampling in the San Francisco Estuary, ed. J. Orsi, 179–216. Interagency Ecological Program for the Sacramento–San Joaquin Estuary.

Beamesderfer R., M. Simpson, G. Kopp, J. Inman, A. Fuller, and D. Demko. 2004. *Historical and current information on green sturgeon occurrence in the Sacramento and San Joaquin rivers and tributaries*. Report by S.P. Cramer & Associates to State Water Contractors, Sacramento, California. August 10, 2004. Revised.

Bennett, W.A. 2005. *Critical Assessment of the Delta Smelt Population in the San Francisco Estuary, California*. *San Francisco Estuary and Watershed Science*, 3(2). http://dx.doi.org/10.15447/sfews.2005v3iss2art1. Accessed May 2025.

Berg, L., and T.G. Northcote. 1985. *Changes in territorial, gill-flaring, feeding behavior in juvenile coho salmon (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment*. *Canadian Journal of Fisheries and Aquatic Sciences*. 42:1410-1417.

CDFG (California Department of Fish and Game). 1998. *A status review of the spring-run Chinook salmon (*Oncorhynchus tshawytscha*) in the Sacramento River drainage*. Report to the Fish and Game Commission, Candidate Species Status Report 98-01. Sacramento, California.

CDFG. 2009. *California Department of Fish and Game Report to the Fish and Game Commission: A Status Review of the Longfin Smelt* Spirinchus thaleichthys *in California*. January 23, 2009.

CDFW (California Department of Fish and Wildlife). 2000. *Exhibit A. Department of Fish and Game Fish Screening Criteria*. Department of Fish and Game Bay Delta Region, Yountville, California. June 19, 2000.

CDFW. 2008. *California Aquatic Invasive Species Management Plan*. Available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=3868&inline=1. Accessed July 2023.

CDFW. 2022. *Aquatic Invasive Species Decontamination Protocols*. Available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=43333. Accessed July 2023.

CDFW. 2023. California Natural Diversity Database (CNDDB: Taylor Monument, Rio Linda, Citrus Heights, Sacramento West, Sacramento East, Carmichael, Clarksburg, Florin, and Elk Grove U.S. Geological Survey 7.5-minute series quadrangles), Sacramento, California. Available online at: https://wildlife.ca.gov/Data/CNDDB. Accessed July 2023.

Caltrans (California Department of Transportation). 2020. *Technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish*. Final Report. Prepared for California Department of Transportation by ICF Jones & Stokes and Illingworth & Rodkin, Inc.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

Dalen, J., and G.M. Knutsen. 1987. *Scaring effects of fish and harmful effects on eggs, larvae and fry from offshore seismic explorations*. In: Merklinger, H.M. (ed.) *Progress in Underwater Acoustics*. Springer, Boston, MA. https://doi.org/10.1007/978-1-4613-1871-2_12. Accessed May 2025.

Demetras, N.J., C.J. Michel, J.M. Smith, G.R. Cutter, S.A. Hayes, and S.T. Lindley. 2016. *Development of underwater recorders to quantify predation of juvenile Chinook salmon (*Oncorhynchus tshawytscha*) in a river environment*. *Fishery Bulletin*, 114(2), 179–185. Available online at: https://doi.org/10.7755/fb.114.2.5. Accessed May 2025.

DWR (California Department of Water Resources). 2021. CalSim 3. Modeling Support Branch, Bay-Delta Office, California Department of Water Resources, Sacramento, CA. Available online at: https://water.ca.gov/Library/Modeling-and-Analysis/Central-Valley-models-and-tools/CalSim-3.

DWR. 2022a. *Delta Conveyance Project Draft Environmental Impact Report*. July 2022. Available online at: https://www.deltaconveyanceproject.com/planning-processes/california-environmental-quality-act/draft-eir/draft-eir-document. Accessed June 2023.

DWR. 2022b. *A Water Resources System Planning Model for State Water Project and Central Valley Project*. CalSim 3 Final Report. California Department of Water Resources, Sacramento, CA. August.

Emmett, R., S. Hinton, S. Stone, and M. Monaco. 1991. *Distribution and Abundance of Fishes and Invertebrates in West Coast Estuaries. Volume II: Species Life History Summaries*. ELMR Report No. 8. NOAA/NOS Strategic Environmental Assessments Division, Rockville, Maryland.

Feyrer, F., M.L. Nobriga, and T.R. Sommer. 2007. *Multi-decadal trends for three declining fish species: habitat patterns and mechanisms in the San Francisco Estuary, California, USA*. *Canadian Journal of Fisheries and Aquatic Sciences* 64:723–734.

Gregory, R.S., and T.G. Northcote. 1993. *Surface, Planktonic, and Benthic Foraging by Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) in Turbid Laboratory Conditions*. *Canadian Journal of Fisheries and Aquatic Sciences*. 50(2): 233–240.

Grimaldo, L., F. Feyrer, J. Burns, and D. Maniscalco. 2017. *Sampling Uncharted Waters: Examining Rearing Habitat of Larval Longfin Smelt (*Spirinchus thaleichthys*) in the Upper San Francisco Estuary*. *Estuaries and Coasts* 40:1771–1784.

Grossman, G.D. 2016. *Predation on Fishes in the Sacramento–San Joaquin Delta: Current Knowledge and Future Directions*. *San Francisco Estuary and Watershed Science* 14(2).

Halvorsen, M.B., B.M. Casper, C.M. Woodley, T.J. Carlson, and A.N. Popper. 2012. *Threshold for onset of injury in Chinook salmon from exposure to impulsive pile driving sounds*. *PLOS One* 7(6): e38968. Available online at: https://doi.org/10.1371/journal.pone.0038968. Accessed May 2025.

Hastings, M.C., and A.N. Popper. 2005. *Effects of Sound on Fish*. California Department of Transportation, Sacramento, California.

Heublein, J.C., J.T. Kelly, C.E. Crocker, A.P. Klimley, and S.T. Lindley. 2009. *Migration of Green Sturgeon,* Acipenser medirostris, *in the Sacramento River*. *Environmental Biology of Fishes* 84(3):245–258. Available online at: https://www.noaa.gov/sites/default/files/legacy/document/2020/Oct/07354626160.pdf. Accessed May 2025.

ICF International. 2016. *Biological Assessment for the California WaterFix*. July. (ICF 00237.15.) Sacramento, CA. Prepared for the United States Department of the Interior, Bureau of Reclamation, Sacramento, CA.

Jackson, Z.J., J.J. Gruber, and J.P. Van Eenennaam. 2015. *White sturgeon spawning in the San Joaquin River, California, and effects of water management*. *Journal of Fish and Wildlife*

Management, *7*(1), 171–180. Available online at: https://doi.org/10.3996/092015-JFWM-092. Accessed May 2025.

Jassby, A.D., W. Kimmerer, S.G. Monismith, C. Armor, J.E. Cloern, T.M. Powell, J.R. Schubel, and T.J. Vendlinski. 1995. *Isohaline Position as a Habitat Indicator for Estuarine Populations*. *Ecological Applications* 5(1) (Feb. 1995):272–289.

Kimmerer, W.J. 2004. *Open water processes of the San Francisco Estuary: from physical forcing to biological responses*. *San Francisco Estuary and Watershed Science*. Vol. 2, Issue 1 (February 2004), Article 1. Available online at: http://repositories.cdlib.org/jmie/sfews/vol2/iss1/art1. Accessed May 2025.

Kimmerer, W.J., E.S. Gross, and M.L. MacWilliams. 2009. *Is the response of estuarine nekton to freshwater flow in the San Francisco Estuary explained by variation in habitat volume? Estuaries and Coasts* 32:375–389.

Klimley, A.P., E.D. Chapman, J.J. Cech, Jr., D.E. Cocherell, N.A. Fangue, M. Gingras, Z. Jackson, E.A. Miller, E.A. Mora, J.B. Poletto, A.M. Schreier, A. Seesholtz, K.J. Sulak, M.J. Thomas, D. Woodbury, and M.T. Wyman. 2015. *Sturgeon in the Sacramento-San Joaquin watershed: new insights to support conservation and management*. *San Francisco Estuary and Watershed Science* 13, 1–19. Available online at: http://escholarship.org/uc/item/7892b2wp. Accessed May 2025.

Lindberg, J.C., YJ.J. Tsai, B.D. Kammerer, B. Baskerville-Bridges, and TC. Hung. 2019. *Spawning Microhabitat Selection in Wild-Caught Delta Smelt* Hypomesus transpacificus *under Laboratory Conditions*. *Estuaries and Coasts* 43, 174–181 (2020). https://doi.org/10.1007/s12237-019-00672-5. Accessed May 2025.

Lindley, S.T., R.S. Schick, E. Mora, P.B. Adams, J.J. Anderson, S. Greene, et al. 2007. *Framework for assessing viability of threatened and endangered Chinook salmon and steelhead in the Sacramento–San Joaquin Basin*. *San Francisco Estuary and Watershed Science*, 5(1). Available online at: https://escholarship.org/uc/item/3653x9xc. Accessed May 2025.

MacNally, R., J.R. Thomson, W.J. Kimmerer, F. Feyrer, K.B. Newman, A. Sih, W.A. Bennett, L. Brown, E. Fleishman, S.D. Culberson, and G. Castillo. 2010. *An analysis of pelagic species decline in the upper San Francisco Estuary using multivariate autoregressive modeling (MAR)*. *Ecological Applications* 20:167–180.

McCabe, G.T., and C.A. Tracy. 1994. *Spawning and early life history of white sturgeon,* Acipenser transmontanus*, in the lower Columbia River*. *Fishery Bulletin* 92:760–772. February 1994.

McEwan, D. 2001. *Central Valley Steelhead*. In Contributions to the Biology of Central Valley Salmonids, *Fish Bulletin* 179. California Department of Fish and Game.

Merz, J.E., P.S. Bergman, J.F. Melgo, and S. Hamilton 2013. *Longfin smelt: spatial dynamics and ontogeny in the San Francisco Estuary, California*. *California Fish and Game* 99:122–148.

Merz, J.E., S. Hamilton, P.S. Bergman, and B. Cavallo. 2011. *Spatial perspective for delta smelt: a summary of contemporary survey data*. *California Fish and Game* 97:164–189.

Michel, C., J. Notch, S. Hayes, and S. Lindley. 2013. *Predator Densities and Associated Salmonid Smolt Mortality around Water Diversions*. Presentation at the International Conference on Engineering and Ecohydrology for Fish Passage, June 25. Corvallis, OR.

Mills, T.J., D.R. McEwan, and M.R. Jennings. 1997. *California salmon and steelhead: beyond the crossroads*. Pages 91–111 in D.J. Stouder, P.A. Bisson and R.J. Naiman, eds. Pacific salmon and their ecosystems: status and future options. Chapman and Hall, New York.

Moyle, P.B. 2002. *Inland Fishes of California*. Second edition. University of California Press: Davis, CA.

Moyle, P.B., J.E. Williams, and E.D. Wikramanayake. 1989. *Fish species of special concern of California*.

Moyle, P.B., B. Herbold, D.E. Stevens, and L.W. Miller. 1992. *Life History and Status of Delta Smelt in the Sacramento-San Joaquin Estuary, California*. *Transactions of the American Fisheries Society*, Volume 121, Issue 1, Pages 6–77. January. Available online at: https://doi.org/10.1577/1548-8659(1992)121%3C0067:LHASOD%3E2.3.CO;2. Accessed May 2025.

Moyle, P.B., R.M. Yoshiyama, J.E. Williams, and E.D. Wikramanayake. 1995. *Fish species of special concern in California.* Final Report. Prepared by Department of Wildlife and Fisheries Biology, University of California, Davis for California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova.

Moyle, P.B., R.D. Baxter, T. Sommer, T.D. Foin, and S.A. Matern. 2004. *Biology and population dynamics of Sacramento splittail (*Pogonichthys macrolepidotus*) in the San Francisco Estuary: a review*. *San Francisco Estuary and Watershed Science*. Vol. 2, Issue 2 (May 2004), Article 3. Available online at: http://repositories.cdlib.org/jmie/sfews/vol2/iss2/art3. Accessed May 2025.

Moyle, P.B., R.M. Quiñones, J.V. Katzand, and J. Weaver. 2015. *Fish Species of Special Concern in California*. Sacramento: California Department of Fish and Wildlife.

Moyle, P.B, L.B. Brown, J.R. Durand, and J.A. Hobbs. 2016. *Delta Smelt: Life History and Decline of a Once-Abundant Species in the San Francisco Estuary*. *San Francisco Estuary and Watershed Science* 14(2).

Myrberg, A.A. 1990. *The Effects of Man-made Noise on the Behavior of Marine Animals*. *Environment International* 16:575–586.

NMFS (National Marine Fisheries Service). 1989. *Endangered and threatened species; critical habitat; winter-run Chinook salmon*. Federal Register 54: 32085–32088.

NMFS. 1993. *Designated critical habitat; Sacramento River winter-run Chinook salmon*. Federal Register 58: 33212–33219.

NMFS. 1994. *Endangered and threatened species; status of Sacramento River winter-run Chinook salmon*. Federal Register 59: 440–450.

NMFS. 1996. *NMFS Juvenile Fish Screen Criteria for Pump Intakes Addendum*. Environmental and Technical Services Division, Portland, OR.

NMFS. 1998a. *Endangered and threatened species: proposed endangered status for two Chinook salmon ESUs and proposed threatened status for five Chinook ESUs; proposed redefinition, threatened status, and revision of critical habitat for one Chinook salmon ESU; proposed designation of Chinook salmon critical habitat in California, Oregon, Washington, Idaho*. Federal Register 63: 11481–11519.

NMFS. 1998b. *Endangered and threatened species: threatened status for two ESU's of steelhead in Washington, Oregon, and California*. Federal Register 63: 13347–13371.

NMFS. 1999. *Endangered and threatened species; threatened status for two Chinook salmon evolutionarily significant units (ESUs) in California*. Federal Register 64: 50394–50415.

NMFS. 2004. *Endangered and threatened species: establishment of Species of Concern list, addition of species to Species of Concern list, description of factors for identifying Species of Concern, and revision of Candidate Species List Under the Endangered Species Act: notice*. Federal Register 69: 19975–19979.

NMFS. 2005a. *Endangered and threatened species; final listing determinations for 16 ESUs of West Coast salmon, and final 4(d) protective regulations for threatened salmonid ESUs*. Federal Register 70: 37160–37204.

NMFS. 2005b. *Endangered and threatened species; designation of critical habitat for 12 Evolutionarily Significant Units of west coast salmon and steelhead in Washington, Oregon, and Idaho*. Federal Register 70: 52630–52858.

NMFS. 2005c. *Endangered and threatened wildlife and plants: proposed threatened status for Southern Distinct Population Segment of North American green sturgeon*. Federal Register 70: 17386–17401.

NMFS. 2006a. *Biological opinion for the Sacramento River Bank Protection Project, 14 critical levee erosion repairs*. Prepared for the U. S. Army Corps of Engineers, Sacramento District, California.

NMFS. 2006b. *Endangered and threatened wildlife and plants: threatened status for southern distinct population segment of North American green sturgeon: final rule*. Federal Register 71: 17757–17766.

NMFS. 2009. *Endangered and threatened wildlife and plants: final rulemaking to designate critical habitat for the threatened southern distinct population segment of North American green sturgeon*. Federal Register 74: 52299–52351.

NMFS. 2014. *Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead*. Federal Register 79 FR 42504.

NMFS. 2016. *5-Year Status Review: Summary and Evaluation of Sacramento River Winter-Run Chinook Salmon ESU*. Federal Register 80 FR 6695.

NMFS. 2018. *Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon (*Acipenser medirostris*)*. Federal Register 83 FR 1025.

NMFS. 2019. *Biological Opinion on the Long-Term Operation of the Central Valley Project and the State Water Project*. West Coast Region, Long Beach, California. October 21, 2019.

NMFS. 2023. Endangered Species Act Critical Habitat Geodatabase. Available online at: https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=68d8df16b39c48fe9f60640692d0e318. Accessed July 2023.

PSMFC (Pacific States Marine Fisheries Commission). 2014. *Juvenile Salmonid Emigration Monitoring in the Lower American River, California January – June 2013*. Unpublished report. Prepared for the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife, Sacramento, California.

Radtke, L.D. 1966. *Distribution of smelt, juvenile sturgeon, and starry flounder in the Sacramento-San Joaquin Delta with observations on food of sturgeon*. In: Ecological studies of the Sacramento-San Joaquin Delta Part II: fishes of the delta. J.L. Turner and D.W. Kelley (Eds). *California Fish and Game Bulletin*, 136, 115–126.

Reclamation (United States Bureau of Reclamation). 2024a. *New Plan for California Water: Updated Long-Term Operation of the Central Valley Project and State Water Project*. Fact Sheet. November 2024. Available online at: https://www.usbr.gov/mp/bdo/docs/lto-roll-out-fact-sheet-11-4-24.pdf. Accessed November 2024.

Reclamation. 2024b. *Record of Decision. Long-Term Operation of the Central Valley Project and State Water Project*. December 20, 2024. Available online at: https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=55600. Accessed January 2025.

Robinson A., and B.K. Greenfield. 2011. *LTMS Longfin Smelt Literature Review and Study Plan*. SFEI contribution XXX. San Francisco Estuary Institute, Oakland, CA. 40 pp. Available online at: https://www.spn.usace.army.mil/Portals/68/docs/Dredging/LMTS/S%20and%20S/LFS_8_15_final.pdf. Accessed May 2025.

Rosenfield, J.A., and R. Baxter. 2007. *Population Dynamics and Distribution Patterns of Longfin Smelt in the San Francisco Estuary*. *Transactions of the American Fisheries Society* 136(6):1577–1592.

Sabal, M., S. Hayes, J. Merz, and J. Setka. 2016. *Habitat Alterations and a Nonnative Predator, the Striped Bass, Increase Native Chinook Salmon Mortality in the Central Valley, California*. North American Journal of Fisheries Management 36(2):309–320.

Scott, W.B. and E.J. Crossman. 1973. *Freshwater fishes of Canada*. *Bulletin of the Fisheries Research Board of Canada* 184:1–966.

Sellheim K., M. Willmes, L.S. Lewis, J. Sweeney, J. Merz, and J.A. Hobbs. 2022. *Diversity in Habitat Use by White Sturgeon Revealed Using Fin Ray Geochemistry*. *Frontiers in Marine Science*, 9:859038.

Snider, B., and R.G. Titus. 2000. *Lower American River Emigration Survey: October 1996–September 1997*. Stream Evaluation Program Technical Report No. 00-2. California

Department of Fish and Game, Habitat Conservation Division, Native Anadromous Fish and Watershed Branch, Stream Evaluation Program. January 2000.

Snider, B., R. Titus, and K. Vyberberg. 2001. *Evaluation of Effects of Flow Fluctuations on the Anadromous Fish Populations in the Lower American River*. California Department of Fish and Game, Habitat Conservation Division. Stream Evaluation Program. Tech. Reports No. 1 and 2 with Appendices 1–3.

Sommer, T., C. Armor, R. Baxter, R. Breuer, and L. Brown. 2007. *The collapse of pelagic fishes in the upper San Francisco estuary*. *Fisheries Magazine*. Available online at: https://doi.org/10.1577/1548-8446(2007)32[270:TCOPFI]2.0.CO;2. Accessed May 2025.

Sommer, T., F.H. Mejia, M.L. Nobriga, F. Feyrer, and L. Grimaldo. 2011. *The Spawning Migration of Delta Smelt in the Upper San Francisco Estuary*. *San Francisco Estuary and Watershed Science*, 9(2). Available online at: https://doi.org/10.15447/sfews.2014v9iss2art2 Retrieved from https://escholarship.org/uc/item/86m0g5sz. Accessed May 2025.

Sommer, T., and F. Mejia. 2013. *A place to call home: a synthesis of Delta Smelt habitat in the upper San Francisco Estuary*. *San Francisco Estuary and Watershed Science*, 11(2): 25 pages.

Stevens, D. E., and L.W. Miller. 1970. *Distribution of sturgeon larvae in the Sacramento-San Joaquin River system*. *California Fish and Game* 56:80-86.

Stevens, D.E., D.W. Kohlhorst, L.W. Miller, and D.W. Kelley. 1985. *The Decline of Striped Bass in the Sacramento–San Joaquin Estuary, California*. *Transactions of the American Fisheries Society* 114:12–30.

Thomson, J.R., W.J. Kimmerer, L.R. Brown, K.B. Newman, R.M. Nally, W.A. Bennett, F. Feyrer, and E. Fleishman. 2010. *Bayesian change point analysis of abundance trends for pelagic fishes in the upper San Francisco Estuary*. *Ecological Applications* 20:1431–1448.

USACE (United States Army Corps of Engineers), U.S. Department of the Interior, Bureau of Reclamation (Reclamation), Central Valley Flood Protection Board (CVFPB), and Sacramento Area Flood Control Agency (SAFCA). 2019. *Folsom Dam Modification Project Water Control Manual Update, Final Supplemental Environmental Assessment/ Environmental Impact Report*. State Clearinghouse No. 2012102034. January 2019.

USFWS (United States Fish and Wildlife Service). 1994. *Endangered and threatened wildlife and plants: critical habitat determination for the delta smelt*. Federal Register 59: 65256–65279.

USFWS. 2001. *Final Restoration Plan for the Anadromous Fish Restoration Program: a plan to increase natural production of anadromous fish in the Central Valley of California*. Prepared for the Secretary of the Interior by the U. S. Fish and Wildlife Service with assistance from the Anadromous Fish Restoration Program Core Group under authority of the Central Valley Project Improvement Act. Adopted as Final on January 9, 2001.

USFWS. 2023. List of Threatened and Endangered Species that may occur in your Project Location, and/or may be Affected by your Project. Information for Planning and

Consultation (IPaC). Consultation Code: Project Codes: 2023-0111189 and 2023-0111192. Available online at: https://ipac.ecoshpere.fws.gov. Accessed July 2023.

Velagic, E. 1995. *Turbidity study: a literature review*. Prepared for Delta planning branch, California Department of Water Resources by Centers for Water and Wildland Resources, University of California, Davis.

Wang, J.C.S. 1986. *Fishes of the Sacramento-San Joaquin Estuary and Adjacent Waters, California: A Guide to the Early Life Histories*. Interagency Ecological Program Technical Report No. 9.

Waters, T.F. 1995. *Sediment in streams: Sources, biological effects, and control*. American Fisheries Society Monograph 7.

Williams, T.H., B.C. Spence, D.A. Boughton, R.C. Johnson, L.G. Crozier, N.J. Mantua, M.R. O'Farrell, and S.T. Lindley. 2016. *Viability assessment for Pacific salmon and steelhead listed under the Endangered Species Act: Southwest*. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-564.

Yoshiyama, R.M., F.W. Fisher, and P.B. Moyle. 1998. *Historical abundance and decline of Chinook salmon in the Central Valley region of California*. *North American Journal of Fisheries Management* 18: 487–521.

Section 3.6, Biological Resources - Terrestrial

Baldwin, B.G., D.H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. *The Jepson Manual: Vascular Plants of California, Second Edition*. University of California Press, Berkeley.

CDFW (California Department of Fish and Wildlife). 2023a. California Natural Diversity Database (CNDDB: Taylor Monument, Rio Linda, Citrus Heights, Sacramento West, Sacramento East, Carmichael, Clarksburg, Florin, and Elk Grove U.S. Geological Survey 7.5-minute series quadrangles), Sacramento, California. Available online at: https://wildlife.ca.gov/Data/CNDDB. Accessed July 2023.

CDFW. 2023b. California Natural Diversity Database RareFind 5 personal computer program. Available online at: https://wildlife.ca.gov/Data/CNDDB/Maps-and-Data#43018407-rarefind-5. Accessed August 2023.

City of Sacramento. 2016. Ordinance No. 2016-0026 Section 4. Chapter 12.56 Tree Planting, Maintenance, and Conservation. August 4, 2016.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

CNPS (California Native Plant Society). 2023. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). (CNPS: Taylor Monument, Rio Linda, Citrus Heights, Sacramento West, Sacramento East, Carmichael, Clarksburg, Florin, and Elk Grove U.S. Geological Survey 7.5-minute series quadrangles). Available online at: https://rareplants.cnps.org/. Accessed July 2023.

CWHR (California Wildlife Habitat Relationship Program) and C. Battistone, Revised February 2005. *Life History Account for White-tailed Kite*. California Wildlife Habitat Relationship System. Department of Fish and Wildlife and California Interagency Wildlife Task Group. Sacramento, CA. Originally published in Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988–1990. California's Wildlife. Vol. I–III. California Department of Fish and Game, Sacramento, CA.

CWHR and C. Battistone, Revised January 2006. *Life History Account for Swainson's Hawk. California Wildlife Habitat Relationship System*. Department of Fish and Wildlife and California Interagency Wildlife Task Group. Sacramento, CA. Originally published in Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988–1990. California's Wildlife. Vol. I–III. California Department of Fish and Game, Sacramento, CA.

CWHR and C. Battistone, Revised 2007. *Life History Account for Song Sparrow*. California Wildlife Habitat Relationship System. Department of Fish and Wildlife and California Interagency Wildlife Task Group. Sacramento, CA. Originally published in Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988–1990. California's Wildlife. Vol. I–III. California Department of Fish and Game, Sacramento, CA.

Shuford, W.D., and T. Gardali, editors. 2008. *California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California*. Studies of Westerns Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in the Central Valley*.

USFWS (United States Fish and Wildlife Service). 2006. *Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) 5-Year Review: Summary and Evaluation*. Sacramento Fish and Wildlife Office, Sacramento, CA. September 2006.

USFWS. 2017. *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)*. U.S. Fish and Wildlife Service, Sacramento, CA. May 2017.

USFWS. 2023a. List of Threatened and Endangered Species that may occur in your Project Location, and/or may be Affected by your Project. Information for Planning and Consultation (IPaC). Consultation Code: Project Codes: 2023-0111189 and 2023-0111192. Available online at: https://ipac.ecoshpere.fws.gov. Accessed July 2023.

USFWS. 2023b. *Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*) Species Account*. Sacramento Fish and Wildlife Office, Sacramento, CA. Available online at: https://www.fws.gov/species/valley-elderberry-longhorn-beetle-desmocerus-californicus-dimorphus. Accessed August 2023.

Section 3.7, Cultural Resources

Arrington, C. 2013. P-34-004772 DPR 523 Form set. Prepared by Parus Consulting. On file at the NCIC.

Arroues, K. 2020. *San Joaquin Series, California State Soil*. Soil Science Society of America.

Bean, W. 1978. *California, an Interpretive History.* New York: McGraw Hill.

Boghosian, P. 1997. 101 Bercut Drive, P-34-000897 DPR 523 form set. On file, NCIC, Sacramento, CA.

Brienes, West, and Schultz. 1981. *Overview of Cultural Resources in the Central Business District, Sacramento, CA.*

Carunchio, K. 2006. "*Turning Mud into Liquid Gold: A History of Sacramento's Water Supply, 1849–1924.*" In Water, Our History & Our Future, *Sacramento History Journal*, Vol. 6, No.1–4. Sacramento County Historical Society.

Castillo, E.D. 1978. "*The Impact of Euro-American Exploration and Settlement.*" In California, edited by R.F. Heizer, pp. 99–127. Handbook of North American Indians, Vol. 8. W.C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

City of Sacramento. 2011. "City of Sacramento Water Treatment Plants Rehabilitation Project (Z14006000) (State Clearinghouse No. 2011112039), Initial Study/Mitigated Negative Declaration". Available online at: https://sacramento.granicus.com/MetaViewer.php?view_id=30& clip_id=2925&meta_id=380852. Accessed October 20203.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

Faye, PL. 1923. *Notes on the Southern Maidu*. University of California Publications in American Archaeology and Ethnology 20:35–53.

Hoover, M.B, H.E. Rensch, E. Rensch, and W.N. Abeloe. 2002. *Historic Spots in California*. Fourth edition, revised by D.E. Kyle. Stanford University Press, Stanford, CA.

Jackson, W.T., R.F. Herbert, and S.R. Wee (Jackson Research Projects). 1983. *The Old Courthouse Block: H-I-6-7 Streets, Sacramento, 1848–1983*. November 1983.

Kroeber, A.L. 1925. *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78, Smithsonian Institution, Washington, D.C., reprinted from 1925 edition, Dover Publications, Inc., New York, 1976.

Lindsey, B. 2021. Historic Glass Bottle Identification and Information Website. Prepared for the Bureau of Land Management and the Society for Historic Archaeology. Available online at: https://sha.org/bottle/index.htm. Accessed September 2022.

Littlejohn, H.W. 1928. *Nisenan Geography, Document 18*. University of California Department of Anthropology, Berkeley, California.

Moratto, M.J. 2004. *California Archaeology*. Reprinted from 1984 edition, Coyote Press, Salinas, California.

NCIC (North Central Information Center). 2022. Records Search File No. File No. SAC-22-140. On file, ESA.

OHP (Office of Historic Preservation). 1995. *Instructions for Recording Historical Resources*. Office of Historic Preservation, Sacramento, CA.

OHP. 2022. Built Environment Resource Directory (BERD) for Sacramento County. Available online at: https://ohp.parks.ca.gov/pages/1068/files/ Sacramento.csv. Accessed September 2022.

Panamerican Consultants. 2009. P-34-004469 US403 DPR 523 form set, prepared by Panamerican Consultants. On file at the NCIC, Sacramento.

Panamerican Consultants. 2010. *Cultural Resources Remote Sensing Survey and Diver Investigations at Selected Target Locations, Sacramento River Bank Stabilization Protection Project (SRBPP), Sacramento River and Tributaries*. Prepared by Panamerican Consultants. Prepared for USACE.

Reps, J.W. 1975. *Cities of the American West: A History of Frontier Urban Planning*. Princeton, NJ: Princeton University Press.

Rosenthal, J.S., and J. Meyer. 2004. *Cultural Resources Inventory of Caltrans District 10 Rural Conventional Highways: Volume III: Geoarchaeological Study, Landscape Evolution and the Archaeological Record of Central California*. Prepared by Far Western Anthropological Research Group, Inc., Davis, CA, Prepared for Caltrans District 10, Stockton.

Rosenthal, J.S., G.G. White, and M.Q. Sutton. 2007. *The Central Valley: A View from the Catbird's Seat*. In California Prehistory: Colonization, Culture, and Complexity, T.L. Jones and K.A. Klar, eds., pp. 147–163. AltaMira Press, Lanham, MD.

Shipley, W.F. 1978. "*Native Languages of California.*" In California, edited by R.F. Heizer, pp. 80–90, Handbook of North American Indians, Vol. 8, W.C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Sikes, N.E. 2013. *Cultural Resources Mitigation Compliance Report for Sacramento Water Treatment Plants Rehabilitation Project, City of Sacramento, Sacramento County, CA*. Prepared by Parus Consulting. Prepared for C. Overra & Company

Strand, R.G., and J.B. Koenig. 1965. Geologic Map of California: Sacramento Sheet. California Division of Mines and Geology.

United States Department of the Interior. 1995. "*National Register Bulletin: How to Apply the National Register Criteria for Evaluation*." U.S. Department of the Interior, National Park Service, Cultural Resources.

USDA (United States Department of Agriculture). 2022. Natural Resources Conservation Service Web Soil Survey, Version 3.1. Available online at: http://websoilsurvey.sc.egov.usda.gov/app/WebSoilSurvey.aspx. Accessed August 2022.

Warner, W.H. 1848. Map of Sacramento, Plan of Sacramento City, 1848. Ithaca, NY: Historic Urban Plans. Reproduced 1969.

Wilson, N.L., and A.H. Towne. 1978. "*Nisenan*." In California, edited by R.F. Heizer, pp. 387–397. Handbook of North American Indians, Vol. 8, W.C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Section 3.8, Energy

CARB (California Air Resources Board). 2022. *Advanced Clean Cars Program*. Available online at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/about. Accessed October 2023.

CDTFA (California Department of Tax and Fee Administration). 2024a. *Motor Vehicle Fuel 10 Year Report*. Available online at: https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm. Accessed October 2023.

CDTFA. 2024b. *Taxable Diesel Gallons 10 Year Report*. Available online at: https://www.cdtfa.ca.gov/taxes-and-fees/spftrpts.htm. Accessed October 2023.

CEC (California Energy Commission). 2021a. *Natural Gas Research and Development Program*. Available online at: https://www.energy.ca.gov/sites/default/files/2021-06/CEC-500-2018-006.pdf. Accessed October 2023.

CEC. 2021b. *2019 Integrated Energy Policy Report, CEC-100-2019-001*. Updated November 8, 2019. Available online at: https://www.energy.ca.gov/publications/2019/2019-integrated-energy-policy-report. Accessed June 2025.

CEC. 2022a. *2022 Total System Electric Generation.* Available online at: https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2022-total-system-electric-generation. Accessed June 2025.

CEC. 2022b. *Oil Supply Sources to California Refineries*. Available online at: https://www.energy.ca.gov/data-reports/energy-almanac/californias-petroleum-market/annual-oil-supply-sources-california. Accessed June 2025.

CEC. 2023. *2022 California Annual Retail Fuel Outlet Report Results (CEC-A15)*. Available online at: https://www.energy.ca.gov/data-reports/energy-almanac/transportation-energy/california-retail-fuel-outlet-annual-reporting. Accessed October 2023.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

PG&E (Pacific Gas and Electric Company). 2023a. *Company Profile*. Available online at: https://www.pge.com/en_US/about-pge/company-information/profile/profile.page. Accessed October 2023.

PG&E. 2023b. *Delivering Low Emission Energy*. Available online at: https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page#:~:text=In%202021%2C%20roughly%20half%20of,nuclear%20and%20large%20hydroelectric%20power. Accessed October 2023.

SMUD (Sacramento Municipal Utility District). 2021. *2030 Zero Carbon Plan*. Available online at: https://www.smud.org/-/media/Documents/Corporate/Environmental-Leadership/Zero Carbon/2030-Zero-Carbon-Plan-Technical-Report.ashx. Accessed October 2023.

SMUD. 2022. 2022 *Power Content Label*. Available online at: https://www.smud.org/SMUDPCL. Accessed October 2023.

SMUD. 2023. *Power Sources*. Available online at: https://www.smud.org/en/Corporate/Environmental-Leadership/Power-Sources. Accessed October 2023.

USEPA (United States Environmental Protection Agency). 2012. *EPA and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017 through 2025 Cars and Light Trucks*. Available online at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EZ7C.PDF?Dockey=P100EZ7C.PDF. Accessed October 2023.

USEPA. 2022a. *The Safer Affordable Fuel Efficient (SAFE) Vehicles proposed Rule for Model years 2021–2026*. Available online at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/safer-affordable-fuel-efficient-safe-vehicles-proposed. Accessed October 2023.

USEPA. 2022b. *EPA Restores California's Authority to Enforce Greenhouse Gas Emission Standards for Cars and Light Trucks*. Available online at: https://www.epa.gov/newsreleases/epa-restores-californias-authority-enforce-greenhouse-gas-emission-standards-cars-and. Accessed October 2023.

USEPA and National Highway Traffic Safety Administration (NHTSA). 2019. *One National Program Rule on Federal Preemption of State Fuel Economy Standards*. Available online at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100XI4W.pdf. Accessed October 2023.

Section 3.9, Geology, Soils, Paleontological Resources and Mineral Resources

CDC (California Department of Conservation). 2023a. Fault Activity Map of California. Available online at: https://maps.conservation.ca.gov/cgs/fam/. Accessed October 2023.

CDC. 2023b. Well Finder. Available online at: https://www.conservation.ca.gov/calgem/Pages/Wellfinder.aspx. Accessed September 2023.

CGS (California Geological Survey). 1966. *Geology of Northern California*. Bulletin 190, pp. 217–219.

CGS. 2022. *CGS Seismic Hazards Program: Liquefication Hazards*. Available online at: https://gis.data.ca.gov/datasets/cadoc::cgs-seismic-hazards-program-liquefaction-zones-1/about. Accessed October 2023.

City of Sacramento. 2015a. *City of Sacramento 2035 General Plan Master Environmental Impact Report*. Certified March 3, 2015. Appendix C, Background Report. p. 7–13.

City of Sacramento. 2015b. *Background Report to the 2035 Sacramento General Plan,* Chapter 7, Public Health and Safety, adopted March 3.

City of Sacramento. 2023. *Sacramento 2040 General Plan and Climate Action & Adaptation Plan Master Environmental Impact Report.* State Clearinghouse No. 2019012048. August 2023. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Environmental-Impact-Reports/2040-GPU-and-CAAP/Sacramento-2040-Project-MEIR-8242023.pdf?la=en. Accessed October 2023.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

Leach-Palm, L. 2012. *Archaeological Survey Report for the Sacramento River and E.A. Fairbairn Water Treatment Plants Rehabilitation Project, Sacramento County, California*. January. Available online at: http://sacramento.granicus.com/MetaViewer.php?view_id=30&clip_id=2925&meta_id=380853. Accessed May 2023.

NRCS (Natural Resources Conservation Service). 1993. *Soil Survey of Sacramento County, California*. April. pp. 83, 84, & 109, Sheets 5 & 6.

NRCS. 2023. Web Soil Survey. Available online at: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed November 2023.

O'Neal, M., and F.W. Gius. 2018. *Special Report 245, Mineral Land Classification Map of Concrete Aggregate in the Greater Sacramento Area Production-Consumption Area*. Available online at: https://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=mlc. Accessed September 2023.

SVP (Society of Vertebrate Paleontology). 1995. *Standard Procedures for the Assessment and Mitigation of Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontological Resources*. *Society of Vertebrate Paleontology News Bulletin*, Vol. 163. pp. 22–27.

SVP. 1996. *Conditions of Receivership for Paleontologic Salvage Collections*, *Society of Vertebrate Paleontology News Bulletin*, Vol. 166. pp. 31–32.

USGS (United States Geological Survey). 2019. *U.S. Landslide Inventory*. Available online at: https://www.usgs.gov/tools/us-landslide-inventory. Accessed October 2023.

USGS. 2023. Quaternary fault and fold database for the United States. Available online at: https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf. Accessed May 2023.

Wesnousky, S.G. 1986. *Earthquakes, Quaternary Faults, and Seismic Hazard in California*. *Journal of Geophysical Research*, Vol. 91, No. B12, Table A1.

Section 3.10, Greenhouse Gas Emissions

BAAQMD (Bay Area Air Quality Management District). 2019. *Calculating Potential to Emit for Emergency Backup Power Generators*. Available online at: https://www.baaqmd.gov/~/media/files/engineering/policy_and_procedures/banking-and-offsets/calculating-pte-for-emergency-generators-06032019-pdf.pdf?la=en. Accessed May 2024.

Cal Adapt. 2022. *Local Climate Change Snapshot*. Available online at: https://cal-adapt.org/tools/local-climate-change-snapshot. Accessed October 2023.

CARB (California Air Resources Board). 2008. *Climate Change Scoping Plan: A Framework for Change, December 2008*. Available online at: https://ww3.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed October 2023.

CARB. 2014. *First Update to the Climate Change Scoping Plan: Building on the Framework. May 2014*. Available online at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf. Accessed October 2023.

CARB. 2017. *California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target, November 2017*. Available online at: https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed October 2023.

CARB. 2021. *California Greenhouse Gas Emissions for 2000–2019 – Trends of Emissions and Other Indicators, July 28, 2021*. Available online at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/ca_ghg_inventory_trends_2000-2019.pdf. Accessed October 2023.

CARB. 2022a. *GHG Global Warming Potentials*. Available online at: https://ww2.arb.ca.gov/ghg-gwps. Accessed October 2023.

CARB. 2022b. *2022 Scoping Plan Update*. Available online at: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents. Accessed October 2023.

CDFA (California Department of Food and Agriculture). 2020. *California Agricultural Statistics Review, 2020*. Available online at: https://www.cdfa.ca.gov/Statistics/PDFs/2020_Ag_Stats_Review.pdf. Accessed October 2023.

City of Sacramento. 2012. *Climate Action Plan*. Available online at: https://planning.saccounty.gov/PlansandProjectsIn-Progress/Documents/Climate%20Action%20Plan/Government%20Operations%20CAP.pdf. Accessed October 2023.

City of Sacramento. 2015a. *General Plan Climate Action Plan Policies and Programs – Appendix B*. https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/General-Plan/2035-GP/Appendix-B---General-Plan-Climate-Action-Plan-Policies-and-Programs.pdf?la=en. Accessed October 2023.

City of Sacramento. 2015b. *Climate Action Plan Consistency Review Checklist*. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Long-Range/CAP-Consistency-Checklist_2030-Gen-Plan-6-19-15.pdf?la=en. Accessed October 2023.

City of Sacramento. 2016. *Climate Action Plan for Internal Operations*. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/Public-Works/Facilities/CityOfSacramento_1606_ClimateActionPlan_InternalOps_FINAL.pdf?la=en. Accessed October 2023.

City of Sacramento. 2024a. *Climate Action and Adaptation Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

City of Sacramento. 2024b. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

Climate Central. 2022. *U.S. Temperatures and Billion-Dollar Disasters*. January 10, 2022. Available online at: https://www.climatecentral.org/climate-matters/2022-u-s-temperatures-and-billion-dollar-disasters. Accessed October 2023.

CNRA (California Natural Resources Agency). 2009. *2009 California Climate Adaptation Strategy – A Report to the Governor of the State of California in Response to Executive Order S-13-2008,* 2009. Available online at: https://resources.ca.gov/CNRALegacyFiles/docs/climate/Statewide_Adaptation_Strategy.pdf. Accessed October 2023.

CNRA. 2014. *Safeguarding California: Reducing Climate Risk, an Update to the 2009 California Climate Adaptation Strategy*, July 2014. Available online at: https://resources.ca.gov/CNRALegacyFiles/docs/climate/Final_Safeguarding_CA_Plan_July_31_2014.pdf. Accessed October 2023.

CNRA. 2016. *Safeguarding California: Implementation Action Plans*, March 2016. Available online at: https://resources.ca.gov/CNRALegacyFiles/docs/climate/safeguarding/Safeguarding%20California-Implementation%20Action%20Plans.pdf. Accessed October 2023.

CNRA. 2018. *Safeguarding California Plan: 2018 Update*, January 2018. Available online at: https://resources.ca.gov/CNRALegacyFiles/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf. Accessed October 2023.

Cook, J., N. Oreskes, P.T Doran, W. RL. Anderegg, B. Verheggen, E.W. Maibach, et al. 2016. *Consensus on consensus: a synthesis of consensus estimates on human-caused global warming*. *Environmental Research Letters* Vol. 11 No. 4, DOI:10.1088/1748-9326/11/4/048002, April 13, 2016. Available online at: https://iopscience.iop.org/article/10.1088/1748-9326/11/4/048002/pdf. Accessed October 2023.

County of Sacramento. 2023. *Sacramento County 2021 GHG Inventory*. Available online at: https://green.saccounty.net/Documents/2021%20GHG%20Inventory%20Public%20Review%20Draft.pdf. Accessed October 2023.

IPCC (Intergovernmental Panel on Climate Change). 2021. *IPCC Sixth Assessment Report: Summary for Policymakers*. Available online at: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf. Accessed October 2023.

IPCC. 2022. *Climate Change 2022: Mitigation of Climate Change*. Available online at: https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/. Accessed October 2023.

NOAA (National Oceanic and Atmospheric Association). 2019. *Assessing the US Climate in 2018*. Published February 6, 2019. Available online at: https://www.ncei.noaa.gov/news/national-climate-201812. Accessed October 2023.

NOAA. 2021. *Climate Change: Global Sea Level*. Last updated December 21, 2021. Available online at: https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level. Accessed October 2023.

NOAA. 2022. *NOAA Wildfires/FIREX Fact Sheet – The Impact of Wildfires on Climate and Air Quality*. Available online at: https://csl.noaa.gov/factsheets/csdWildfiresFIREX.pdf. Accessed October 2023.

Office of Governor. 2015. *Executive Order B-30-15*. April 29, 2015. Available online at: https://www.ca.gov/archive/gov39/2015/04/29/news18938/index.html. Accessed October 2023.

OPR (Office of Planning and Research). 2018. *Discussions Draft: CEQA and Climate Change Advisory*, December 2018. Available online at: https://lci.ca.gov/docs/20181228-Discussion_Draft_Climate_Change_Adivsory.pdf. Accessed June 2025.

Red Cross Red Crescent Climate Centre. 2019. *Heatwave Guide for Cities*. July 2019. Available online at: https://www.climatecentre.org/downloads/files/IFRCGeneva/RCCC%20Heatwave%20Guide%202019%20A4%20RR%20ONLINE%20copy.pdf. Accessed November 2024.

SMAQMD (Sacramento Metropolitan Air Quality Management District). 2016. *Guidance for Construction GHG Emission Reductions*, May 2016. Available online at: https://www.airquality.org/LandUseTransportation/Documents/Ch6ConstructionMitMeasuresFINAL5-2016.pdf. Accessed November 2023.

SMUD (Sacramento Municipal Utility District). 2021. *2030 Zero Carbon Plan*. Available online at: https://www.smud.org/-/media/Documents/Corporate/Environmental-Leadership/ZeroCarbon/2030-Zero-Carbon-Plan-Technical-Report.ashx. Accessed October 2023.

Singh, R., J. Arrighi, E. Jjemba, K. Strachan, M. Spires, and A. Kadihasanoglu. 2019. *Heatwave Guide for Cities*, July 2019. Red Cross Red Crescent Climate Centre. Available online at: https://www.climatecentre.org/downloads/files/IFRCGeneva/RCCC%20Heatwave%20Guide%202019%20A4%20RR%20ONLINE%20copy.pdf. Accessed October 2023.

Reclamation (United States Bureau of Reclamation). 2022. *American River Basin Study*, August 2022. Available online at: https://www.usbr.gov/watersmart/bsp/docs/arbs/ARBS-Study.pdf. Accessed October 2023.

USEPA (United States Environmental Protection Agency). 2022. *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990–2020.* Available online at: https://www.epa.gov/system/files/documents/2022-04/us-ghg-inventory-2022-main-text.pdf. Accessed October 2023.

Westerling, A.L. 2018. *Wildfire Simulations for the Fourth California Climate Assessment: Projecting Changes in Extreme Wildfire Events with a Warming Climate*, Publication no. CCCA4-CEC-2018-014, August 2018. Available online at: https://www.energy.ca.gov/

sites/default/files/2019-11/Projections_CCCA4-CEC-2018-014_ADA.pdf. Accessed October 2023.

Section 3.11, Hazards and Hazardous Materials

City of Sacramento. 2018. Emergency Operations Plan. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/Emergency-Services/2018-City-of-Sacramento-Emergency-Operations-Plan.pdf?la=en. Accessed September 2023.

City of Sacramento. 2021. Sacramento County Local Hazard Mitigation Plan Update. Annex F City of Sacramento. Available online at: https://waterresources.saccounty.gov/stormready/Documents/LHMP%202021/Annex%20F%20City%20of%20Sacramento.pdf. Accessed September 2024.

City of Sacramento. 2023a. *Sacramento 2040 General Plan and Climate Action & Adaptation Plan Master Environmental Impact Report.* State Clearinghouse No. 2019012048. August 2023. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Environmental-Impact-Reports/2040-GPU-and-CAAP/Sacramento-2040-Project-MEIR-8242023.pdf?la=en. Accessed October 2023.

City of Sacramento. 2023b. County Emergency Operations and Evacuations Plans. Available online at: https://sacoes.saccounty.gov/EmergencyManagement/Pages/Planning.aspx. Accessed October 2023.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

County of Sacramento. 2021. 2021 Multi-jurisdictional Local Hazard Mitigation Plan Update. September 2021. Available online at: https://waterresources.saccounty.gov/stormready/Pages/2021-Local-Hazard-Mitigation-Plan.aspx. Accessed April 2024.

County of Sacramento. 2023. Sacramento Ready. Evacuation Zone Maps. Available online at: https://sacramentoready.saccounty.gov/Prepare/Pages/EvacuationZoneMaps.aspx. Accessed October 2023.

DTSC (Department of Toxic Substances Control). 2024a. EnviroStor. Available online at: https://www.envirostor.dtsc.ca.gov/public/search?basic=True. Accessed September 2024.

DTSC. 2024b. Site Mitigation and Restoration Program. Available online at: https://dtsc.ca.gov/site-mitigation/. Accessed September 2024.

SCEMD (Sacramento County Environmental Management Department). 2024. Site Assessment and Mitigation Program. Available online at: https://emd.saccounty.gov/EC/Pages/SiteAssessment.aspx. Accessed September 2024.

SMUD (Sacramento Municipal Utility District). 2023. 2023–2025 Wildfire Mitigation Plan. June 19, 2023. Available online at: https://www.smud.org/In-Our-Community/Safety-Tips/Wildfire-safety/Wildfire-Mitigation-Plan. Accessed September 2023.

State Water Board (State Water Resources Control Board). 2024. GeoTracker. Available online at: https://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=Search+GeoTracker. Accessed September 2024.

Section 3.12, Hydrology, Water Quality, and Water Supply

American River Water Agencies. 2017. Modified Flow Management Standard Proposed Water-Right Terms and Conditions. Available online at: https://www.waterforum.org/wp-content/uploads/2017/12/ARWA-502-Modified-Flow-Management-Standard-Proposed-Water-Right-Terms-and-Conditions_-November-2017-_00022797-3xE2E14_.pdf. Accessed June 2023.

CDFW (California Department of Fish and Wildlife). 2020. Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta (2081-2019-066-00). Available online at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/State-Water-Project/Files/ITP-for-Long-Term-SWP-Operations.pdf. Accessed October 2023.

City of Sacramento. 2021. *2020 Urban Water Management Plan*. Final Report. June. Available online at: http://www.cityofsacramento.org/-/media/Corporate/Files/DOU/Reports/Sacramento-2020-UWMP---Final-w-Ltr-of-Acceptance.pdf. Accessed October 2023.

City of Sacramento. 2023a. *Public Review Draft Master Environmental Impact Report for the Sacramento 2040 General Plan and Climate Action & Adaptation Plan*. State Clearinghouse No. 2019023048. August 2023. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Environmental-Impact-Reports/2040-GPU-and-CAAP/Sacramento-2040-Project-MEIR-8242023.pdf?la=en. Accessed October 2023.

City of Sacramento. 2023b. *Draft Environmental Impact Report for City of Sacramento Groundwater Master Plan Well Replacement Program*. State Clearinghouse No. 2022030709. April 2023. Available online at: https://files.ceqanet.opr.ca.gov/277493-2/attachment/UTzGjMDooXTvOYZfJwjPGlODrfhjOsxubx4a-7_m07A_0SerOUt984bEcazB1zxCfZ7kj-yOIxZvWB2i0. Accessed April 2025.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

City of Sacramento. 2025. Groundwater Well Replacement. Available online at: https://www.cityofsacramento.gov/utilities/projects/groundwater-well-replacement. Accessed April 2025.

DWR (California Department of Water Resources). 2004. Sacramento Valley Groundwater Basin South American Subbasin. *California's Groundwater Bulletin* 118. Last updated 2/27/04. Available online at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/5_021_65_SouthAmericanSubbasin.pdf. Accessed September 2023.

DWR. 2006. Sacramento Valley Groundwater Basin North American Subbasin. *California's Groundwater Bulletin* 118. Last updated 1/20/06. Available online at: https://water.ca.gov/-

/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/5_021_64_NorthAmericanSubbasin.pdf. Accessed September 2023.

DWR. 2017. A Water Resources System Planning Model for State Water Project and Central Valley Project. CalSim 3 Draft Report. California Department of Water Resources, Sacramento, CA. December.

DWR. 2019. *Draft Environmental Impact Report for Long-Term Operation of the California State Water Project*. State Clearinghouse No. 2019049121. Available online at: https://ceqanet.opr.ca.gov/2019049121/3. Accessed November 2024.

DWR. 2021. CalSim 3. Modeling Support Branch, Bay-Delta Office, California Department of Water Resources, Sacramento, CA. Available online at: https://water.ca.gov/Library/Modeling-and-Analysis/Central-Valley-models-and-tools/CalSim-3. Accessed November 2024.

DWR. 2022a. *Delta Conveyance Project Draft Environmental Impact Report*. July 2022. Available online at: https://www.deltaconveyanceproject.com/planning-processes/california-environmental-quality-act/draft-eir/draft-eir-document. Accessed June 2023.

DWR. 2022b. State Plan of Flood Control Descriptive Document. Public Draft. February. Available online at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Flood-Management/Flood-Planning-and-Studies/FSSR-and-SPFC/2022-SPFC_508.pdf. Accessed February 2024.

DWR. 2022c. *State Water Project. Final Delivery Capability Report 2021*. September 2022. Available online at: https://data.cnra.ca.gov/dataset/state-water-project-delivery-capability-report-dcr-2021. Accessed November 2024.

DWR. 2022d. Water Year 2022: The Drought Continues. October 2022. Available online at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Water-Basics/Drought/Files/Publications-And-Reports/Water-Year-2022-Brochure_ay11.pdf. Accessed November 2024.

DWR. 2022e. Central Valley Flood Protection Plan Update 2022. Available online at: https://water.ca.gov/Programs/Flood-Management/Flood-Planning-and-Studies/Central-Valley-Flood-Protection-Plan. Accessed February 2024.

DWR. 2022f. CalSim 3 Report. A Water Resources System Planning Model for the State Water Project and Central Valley Project. August 2022. Available online at: https://water.ca.gov/Library/Modeling-and-Analysis/Central-Valley-models-and-tools/CalSim-3. Accessed June 2023.

DWR. 2023. GSP Status Summary. Last updated July 27, 2023. Available online at: https://sgma.water.ca.gov/portal/gsp/status. Accessed November 2024.

FEMA (Federal Emergency Management Agency). 2023. FEMA's National Flood Hazard Layer (NFHL) Viewer. Last updated 2021. Available online at: https://www.fema.gov/flood-maps/national-flood-hazard-layer. Accessed September 2023.

GEI Consultants. 2021. North American Subbasin Groundwater Sustainability Plan. Available online at: https://nasbgroundwater.org/gsp/. Accessed September 2023.

LWA. 2021. South American Subbasin Groundwater Sustainability Plan, Section 2: Plan Area and Basin Setting. Available online at: http://sasbgroundwater.org/resources.html. Accessed September 2023.

NMFS (National Marine Fisheries Service). 2009. *Biological Opinion and Conference Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan*. National Marine Fisheries Service, Southwest Region, June 4, 2009. Available online at: https://www.fisheries.noaa.gov/resource/document/biological-opinion-and-conference-opinion-long-term-operations-central-valley. Accessed January 2025.

NMFS. 2019. Biological Opinion on the Long-Term Operation of the Central Valley Project and the State Water Project. West Coast Region, Long Beach, California. October 21, 2019.

Reclamation (United States Bureau of Reclamation). 1957. *Operating Contract Relating to Folsom and Nimbus Dams and Their Related Works and to Diversions of Water by the City of Sacramento*. Available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/california_waterfix/exhibits/docs/Sacramento/citysac_17.pdf. Accessed January 2025.

Reclamation. 2015. *Final Environmental Impact Statement, Coordinated Long-Term Operation of the Central Valley Project and State Water Project*. Available online at: https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=21883. Accessed January 2025.

Reclamation. 2021. *Delta Cross Channel*. Available online at: https://www.usbr.gov/mp/mpr-news/docs/factsheets/delta-cross-channel-canal.pdf. Accessed September 2024.

Reclamation. 2024a. *New Plan for California Water: Updated Long-Term Operation of the Central Valley Project and State Water Project*. Fact Sheet. November 2024. Available online at: https://www.usbr.gov/mp/bdo/docs/lto-roll-out-fact-sheet-11-4-24.pdf. Accessed November 2024.

Reclamation. 2024b. *Record of Decision. Long-Term Operation of the Central Valley Project and State Water Project*. December 20, 2024. Available online at: https://www.usbr.gov/mp/nepa/includes/documentShow.php?Doc_ID=55600. Accessed January 2025.

Reclamation. 2024c. *Final Environmental Impact Statement, Coordinated Long-Term Operation of the Central Valley Project and State Water Project*. Available online at: https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=54661. Accessed January 2025.

Regional San (Sacramento Regional County Sanitation District). 2023. Consolidated Ordinance (#SRSD-0124). Adopted May 10, 2023. Effective June 9, 2023. Available online at: https://www.regionalsan.com/ordinance. Accessed September 2023.

Regional Water Board (Central Valley Regional Water Quality Control Board). 2010. *American River Watershed Methylmercury TMDL and Mercury Control Program Information Sheet*. October. Available online at: https://data.sacriver.org/assets/5ffd2763a1b5d1a3078c4bd

991651244/application/pdf/2010oct_arwatershed_merctmdl_info.pdf. Accessed February 2024.

Regional Water Board. 2019. *The Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region. The Sacramento River Basin and The San Joaquin River Basin*. Available online at: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf. Accessed June 2023.

Sacramento River Watershed Program. 2024. *Sacramento Valley Subregion*. Available online at: https://sacriver.org/explore-watersheds/sacramento-valley-subregion/. Accessed February 2024.

SacSewer (Sacramento Area Sewer District). 2023. *The Sacramento Regional County Sanitation District Announces Merger with the Sacramento Area Sewer District. December 18, 2023*. Available online at: https://www.sacsewer.com/press-release/sacramento-regional-county-sanitation-district-announces-merger-sacramento-area-sewer/. Accessed May 2025.

SAFCA (Sacramento Area Flood Control Agency). 2024. *American River Watershed Common Features 2016 Project*. Available online at: https://www.safca.org/projects/american-river-levees/. Accessed July 2024.

Sauer, V.B., and R.W. Meyer. 1992. *Determination of Error in Individual Discharge Measurements.* U.S. Geological Survey Open-File Report 92-144. Available online at: https://pubs.usgs.gov/of/1992/ofr92-144/. Accessed November 2024.

SRWI (Surface Water Resources, Inc.). 2001. *Aquatic Resources of the Lower American River: Baseline Report. Draft Report*. Prepared for the Lower American River Fisheries and Instream Habitat (FISH) Working Group. Funded by CALFED, Water Forum, SAFCA, and the City of Sacramento. March 2001. Available online at: https://www.noaa.gov/sites/default/files/legacy/document/2020/Oct/07354626214.pdf. Accessed November 2024.

State Water Board (State Water Resources Control Board). 1995. *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*. May. Available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plans/1995wqcp/docs/1995wqcpb.pdf. Accessed June 2023.

State Water Board. 2000. *Revised Water Right Decision 1641, In the Matter of: Implementation of Water Quality Objectives for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; A Petition to Change Points of Diversion of the Central Valley Project and the State Water Project in the Southern Delta; and A Petition to Change Places of Use and Purposes of Use of the Central Valley Project*. December 29, 1999. Revised in Accordance with Order WR 2000-02, March 15, 2000. Available online at: https://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1641_1999dec29.pdf. Accessed June 2023.

State Water Board. 2006. *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*. December 13, 2006. Available online at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plans/. Accessed February 2024.

State Water Board. 2018. *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*. December 12, 2018. Available online at: https://www.waterboards.ca.gov/plans_policies/docs/2018wqcp.pdf. Accessed June 2023.

State Water Board. 2021. *State Policy for Water Quality Control: State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*. Adopted April 2, 2019. Revised April 6, 2021.

State Water Board. 2022. *Final Staff Report for 2020–2022 Integrated Report for Clean Water Act Sections 305(b) and 303(d)*. Available online at: https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2020_2022_integrated_report.html. Accessed June 2023.

State Water Board. 2024a. *Sacramento-San Joaquin Delta Watershed Drought & Curtailments 2021–2023*. Last updated April 3, 2024. Available online at: https://www.waterboards.ca.gov/drought/delta/. Accessed November 2024.

State Water Board. 2024b. *Water Unavailability Methodology for the Delta Watershed, 2021–2023*. Last updated April 3, 2024. Available online at: https://www.waterboards.ca.gov/drought/drought_tools_methods/delta_method.html. Accessed November 2024.

State Water Board. 2024c. *Curtailment Status History compilation for the Sacramento-San Joaquin Delta Watershed between August 20, 2021 and April 3, 2023*. Available online at: https://www.waterboards.ca.gov/drought/delta/docs/2024/delta-curtail-status-history.xlsx. Accessed November 2024.

USACE (United States Army Corps of Engineers). 2017. *Draft Water Control Manual, Folsom Dam and Lake, American River, California*. December 1987. Revised September 2017. Available online at: https://www.spk.usace.army.mil/Missions/Civil-Works/Folsom-Water-Control-Manual-Update/. Accessed October 2023.

USACE. 2022. Common Features Release 6.2 HEC-RAS 1-D model.

USFWS (United States Fish and Wildlife Service). 2008. *Biological Opinion on the Coordinated Operations of the Central Valley Project and State Water Project in California*. [Report.]

USGS (United States Geological Survey). 1992. *Policy Statement on Stage Accuracy*. Office of Surface Water, Technical Memorandum Number 93.07, Washington, D.C. Available online at: https://water.usgs.gov/water-resources/memos/memo.php?id=1019. Accessed October 2023.

Water Forum. 2000. *Water Forum Agreement. Section 5: Specific Agreements and Mutual Commitments*. January 2000. Available online at: https://waterforum.org/water-forum-agreement/. Accessed October 2023.

Water Forum. 2015a. *Water Forum Agreement*. January 2000, Updated October 2015. Available online at: https://waterforum.org/wp-content/uploads/2014/08/Water-Forum-Agreement-Update-2015-FINAL-FOR-PRINT2.pdf. Accessed June 2023.

Water Forum. 2015b. *The Lower American River Modified Flow Management Standard, A Drought Buffer for the Environment and Local Water Supplies*. October 2015. Available online at: https://www.waterforum.org/wp-content/uploads/2017/08/WF-Modified-FMS-10_8_final_Single.pdf. Accessed October 2023.

Water Forum. 2020. *The Water Forum Past, Present, and Future*. September 24, 2020. Available online at: https://waterforum.org/wp-content/uploads/2020/12/The-Water-Forum-Past-Present-Future_v11.pdf. Accessed October 2023.

Section 3.13, Land Use and Planning

City of Sacramento. 1997. *Sacramento River Parkway Plan*. Adopted October 21, 1997. Available online at: https://www.cityofsacramento.gov/content/dam/portal/pw/Engineering/Projects/Sac-River-Pkwy/1997-Sacramento-River-Parkway-Plan.pdf. Accessed October 2023.

City of Sacramento. 2011. *River District Specific Plan*. Adopted February 15, 2011. Available online at: https://www.cityofsacramento.gov/content/dam/portal/cdd/Planning/Specific-Plans/River-District-Specific-Plan_Adopted-02-15-2011.pdf. Accessed October 2023.

City of Sacramento. 2016. *Sacramento Railyards Specific Plan*. Adopted November 10, 2016. Available online at: https://www.cityofsacramento.gov/content/dam/portal/cdd/Planning/Major-Projects/Railyards---1/R2016-0380-2016-Sacramento-Railyards-Specific-Plan-Public-Facilities-Financing-Plan.pdf. Accessed April 2024.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

County of Sacramento. 2008. *American River Parkway Plan*. Adopted September 10, 2008. Available online at: https://planning.saccounty.gov/LandUseRegulationDocuments/Documents/AmericanRiverParkwayPlan.pdf. Accessed October 2023.

Section 3.14, Noise and Vibration

Caltrans (California Department of Transportation). 2009. *Technical Noise Supplement to the Caltrans Noise Analysis Protocol*. September 2009.

Caltrans. 2013. *Technical Noise Supplement to the Caltrans Noise Analysis Protocol*. September 2013.

Caltrans. 2020. *Transportation and Construction Vibration Guidance Manual.* April 2020.

City of Sacramento. 2023. *Sacramento 2040 General Plan and Climate Action & Adaptation Plan Master Environmental Impact Report.* State Clearinghouse No. 2019012048. August 2023. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Environmental-Impact-Reports/2040-GPU-and-CAAP/Sacramento-2040-Project-MEIR-8242023.pdf?la=en. Accessed October 2023.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

County of Sacramento. 2022. *Sacramento County General Plan of 2005–2030 – Noise Element*. Adopted December 15, 1993. Amended December 13, 2022. Available online at: https://planning.saccounty.gov/PlansandProjectsIn-Progress/pages/generalplan.aspx. Accessed October 2023.

FHWA (Federal Highway Administration). 2006. *FHWA Highway Construction Noise Handbook*. August 2006.

FICON (Federal Interagency Committee on Noise). 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.

FTA (Federal Transit Administration). 2018. *Transit Noise and Vibration Impact Assessment Manual, September 2018*. Available online at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed October 2023.

NIOSH (The National Institute for Occupational Safety and Health). 2024. *About Occupational Hearing Loss*. Available online at: https://www.cdc.gov/niosh/noise/about/index.html#cdc_health_safety_special_topic_how-signs-of-hearing-loss. Accessed September 2024.

USEPA (United States Environmental Protection Agency). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. March 1974.

WHO (World Health Organization). 2009. *Night Noise Guidelines for Europe*. Available online at: https://iris.who.int/bitstream/handle/10665/326486/9789289041737-eng.pdf?isAllowed=y&sequence=1. Accessed September 2024.

Section 3.15, Public Services

City of Sacramento. 2017. Police District Neighborhoods and Maps, Police District 3. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/Police/Crime/Maps/District-3.pdf?la=en. Accessed October 2023.

City of Sacramento. 2019. Police District Neighborhoods and Maps, Police District 6 Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/Police/Crime/Maps/District-6-January-2019.pdf?la=en. Accessed October 2023.

City of Sacramento. 2021. Sacramento City Council Districts Map. December 16, 2021. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/Fire/Maps/Fire-Stations-by-Council-District-with-addresses-and-map-link.pdf?la=en. Accessed October 2023.

City of Sacramento. 2022. *Proposed City of Sacramento Fiscal Year 2022/2023*. p. 208: "Staffing Levels."

City of Sacramento. 2023. *Sacramento Parks*. Available online at: http://www.cityofsacramento.org/ParksandRec/Parks. Accessed May 2023.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

SCUSD (Sacramento County Unified School District). 2023. Enrollment. Available online at: https://www.scusd.edu/enrollment. Accessed May 2023.

Sacramento Fire Department. 2022a. Office of Operations. Available online at: http://portal.cityofsacramento.org/Fire/Operations. Accessed May 2023.

Sacramento Fire Department. 2022b. Fire Suppression. Available online at: http://www.cityofsacramento.org/Fire/Operations/Fire-Suppression. Accessed May 2023.

Sacramento Fire Department. 2022c. Emergency Medical Services. Available online at: http://www.cityofsacramento.org/Fire/Operations/Emergency-Medical-Services. Accessed May 2023.

Sacramento Fire Department. 2022d. Special Operations. Available online at: http://www.cityofsacramento.org/Fire/Operations/Special-Operations. Accessed May 2023.

Sacramento Police Department. 2017. *2016 Annual Report*.

Sacramento Regional Transit. 2022. Sacramento Regional Transit District – Police Services. Available online at: http://www.sacrt.com/safety/rtpolice.aspx. Accessed May 2023.

Section 3.16, Recreation

City of Sacramento. 1997. *Sacramento River Parkway Plan*. Adopted October 21, 1997. Available online at: https://www.cityofsacramento.gov/content/dam/portal/pw/Engineering/Projects/Sac-River-Pkwy/1997-Sacramento-River-Parkway-Plan.pdf. Accessed October 2023.

City of Sacramento. 2016. *Sacramento Railyards Specific Plan*. Adopted November 10, 2016. Available online at: https://www.cityofsacramento.gov/content/dam/portal/cdd/Planning/Major-Projects/Railyards---1/R2016-0380-2016-Sacramento-Railyards-Specific-Plan-Public-Facilities-Financing-Plan.pdf. Accessed April 2024.

City of Sacramento. 2024a. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

City of Sacramento. 2024b. *Final Parks Plan 2040*. Adopted August 20, 2024. Available online at: https://www.cityofsacramento.gov/ypce/parks/planning---development/park-plan. Accessed January 2025.

County of Sacramento. 2008. *American River Parkway Plan*. Adopted September 10, 2008. Available online at: https://planning.saccounty.gov/LandUseRegulationDocuments/Documents/AmericanRiverParkwayPlan.pdf. Accessed October 2023.

Section 3.17, Transportation

City of Sacramento. 2016. *Bicycle Master Plan*. Approved August 16, 2016. Amended August 14, 2018. Available online at: https://www.cityofsacramento.gov/content/dam/portal/pw/Transportation/Active-Transportation/Sacramento-BMP-Amendments-Incorporated_090622.pdf. Accessed October 2023.

City of Sacramento. 2021. *Sacramento County Local Hazard Mitigation Plan Update*. Annex F City of Sacramento. Available online at: https://waterresources.saccounty.gov/stormready/Documents/LHMP%202021/Annex%20F%20City%20of%20Sacramento.pdf. Accessed September 2024.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

OPR (Office of Planning and Research). 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. Available online at: https://opr.ca.gov/docs/20180416-743_Technical_Advisory_4.16.18.pdf. Accessed October 2023.

Section 3.18, Tribal Cultural Resources

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

Tremaine, K. 2018. P-34-005225 Sacramento River TCL DPR 523 Form set. Prepared by Parus Consulting. On file at the NCIC.

Section 3.19, Utilities and Service Systems

CalRecycle (California Department of Resources Recycling and Recovery). 2024. SWIS Facility/Site Search. Available online at: https://www2.calrecycle.ca.gov/SolidWaste/Site/Search. Accessed September 2024.

City of Sacramento. 2021. 2020 *Urban Water Management Plan*. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/DOU/Reports/R---038---City-of-Sacramento-Draft-2020-UWMP---05-18-21.pdf?la=en. Accessed February 2024.

City of Sacramento. 2023. *Sacramento 2040 General Plan and Climate Action & Adaptation Plan Master Environmental Impact Report.* State Clearinghouse No. 2019012048. August 2023. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Environmental-Impact-Reports/2040-GPU-and-CAAP/Sacramento-2040-Project-MEIR-8242023.pdf?la=en. Accessed October 2023.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

County of Sacramento. 2024. *Local Disposal and Recycling Facilities.* Available online at: https://wmr.saccounty.gov/Pages/Local-Disposal-and-Recycling-Facilities-.aspx. Accessed September 2024.

SacSewer (Sacramento Area Sewer District). 2021. Sacramento Area Sewer District Service Area Map. Available online at: https://www.sacsewer.com/sites/main/files/file-attachments/sasd_servicearea_20210208.pdf?1612892152. Accessed October 2023.

SacSewer. 2023. *The Sacramento Regional County Sanitation District Announces Merger with the Sacramento Area Sewer District*. December 18, 2023. Available online at: https://www.sacsewer.com/press-release/sacramento-regional-county-sanitation-district-announces-merger-sacramento-area-sewer/. Accessed May 2025.

SMUD (Sacramento Municipal Utility District). 2022. *Power Content Label*. Available online at: https://www.smud.org/SMUDPCL. Accessed October 2023.

SMUD. 2024. *Station J Bulk Transmission Substation Project Final Environmental Impact Report*. March 2024. State Clearinghouse No. 2023020549. Available online at: https://www.smud.org/Corporate/About-us/Reliability/Station-J-substation. Accessed June 2024.

Section 3.20, Wildfire

CAL FIRE (California Department of Forestry and Fire Protection). 2023. Fire Hazard Severity Zones. Available online at: https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/. Accessed October 2023.

City of Sacramento. 2018. *Emergency Operations Plan*. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/Emergency-Services/2018-City-of-Sacramento-Emergency-Operations-Plan.pdf?la=en. Accessed October 2023.

City of Sacramento. 2021. *Sacramento County Local Hazard Mitigation Plan Update*. Annex F City of Sacramento. Available online at: https://waterresources.saccounty.gov/stormready/Documents/LHMP%202021/Annex%20F%20City%20of%20Sacramento.pdf. Accessed September 2024.

City of Sacramento. 2023. *Sacramento 2040 General Plan and Climate Action & Adaptation Plan Master Environmental Impact Report.* State Clearinghouse No. 2019012048. August 2023. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Environmental-Impact-Reports/2040-GPU-and-CAAP/Sacramento-2040-Project-MEIR-8242023.pdf?la=en. Accessed October 2023.

City of Sacramento. 2024a. Flood Preparedness Evacuation Maps. Available online at: https://www.cityofsacramento.gov/utilities/flood-preparedness/evacuation-maps. Maps ARS 16 and ARS 18. Accessed March 2024.

City of Sacramento. 2024b. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

County of Sacramento. 2008. *American River Parkway Plan*. Available online at: https://regionalparks.saccounty.gov/Parks/Documents/Parks/ARPP06-092617_sm.pdf. Accessed October 2023.

County of Sacramento. 2021. *Sacramento County Multi-jurisdictional Local Hazard Mitigation Plan Update: Annex F City of Sacramento*. Available online at: https://waterresources.saccounty.gov/stormready/Pages/2021-Local-Hazard-Mitigation-Plan.aspx. Accessed October 2023.

County of Sacramento. 2023. Sacramento Ready. Evacuation Zone Maps. Available online at: https://sacramentoready.saccounty.gov/Prepare/Pages/EvacuationZoneMaps.aspx. Accessed October 2023.

SMUD (Sacramento Municipal Utility District). 2023. *2023–2025 Wildfire Mitigation Plan*. June 19, 2023. Available online at: https://www.smud.org/In-Our-Community/Safety-Tips/Wildfire-safety/Wildfire-Mitigation-Plan. Accessed September 2023.

Chapter 4, Cumulative Impacts

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. *The Jepson Manual: Vascular Plants of California, Second Edition*. University of California Press, Berkeley.

City of Sacramento. 2011. *River District Specific Plan*. Adopted February 15, 2011.

City of Sacramento. 2016. *Sacramento Railyards Specific Plan*. Adopted November 10, 2016.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

County of Sacramento. 2023. Sacramento Ready. Evacuation Zone Maps. Available online at: https://sacramentoready.saccounty.gov/Prepare/Pages/EvacuationZoneMaps.aspx. Accessed October 2023.

LWA. 2021. *South American Subbasin Groundwater Sustainability Plan*. Available online at: http://sasbgroundwater.org/resources.html. Accessed September 2023.

Regional Water Board (Central Valley Regional Water Quality Control Board). 2019. *The Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region. The Sacramento River Basin and The San Joaquin River Basin*. Available online at: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201902.pdf. Accessed June 2023.

State Water Board (State Water Resources Control Board). 2018. *Water Quality Control Plan for the San Francisco Bay/Sacramento San Joaquin Delta Estuary*. Sacramento, CA. Available online at: https://www.waterboards.ca.gov/plans_policies/docs/2018wqcp.pdf. Accessed June 2023.

Tremaine, K. 2018. P-34-005225 Sacramento River TCL DPR 523 Form set. Prepared by Parus Consulting. On file at the NCIC.

Chapter 5, Other CEQA Considerations

City of Sacramento. 2020. *Technical Background Report for the City of Sacramento 2040 General Plan, Appendix F: Market Study*. November. Adopted January 19, 2021. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan/resources. Accessed May 2025.

City of Sacramento. 2021. *2020 Urban Water Management Plan*. Final Report. June. Available online at: http://www.cityofsacramento.org/-/media/Corporate/Files/DOU/Reports/Sacramento-2020-UWMP---Final-w-Ltr-of-Acceptance.pdf. Accessed August 2024.

City of Sacramento. 2023. *Public Review Draft Master Environmental Impact Report for the Sacramento 2040 General Plan and Climate Action & Adaptation Plan*. State Clearinghouse No. 2019023048. August 2023. Available online at: https://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Environmental-Impact-Reports/2040-GPU-and-CAAP/Sacramento-2040-Project-MEIR-8242023.pdf?la=en. Accessed June 2024.

City of Sacramento. 2024. *Sacramento 2040 General Plan*. Adopted February 27, 2024. Available online at: https://www.cityofsacramento.gov/community-development/planning/long-range/general-plan/2040-general-plan. Accessed June 2024.

Chapter 6, Alternatives

Carollo Engineers. 2015. EAFWTP: *Long-Term Water Treatment Capacity Evaluation Project. Technical Memorandum No. 2, New Intake Alternatives Development*. Final. November 2015.

Schnabel Engineering and Carollo Engineers. 2020. *Sacramento River Intake Siting and Conceptual Design*. Technical Memorandum. January 5, 2020.

Schnabel Engineering and Carollo Engineers. 2023. *Sacramento River Intake Siting and Conceptual Design*. Technical Memorandum – DRAFT. July 31, 2023.

West Yost Associates. 2013. *City of Sacramento Water Supply Master Plan, Volume 1*. Prepared for the City of Sacramento. July.

Chapter 7, List of Preparers

No references are cited in this chapter.

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Appendix A
Notice of Preparation and Comment Letters

City of SACRAMENTO
Community Development

300 Richards Boulevard, Third Floor
Sacramento, CA 95811

DATE: April 6, 2022

TO: Interested Persons

FROM: Scott Johnson, Senior Planner
Community Development Department

RE: NOTICE OF PREPARATION OF ENVIRONMENTAL IMPACT REPORT AND SCOPING MEETING FOR THE SACRAMENTO WATER+ TREATMENT PLANTS RESILIENCY AND IMPROVEMENTS PROJECT

COMMENT PERIOD: April 6, 2022 – May 6, 2022

SCOPING MEETING: April 27, 2022; 12:00 p.m.(noon)

By Computer: To join the meeting by computer, please register:

Zoom Meeting Registration Link:

https://cityofsacramento-org.zoom.us/webinar/register/WN_i4hCwltxRyKAZeDqomPaYg

The presentation will be recorded and available to view after **April 27, 2022**.

Responsible agencies and members of the public are invited to attend and provide input on the scope of the EIR. Written comments regarding relevant issues may be submitted during the meeting.

INTRODUCTION

The City of Sacramento (City) is the Lead Agency for preparation of an Environmental Impact Report (EIR) for the City's proposed Water+ Treatment Plants Resiliency and Improvements Project (proposed project). The EIR to be prepared by the City will evaluate potential significant environmental effects of the proposed project and other actions associated with construction and operation of the proposed project. Written comments regarding the issues that should be covered in the EIR, including potential alternatives to the proposed project and the scope of the analysis, are invited.

The EIR for the proposed project is being prepared in compliance with the California Environmental Quality Act (CEQA). Under CEQA, upon deciding to prepare an EIR, the City as lead agency must issue a Notice of Preparation (NOP) to inform responsible agencies, the public, and trustee agencies of that decision. The purpose of the NOP is to provide information describing the proposed project and its potential environmental effects to those who may wish to comment regarding the scope and content of the information to be included in the EIR. Agencies should comment on such information as it relates to their statutory responsibilities in connection with the project.

The EIR will provide an evaluation of potential environmental impacts associated with development of the proposed project. The proposed project location, description, and environmental issue areas that may be affected by development of the proposed project are described below. The EIR will evaluate potentially significant environmental impacts of the proposed project, on a direct, indirect, and cumulative basis; identify mitigation measures that may be feasible to lessen or avoid such impacts; and identify alternatives that may lessen one or more potentially significant impacts to the proposed project.

PROJECT BACKGROUND

The City owns and operates treatment and distribution facilities that provide drinking water to nearly half a million customers in a 100 square-mile service area. These facilities include approximately 1,700 miles of distribution pipelines, two surface-water treatment plants, and 32 groundwater wells.

The City's two surface water treatment plants, the E.A. Fairbairn Water Treatment Plant (FWTP) and the Sacramento River Water Treatment Plant (SRWTP), currently have a combined reliable water supply and treatment capacity of 260 million gallons per day (MGD).[1] The FWTP, originally constructed in 1961 and last updated in 2014, treats water from the American River. The SRWTP, originally constructed in 1923 and last updated in 2014 treats water from the Sacramento River through the Sacramento River Intake. Both surface water treatment plants use conventional treatment process including flocculation, sedimentation, filtration, and chemical treatment, to produce drinking water in compliance with state and federal requirements.

Consistent with the 2035 General Plan,[2] the City is proposing the Water+ Treatment Plants Resiliency and Improvements Project to provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its useful life, and to meet the projected potable water demand. Service area needs are anticipated to exceed the reliable surface water supply and treatment capacity by 2035. By 2050, it is estimated that an additional 150 MGD (410 MGD[3] total) of treated surface water will be required. The proposed project includes the following components:

- Rehabilitation of infrastructure approaching the end of its effective life at both FWTP and SRWTP to improve treatment reliability.
- Integration of ozone generation and contact into the treatment process at both FWTP and SRWTP to reduce regulated disinfection byproducts and improve the ability for both treatment plants to address changing river water quality conditions.

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[1] Long Term Water Supply Infrastructure Needs Memorandum (2017)
[2] Sacramento 2035 General Plan (2015); www.sacgp.org
[3] Water Supply Master Plan (2013)

- Installation of pipelines between both of the City's Sacramento River water intakes and SRWTP to assist with cleaning of these facilities.
- Construction and operation of a replacement to the original Sacramento River Water Intake Structure in the Sacramento River and pipelines for transferring water to SRWTP and to improve surface water supply reliability during low river level conditions.
- Phased construction and operation of additional SRWTP water treatment capacity to match the projected service area needs.
- Conversion from chlorine gas to sodium hypochlorite as the primary chemical for disinfection of the water to improve facility, City staff, and public safety, and to help protect against reductions in chemical availability.
- Phased improvement of the water transmission and distribution system in the vicinity of SRWTP to match the demand and address critical hydraulic constrictions.

The elements of each of these components is described below under Project Description.

PROJECT LOCATION/SETTING

The proposed project area includes existing and proposed facilities at FWTP and SRWTP. Figure 1 shows the location of the project areas in the Sacramento region. Figures 2 and 3 show the proposed project areas around the FWTP and SRWTP, respectively. The 30-acre FWTP is located just south of the American River and at the northwest corner of State University Drive and College Town Drive, approximately eight miles upstream from SRWTP along the American River (see Figure 2).

The approximately 50-acre SRWTP site is located near the confluence of the Sacramento River and American River. Nearby features include the Sacramento River to the west; the American River and Richards Boulevard to the north, 7th Street to the east, and Railyards Boulevard to the south. The original Sacramento River Water Intake Structure and proposed replacement intake site are located off the east bank of the Sacramento River within the project area (see Figure 3).

PROJECT DESCRIPTION

PROJECT OBJECTIVES

The general objective of the proposed project is to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand.

Specific proposed project objectives include:

- Increase treatment flexibility to address changing water qualities within the Sacramento and American Rivers and to meet drinking water regulations.
- Improve safety, reliability, and resiliency of both surface water treatment plants.
- Provide for consistent treatment and distribution of potable water to the service area.
- Increase reliable water supply and treatment capacity to meet projected water demand.

PROJECT ELEMENTS

The proposed project is designed to achieve these objectives through multiple phases of work. The initial phase would improve treatment reliability by replacing facilities at the end of their effective lives. This phase of work would also provide treatment resiliency through the addition of ozone treatment to both water treatment plants. In parallel with the initial reliability and resiliency improvements at both water treatment plants, the SRWTP raw-water supply and treatment capacity would be increased from 160 MGD to 235 MGD. Additional phases would be staged to meet the increasing City potable water demand through 2050 for an ultimate capacity of 310 MGD at SRWTP. No expansion of treatment capacity at FWTP would be implemented due to limitations placed on withdrawal amounts from the American River. Specifically, implementation of the proposed project would involve the following components:

- Replacement of aging infrastructure at both FWTP and SRWTP.
- Integration of ozone into the treatment process at both FWTP and SRWTP.
- Conversion from chlorine gas to sodium hypochlorite as the primary chemical for disinfection of the water at both FWTP and SRWTP.
- Construction and operation of a replacement intake to the original Sacramento River Water Intake Structure in the Sacramento River and pipelines for transferring water to SRWTP.
- Installation of pipelines between the existing Sacramento River Intake and the replacement intake and SRWTP.
- Improvement of the water transmission and distribution system in the vicinity of SRWTP to address critical hydraulic constrictions.

Both FWTP and SRWTP would remain operational throughout construction of the proposed project elements. The work would be sequenced in a manner that minimizes facility shutdowns and maintains the integrity of the treatment process. The overall schedule to complete the work for each phase is anticipated to take several years with the initial phase of work having the longest schedule. The length of the schedule for each phase will be dependent upon the amount of work or project elements included for that phase.

The elements of each of these components is summarized below.

<u>FWTP improvements to enhance treatment processes and improve treatment resiliency</u> – This involves the construction and operation of following elements summarized in Table 1. Construction activities would occur within the existing FWTP facility property limits.

Table 1: Summary of Elements for FWTP

Project Element	Initial Phase[1,2]
Ozone Generation Treatment System	• Four enclosed partially buried process tanks (300,000 gal/tank) • Equipment located inside new building and dedicated area outside • Liquid oxygen supply tanks (2)
Flocculation-Sedimentation Basins Modifications and Replacement	• Replace two aged flocculation-sedimentation basins with a new basin (50 MGD capacity) • Extend existing concrete effluent channel to feed to new ozone system • Structural modifications (e.g., valve and overflow weir) to feed inlet channel to improve water distribution and conveyance between basins
Intermediate Pump Station	• One new wetwell (500,000 gal) with pump station (reliable 120 MGD capacity)
Hypochlorite Storage and Feed Facility	• Decommission existing gas chlorine system • Four new storage tanks and shelter • One new chemical feed building
Electrical Building	• Two new electrical generators • Electrical improvements
Filters	• Replace eight aged filters with four new filters • Replace filter media in remaining eight filters • One new wetwell (650,000 gal) with backwash supply pump station (46 MGD). • Constant head box to protect filter underdrain from excess pressure
Maintenance Shop	• Replacement for maintenance shop removed to construct treatment improvements above

Improvements to enhance the resiliency and increase treatment capacity of SRWTP – This component involves construction and operation of the elements summarized in Table 2. Construction activities would occur within the City owned properties for SRWTP. Implementation of elements as part of an initial phase would increase SRWTP capacity to 235 MGD and additional elements would be integrated over additional phases to increase the treatment capacity to the buildout maximum 310 MGD.

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[1] All dimensions, sizes or volumes listed in this table are approximate and may change during the design phase of the project. Complete or partial demolition of existing facilities will be required for each project element.

[2] "Process Equipment" may include any of the following: process pumps, mixers, specialty equipment (e.g., ozone generator, liquid oxygen vaporizers), piping, valves, and related electrical equipment.

Table 2: Summary of Elements for SRWTP

Project Element[1]	Initial Phase (235 Mgd Capacity[2])	Buildout (310 Mgd Capacity)
Grit Basin	• Open-top, above-grade process tank (1,500,000 gal) • Equipment located in process tank and dedicated area around tank	Not Applicable (N/A)
Raw Water Blending System	• Open-top, above-grade tank (100,000 gal) • Process equipment located in process tank and dedicated area around tank	• Additional process equipment[3]
Chemical Flash Mix System	• Process equipment and large diameter (72-inch) piping • Process equipment located in dedicated area around above-grade piping	• Additional process equipment
Flocculation-Sedimentation Basins	• Two open-top, partially buried process tanks process tanks (2,000,000 gal/tank) • Process equipment located in tank and dedicated area around tank • Modifications to existing four basins.	• Two process tanks and associated process equipment
Ozone Generation and Treatment System	• Six enclosed, partially buried process tanks (350,000 gal/tank) • Process equipment located inside new building or dedicated storage area outside • Liquid oxygen supply tanks (4)	• Two process tanks and associated process equipment
Filters	• Eight new open-top, partially buried process tanks (200,000 gal/tank) • Process equipment located inside new building or dedicated storage area outside • Replace filter media in sixteen filters • Operational control area located above filter process equipment	• Eight process tanks and associated process equipment
Chlorine Contact Tank 2	• One process tank (3,000,000 gal) • Enclosed, partially buried tank • Process equipment located inside new tank or dedicated storage area outside	N/A

[1] For purposes of discussion “Initial Phase” and “Buildout” have been designated with plant production capacities of 235 MGD and 310 MGD respectively. These capacities represent the SRWTP treatment capacity. The number of phases in between may change based on future water demands and budgets.
[2] All dimensions, sizes or volumes listed in this table are approximate and may change during the design phase of the project. Complete or partial demolition of existing facilities will be required for each project element.
[3] “Process Equipment” may include any of the following: process pumps, mixers, specialty equipment (e.g., air-burst screen cleaning, ozone generator), mixers, piping, valves, and related electrical equipment.

Project Element[1]	Initial Phase (235 Mgd Capacity[2])	Buildout (310 Mgd Capacity)
5 MG Finished Water Reservoir	• Replacement of existing reservoir with new reservoir (3.5 million gallon [MG]) • Enclosed, partially buried tank • Process equipment located inside new tank or dedicated storage area outside	N/A
9.5 MG Finished Water Reservoir	• Replacement of existing reservoir with new enclosed, partially buried tank (13 MG) • Process equipment located inside new tank or dedicated storage area outside	N/A
High-Service Pump Station 2	• 7,000 square foot (sq-ft) building • Process equipment located inside new building	• Additional pumps and process equipment
Electrical Building 2	• 10,000 sq-ft two-story building • Electrical distribution equipment • High-voltage transformer / switchgear	• Additional electrical equipment and transformer
Chemical Building - North	• Modification of existing chemical building • Seven storage tanks for lime (12,000 gal/tank) • Three storage tanks for fluoride (6,000 gal/tank)	• Three storage tanks for lime • One storage tank for fluoride
Chemical Bulk Storage & Feed - North	• 3,000 sq-ft sun canopy • Six storage tanks for sodium hypochlorite (21,000 gal/tank)	• Two process tanks for sodium hypochlorite
Chemical Building – South	• 10,000 sq-ft single-story building • Process equipment (chemical feed and polymer systems) located inside new building • Maintenance and operator workspace	• Additional process equipment
Chemical Bulk Storage & Feed - South	• 6,000 sq-ft sun canopy • Three storage tanks for caustic soda • Six storage tanks for alum	• One storage tank for caustic soda • Two storage tanks for alum
Filter Waste Washwater Basins	• Replace existing three filter waste washwater basins with three new open-top, partially buried process tanks (1,200,000 gal/tank) • Process equipment located inside new tank or dedicated storage area outside	N/A
Dewatering Building 2	• 17,000 sq-ft three-story building • Six process tanks (80,000 gal/tank) • Open-top, partially buried process tanks • Waste processing equipment	• Additional process equipment

Project Element[1]	Initial Phase (235 Mgd Capacity[2])	Buildout (310 Mgd Capacity)
Gravity Thickeners	• Four process tanks (60,000 gal/tank) • Open-top, partially buried process tanks • Process equipment located inside new building or dedicated storage area outside	• Two process tanks and associated process equipment
Miscellaneous Yard Improvements	• Three backup diesel generators (3,250 kilowatts each) • Three surge tanks (45,000 gal/tank) • Subsurface electrical ductbanks, process lines and equipment vaults • Concrete retaining walls	• One surge tank • Additional electrical ductbanks, process lines and equipment vaults
Electrical & Instrumentation Building	• 22,000 sq-ft three-story building • Maintenance and administrative work areas	N/A
Maintenance Building	• 10,000 sq-ft two-story building • Maintenance work areas	N/A
Parking / Storage	• Provide dedicated parking for City vehicles (electric and conventional) and motored equipment. • Relocate storage areas around the site that will be displaced by facility resiliency, facility improvements, and construction activities.	• Relocate storage areas around the site that will be displaced by facility resiliency, facility improvements, and construction activities.

Replacement intake and raw water transmission pipelines to the SRWTP – This component involves the following elements:

- Demolition and removal of the original Sacramento River Water Intake Structure. Construction and operation of a replacement intake structure in the Sacramento River between the I Street Bridge and the confluence of Sacramento River and American River. The replacement intake would operate in parallel with the currently operating Sacramento River Intake to provide surface water for the water treatment plant capacity.
- Installation of conveyance pipelines to convey raw water and sediment from the replacement river intake to SRWTP. The pipelines are anticipated to go through/over the Sacramento River levee, east along the north side of Sacramento Municipal Utility District's (SMUD) Museum of Science and Curiosity (MOSAC), under Interstate 5 (I-5), to SRWTP.
- Installation of a conveyance pipeline to transport sediment from the currently operating Sacramento River Intake to SRWTP. The pipeline would be located on/under the existing bridge, through/over the Sacramento River levee and under I-5, to SRWTP.

Potable water distribution pipelines from the SRWTP – This involves the installation and operation of following elements summarized in Table 3. Potable water transmission pipelines will be installed in the vicinity of SRWTP to overcome hydraulic constrictions within the area defined on the north by the American River, on the east by 7th Street, on the south by the Union Pacific Railroad, and on the west by the Sacramento River.

Table 3: Summary of Elements of Potable Water Transmission Pipelines in Vicinity of SRWTP

Project Element[1]	Initial Phase
Pipeline (78-in Diameter)	• 4,000 linear feet
Pipeline (66-in Diameter)	• 10,000 linear feet

ENVIRONMENTAL EFFECTS AND SCOPE OF THE EIR

The EIR will analyze potentially significant impacts that result from construction and operation of the proposed project. The proposed project is consistent with the City 2020 Urban Water Management Plan (2021).

Pursuant to section 15063(a) of the CEQA Guidelines, an Initial Study has not been prepared for the proposed project. The EIR will evaluate the full range of environmental issues contemplated for consideration under CEQA and the CEQA Guidelines, as well as non-environmental issues including:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils and Paleontology
- Greenhouse Gas Emissions, Climate Change, and Energy
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise and Vibration
- Public Services
- Population and Housing
- Recreation

[1] All dimensions, sizes or volumes listed in this table are approximate and may change during the design phase of the project.

- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire
- Growth Inducement
- Cumulative Impacts

Environmental issues not contemplated for consideration due to the determination that there will be no impact include:

- Forestry Resources

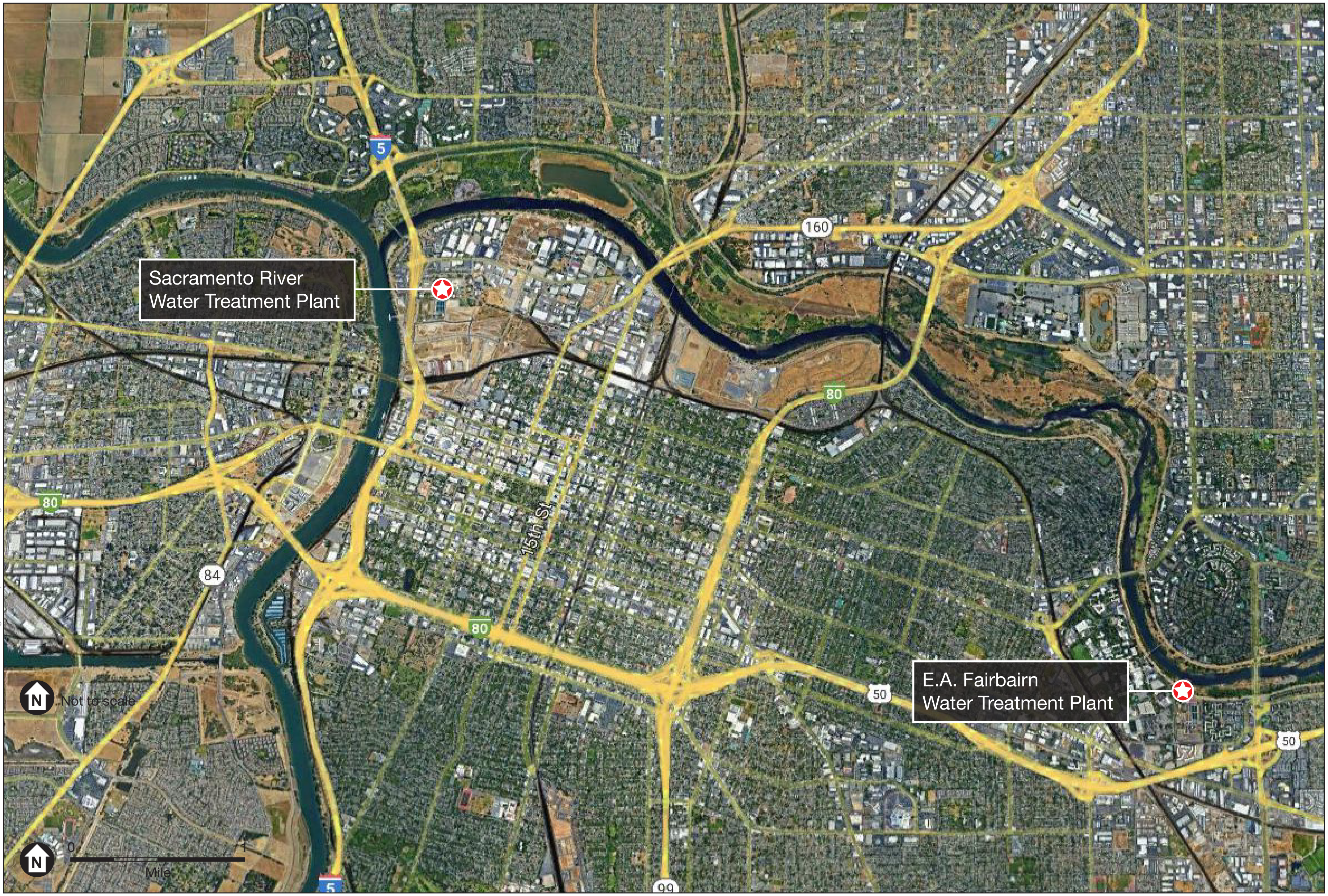
The EIR will identify and evaluate alternatives to the proposed project.

SUBMITTING COMMENTS

Comments and suggestions as to the appropriate scope of analysis in the EIR are invited from all interested parties. Written comments or questions concerning the EIR for the proposed project should be directed to the City's environmental project manager at the following email address: srjohnson@cityofsacramento.org, or by mail addressed to the following address

Scott Johnson, Senior Planner
City of Sacramento Community Development Department
300 Richards Blvd., Third Floor
Sacramento, CA 95811 Phone (916) 808-5842
Email: srjohnson@cityofsacramento.org

Comments should be submitted no later than 5:00 p.m. on May 6, 2022. Please include the commenter's full name and address.



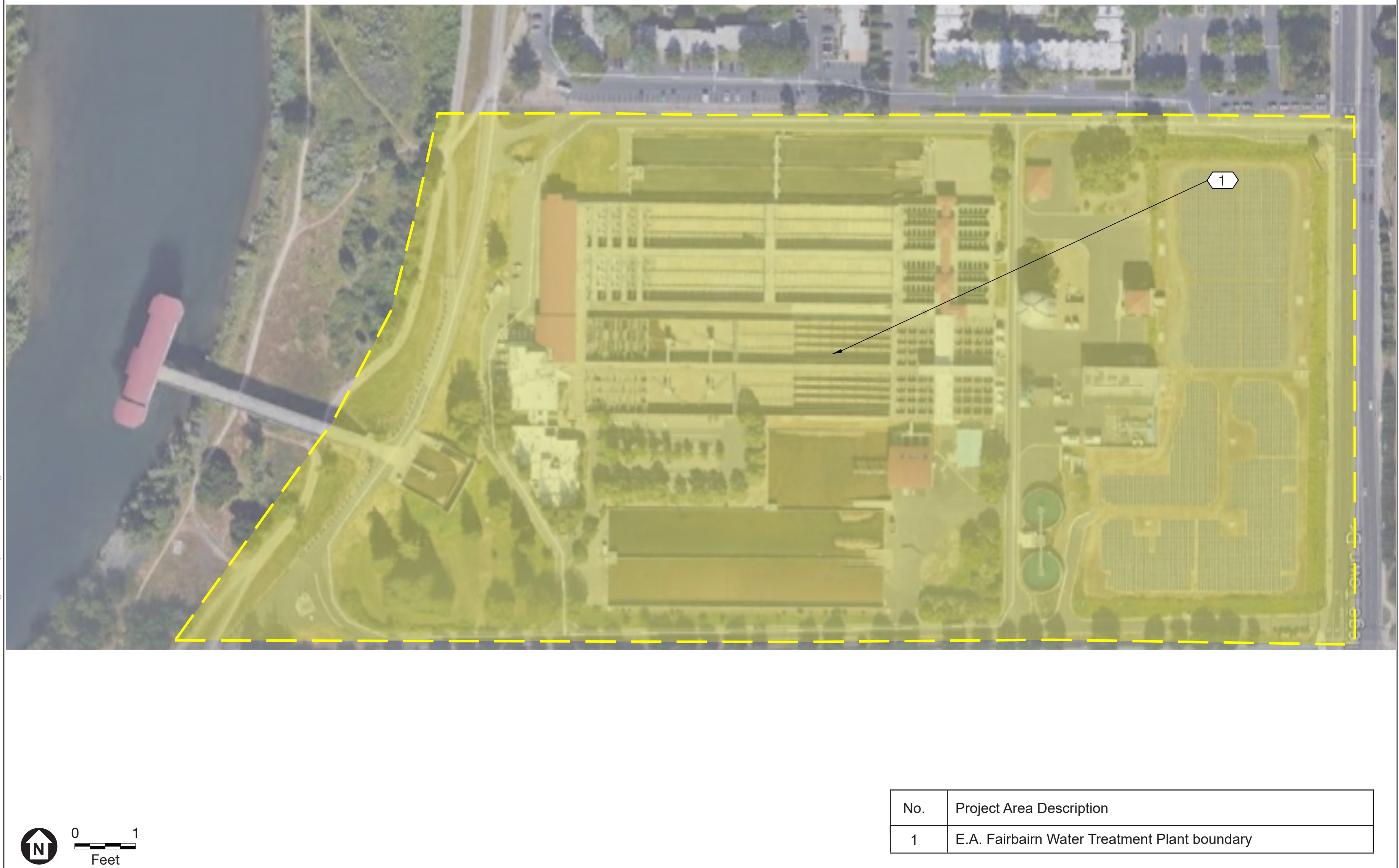
D201800874.00 - Sacramento River WTP CEQA and Permitting\05 Graphic-GIS Modeling\Illustrator

SOURCE: Carollo, 2022

Sacramento Water + Treatment Plants Resiliency and Improvement Projects

Figure 1
Regional Location Map

ESA



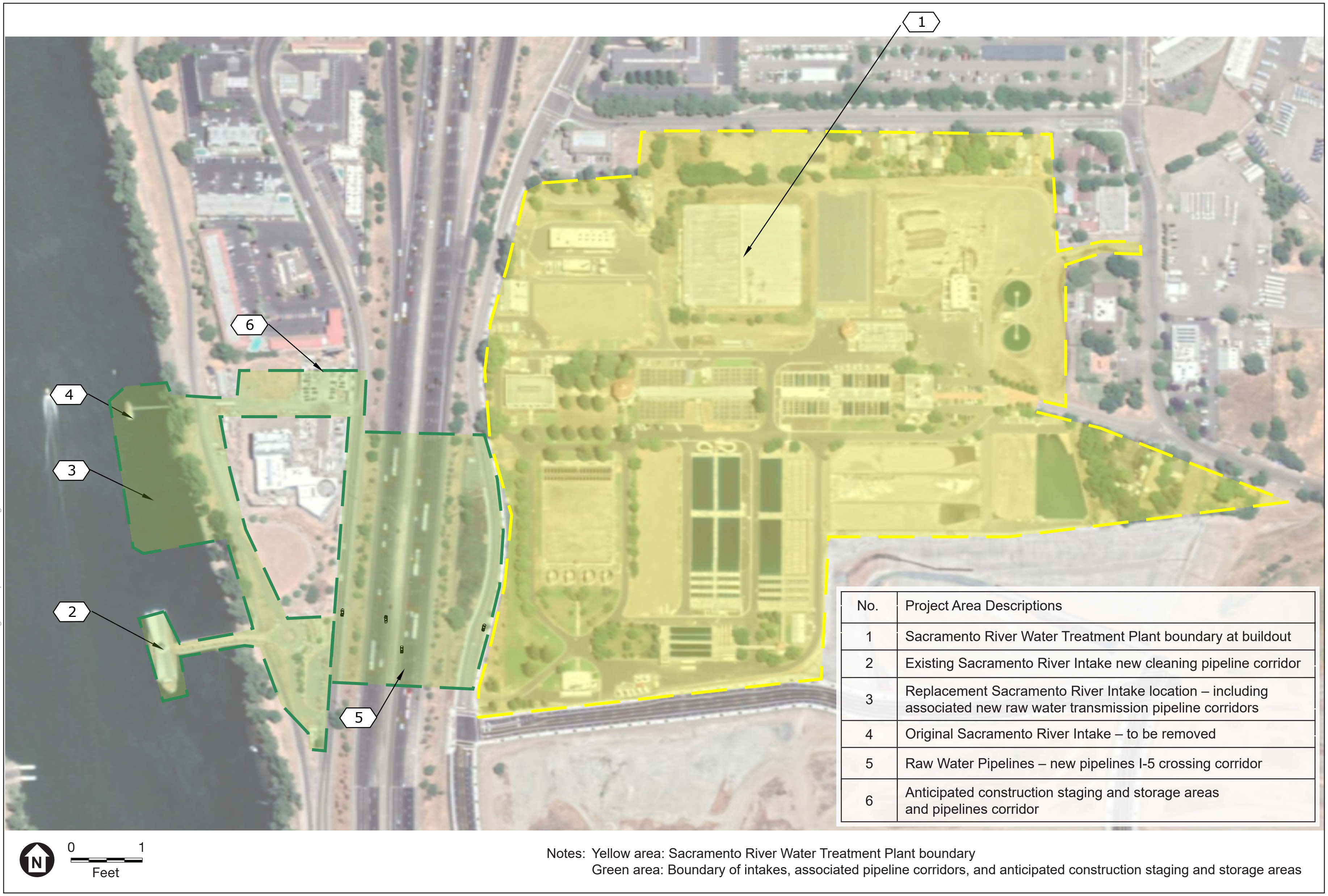
No.	Project Area Description
1	E.A. Fairbairn Water Treatment Plant boundary

SOURCE: Carollo, 2022

Sacramento Water + Treatment Plants Resiliency and Improvement Projects

Figure 2
E.A. Fairbairn Water Treatment Plant Project Area

ESA



No.	Project Area Descriptions
1	Sacramento River Water Treatment Plant boundary at buildout
2	Existing Sacramento River Intake new cleaning pipeline corridor
3	Replacement Sacramento River Intake location – including associated new raw water transmission pipeline corridors
4	Original Sacramento River Intake – to be removed
5	Raw Water Pipelines – new pipelines I-5 crossing corridor
6	Anticipated construction staging and storage areas and pipelines corridor

Notes: Yellow area: Sacramento River Water Treatment Plant boundary
Green area: Boundary of intakes, associated pipeline corridors, and anticipated construction staging and storage areas

SOURCE: Carollo, 2022

Figure 3
Sacramento River Water Treatment Plant Project Areas

From:	Cultural Preservation Department Inbox
To:	Scott Johnson
Cc:	Megan Thomas
Subject:	RE: Sacramento Water+ Treatment Plants Resiliency and Improvements Project CEQA Notice of Preparation of an EIR
Date:	Thursday, April 7, 2022 9:09:11 AM
Attachments:	image001.png

Hello Scott,

We have no comments at this time.

Thanks

Cultural Preservation Department
Wilton Rancheria
Tel: 916.683.6000 | Fax: 916.683.6015
9728 Kent Street | Elk Grove | CA | 95624
cpd@wiltonrancheria-nsn.gov
wiltonrancheria-nsn.gov

From: Scott Johnson <SRJohnson@cityofsacramento.org>
Sent: Wednesday, April 6, 2022 1:40 PM
To: Scott Johnson <SRJohnson@cityofsacramento.org>
Cc: Megan Thomas <MeThomas@cityofsacramento.org>
Subject: Sacramento Water+ Treatment Plants Resiliency and Improvements Project CEQA Notice of Preparation of an EIR

The City of Sacramento as lead agency is circulating the Notice of Preparation (NOP) for the City of Sacramento Water+ Treatment Plants Resiliency and Improvements Project. Agencies and members of the public are invited to comment on the scope of the Environmental Impact Report (EIR).

The NOP comment period is April 6, 2022 to May 6, 2022. A scoping meeting will be held on April 27, 2022.

The general objective of the proposed project is to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand.
Specific proposed project objectives include:

- Increase treatment flexibility to address changing water qualities within the Sacramento and American Rivers and to meet drinking water regulations.
- Improve safety, reliability, and resiliency of both surface water treatment plants.
- Provide for consistent treatment and distribution of potable water to the service area.
- Increase reliable water supply and treatment capacity to meet projected water demand.

Comments in response to the NOP should be addressed to Scott Johnson, Senior Planner for the City of Sacramento. Telephone: (916) 808-5842; Email srjohnson@cityofsacramento.org.

The Notice of Preparation is attached.

The NOP is also available on the City's Community Development Department webpage at: http://www.cityofsacramento.org/Community-Development/Planning/Environmental/Impact-Reports

Thank you.

Scott Johnson
City of Sacramento
Community Development Department
Environmental Planning Services
300 Richards Blvd., 3rd Floor
Sacramento, CA 95811
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srjohnson@cityofsacramento.org

NATIVE AMERICAN HERITAGE COMMISSION

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nahc@nahc.ca.gov
NAHC.ca.gov

Governor's Office of Planning & Research

Apr 15 2022

STATE CLEARINGHOUSE

April 15, 2022

Scott Johnson
City of Sacramento
300 Richards Boulevard, Third Floor
Sacramento, CA 95811

Re: 2022040138, Sacramento Water+ Treatment Plants Resiliency and Improvements Project, Sacramento County

Dear Mr. Johnson:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

a. A brief description of the project.

b. The lead agency contact information.

c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).

d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

a. Alternatives to the project.

b. Recommended mitigation measures.

c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

a. Type of environmental review necessary.

b. Significance of the tribal cultural resources.

c. Significance of the project's impacts on tribal cultural resources.

d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

a. Whether the proposed project has a significant impact on an identified tribal cultural resource.

b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

- **a.** The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
- **b.** A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

- **a.** Avoidance and preservation of the resources in place, including, but not limited to:
  - **i.** Planning and construction to avoid the resources and protect the cultural and natural context.
  - **ii.** Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
- **b.** Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
  - **i.** Protecting the cultural character and integrity of the resource.
  - **ii.** Protecting the traditional use of the resource.
  - **iii.** Protecting the confidentiality of the resource.
- **c.** Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
- **d.** Protecting the resource. (Pub. Resource Code §21084.3 (b)).
- **e.** Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
- **f.** Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

- **a.** The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
- **b.** The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
- **c.** The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
  a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
  b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
  a. If part or all of the APE has been previously surveyed for cultural resources.
  b. If any known cultural resources have already been recorded on or adjacent to the APE.
  c. If the probability is low, moderate, or high that cultural resources are located in the APE.
  d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.

b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Pricilla.Torres-Fuentes@nahc.ca.gov.

Sincerely,

Pricilla Torres-Fuentes

Pricilla Torres-Fuentes
Cultural Resources Analyst

cc: State Clearinghouse

From:	Dustin Hollingsworth
To:	Scott Johnson
Subject:	Water Treatment Plan Scoping
Date:	Wednesday, April 27, 2022 12:47:52 PM
Attachments:	image001.png

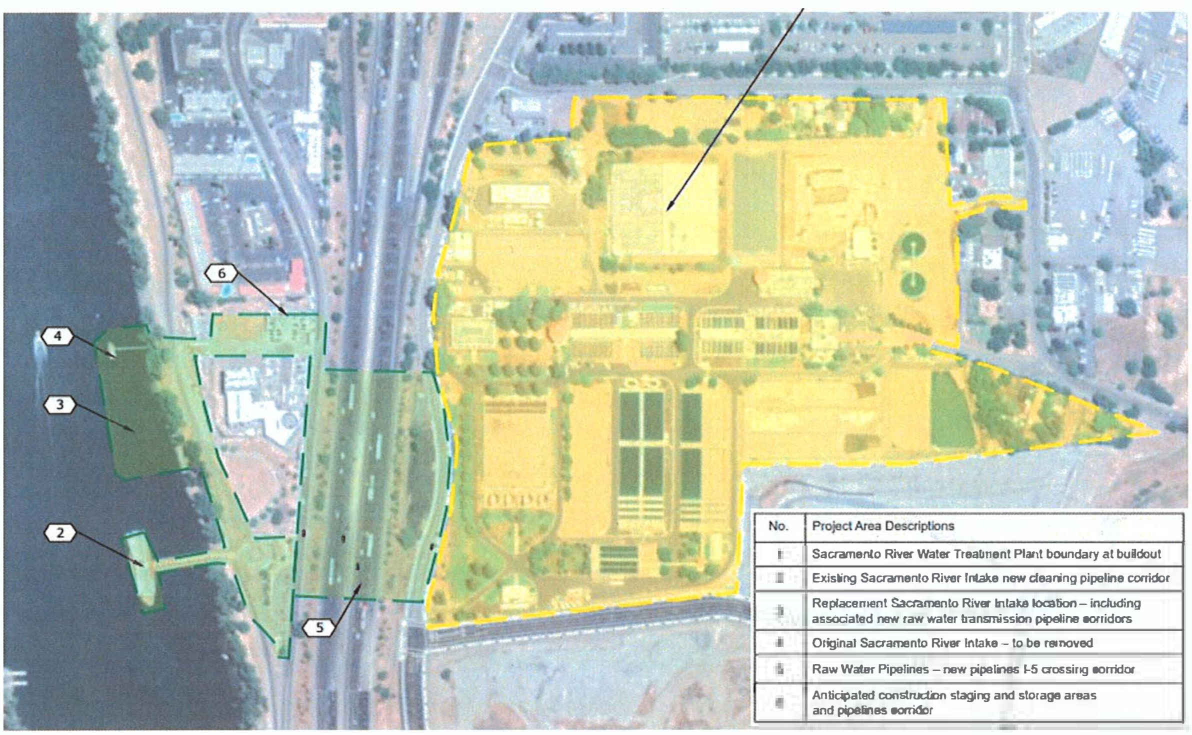
Hi Scott,

I hope that things are going well with you. I wanted to comment on the plan. No. 6 is the parking lot of the SMUD Museum of Science and Curiosity (MOSAC) which has a lease with the City for use of the space. Our department, CCS manages the lease, and I sit on the MOSAC board as the City representative. Any use of that parking are would have significant impact on their operations and may be a breach of contract. I have attached There are actually 3 primary agreements between the City and MOSAC that create a lease – lease back, I would be happy to share them if you would like. Also as I am sure that you are aware there is a clay cap on the parcel that contains hazardous materials. I am fairly certain that it is not in area 6 but I wanted to be certain that you were aware.

Please let me know if you have any questions.

Best,

Dustin



Dustin Hollingsworth
Facilities and Real Property Superintendent
City of Sacramento
Convention & Cultural Services
Email: Djhollingsworth@cityofsacramento.org
Office: 916-808-5538

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
North Central Region
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670-4599
916-358-2900
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

May 3, 2022

Scott Johnson
City of Sacramento, Community Development Department
300 Richard Boulevard, 3rd Flood
Sacramento, CA 95811
srjohnson@cityofsacramento.org

Subject: CITY OF SACRAMENTO WATER + TREATMENT PLANTS RESILIENCY AND IMPROVEMENTS PROJECT SCH# 2022040138

Dear Mr. Johnson:

The California Department of Fish and Wildlife (CDFW) received and reviewed the Notice of Preparation of an Environmental Impact Report (EIR) from the City of Sacramento for the City of Sacramento Water + Treatment Plants Resiliency and Improvements Project (Project) in Sacramento County pursuant the California Environmental Quality Act (CEQA) statute and guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish, wildlife, plants and their habitats. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may need to exercise its own regulatory authority under the Fish and Game Code (Fish & G. Code).

CDFW ROLE

CDFW is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).). CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (*Id.*, § 1802.). Similarly, for purposes of CEQA, CDFW provides, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

1 CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

CDFW may also act as a Responsible Agency under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project proponent may seek related take authorization as provided by the Fish and Game Code.

PROJECT DESCRIPTION SUMMARY

The proposed Project area includes existing and proposed facilities at the E.A. Fairbairn Water Treatment Plant (FWTP) and Sacramento River Water Treatment Plant (SRWTP). The 30-acre FWTP is located just south of the American River and at the northwest corner of State University Drive and College Town Drive, approximately eight miles upstream along the American River. The approximately 50-acre SRWTP site is located near the confluence of the Sacramento River and American River. Nearby features include the Sacramento River to the west; the American River and Richards Boulevard to the north, 7th Street to the east, and Railyards Boulevard to the south.

Consistent with the 2035 General Plan, the City is proposing the Project to provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its useful life, and to meet the projected potable water demand. Service area needs are anticipated to exceed the reliable surface water supply and treatment capacity by 2035. By 2050, it is estimated that an additional 150 million gallons per day (MGD)(410 MGD total) of treated surface water will be required. The proposed Project includes the following components: Rehabilitation of infrastructure approaching the end of its effective life at both FWTP and SRWTP to improve treatment reliability; Integration of ozone generation and contact into the treatment process at both FWTP and SRWTP to reduce regulated disinfection byproducts and improve the ability for both treatment plants to address changing river water quality conditions; Installation of pipelines between both of the City's Sacramento River water intakes and SRWTP to assist with cleaning of these facilities; construction and operation of a replacement to the original Sacramento River Water Intake Structure in the Sacramento River and pipelines for transferring water to SRWTP and to improve surface water supply reliability during low river level conditions; Phased construction and operation of additional SRWTP water treatment capacity to match the projected service area needs; Conversion from chlorine gas to sodium hypochlorite as the primary chemical for disinfection of the water to improve facility, City staff, and public safety, and to help protect against reductions in chemical availability; Phased improvement of the water transmission and distribution system in the vicinity of SRWTP to match the demand and address critical hydraulic constrictions.

The Project description should include the whole action as defined in the CEQA Guidelines § 15378 and should include appropriate detailed exhibits disclosing the Project area including temporary impacted areas such as equipment stage area, spoils areas, adjacent infrastructure development, staging areas and access and haul roads if applicable.

As required by § 15126.6 of the CEQA Guidelines, the EIR should include an appropriate range of reasonable and feasible alternatives that would attain most of the basic Project objectives and avoid or minimize significant impacts to resources under CDFW's jurisdiction.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations presented below to assist the City of Sacramento in adequately identifying and/or mitigating the Project's significant, or potentially significant, impacts on biological resources. The comments and recommendations are also offered to enable CDFW to adequately review and comment on the proposed Project with respect to impacts on biological resources. CDFW recommends that the forthcoming EIR address the following:

Assessment of Biological Resources

Section 15125(c) of the CEQA Guidelines states that knowledge of the regional setting of a project is critical to the assessment of environmental impacts and that special emphasis should be placed on environmental resources that are rare or unique to the region. To enable CDFW staff to adequately review and comment on the Project, the EIR should include a complete assessment of the flora and fauna within and adjacent to the Project footprint, with emphasis on identifying rare, threatened, endangered, and other sensitive species and their associated habitats. CDFW recommends the EIR specifically include:

1. An assessment of all habitat types located within the Project footprint, and a map that identifies the location of each habitat type. CDFW recommends that floristic, alliance- and/or association-based mapping and assessment be completed following, *The Manual of California Vegetation*, second edition (Sawyer 2009). Adjoining habitat areas should also be included in this assessment where site activities could lead to direct or indirect impacts offsite. Habitat mapping at the alliance level will help establish baseline vegetation conditions.

2. A general biological inventory of the fish, amphibian, reptile, bird, and mammal species that are present or have the potential to be present within each habitat type onsite and within adjacent areas that could be affected by the Project. CDFW recommends that the California Natural Diversity Database (CNDDB), as well as previous studies performed in the area, be consulted to assess the potential presence of sensitive species and habitats. A nine United States Geologic Survey 7.5-minute quadrangle search is recommended to determine

what may occur in the region, larger if the Project area extends past one quad (see *Data Use Guidelines* on the Department webpage www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data). Please review the webpage for information on how to access the database to obtain current information on any previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code, in the vicinity of the Project. CDFW recommends that CNDDB Field Survey Forms be completed and submitted to CNDDB to document survey results. Online forms can be obtained and submitted at: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data.

Please note that CDFW's CNDDB is not exhaustive in terms of the data it houses, nor is it an absence database. CDFW recommends that it be used as a starting point in gathering information about the *potential presence* of species within the general area of the Project site. Other sources for identification of species and habitats near or adjacent to the Project area should include, but may not be limited to, State and federal resource agency lists, California Wildlife Habitat Relationship System, California Native Plant Society Inventory, agency contacts, environmental documents for other projects in the vicinity, academics, and professional or scientific organizations.

3. A complete and recent inventory of rare, threatened, endangered, and other sensitive species located within the Project footprint and within offsite areas with the potential to be affected, including California Species of Special Concern and California Fully Protected Species (Fish & G. Code § § 3511, 4700, 5050, and 5515). Species to be addressed should include all those which meet the CEQA definition (CEQA Guidelines § 15380). The inventory should address seasonal variations in use of the Project area and should not be limited to resident species. The EIR should include the results of focused species-specific surveys, completed by a qualified biologist and conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable. Species-specific surveys should be conducted in order to ascertain the presence of species with the potential to be directly, indirectly, on or within a reasonable distance of the Project activities. CDFW recommends the City of Sacramento rely on survey and monitoring protocols and guidelines available at: www.wildlife.ca.gov/Conservation/Survey-Protocols. Alternative survey protocols may be warranted; justification should be provided to substantiate why an alternative protocol is necessary. Acceptable species-specific survey procedures should be developed in consultation with CDFW and the U.S. Fish and Wildlife Service, where necessary. Some aspects of the Project may warrant periodic updated surveys for certain sensitive taxa, particularly if the Project is proposed to occur over a protracted time frame, or in phases, or if surveys are completed during periods of drought or deluge.

4. A thorough, recent (within the last two years), floristic-based assessment of

special-status plants and natural communities, following CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (see www.wildlife.ca.gov/Conservation/Plants).

5. Information on the regional setting that is critical to an assessment of environmental impacts, with special emphasis on resources that are rare or unique to the region (CEQA Guidelines § 15125[c]).

Analysis of Direct, Indirect, and Cumulative Impacts to Biological Resources

The EIR should provide a thorough discussion of the Project's potential direct, indirect, and cumulative impacts on biological resources. To ensure that Project impacts on biological resources are fully analyzed, the following information should be included in the EIR:

1. The EIR should define the threshold of significance for each impact and describe the criteria used to determine whether the impacts are significant (CEQA Guidelines, § 15064, subd. (f)). The EIR must demonstrate that the significant environmental impacts of the Project were adequately investigated and discussed and it must permit the significant effects of the Project to be considered in the full environmental context.

2. A discussion of potential impacts from lighting, noise, human activity, and wildlife-human interactions created by Project activities especially those adjacent to natural areas, exotic and/or invasive species occurrences, and drainages. The EIR should address Project-related changes to drainage patterns and water quality within, upstream, and downstream of the Project site, including: volume, velocity, and frequency of existing and post-Project surface flows; polluted runoff; soil erosion and/or sedimentation in streams and water bodies; and post-Project fate of runoff from the Project site.

3. A discussion of potential indirect Project impacts on biological resources, including resources in areas adjacent to the Project footprint, such as nearby public lands (e.g. National Forests, State Parks, etc.), open space, adjacent natural habitats, riparian ecosystems, wildlife corridors, and any designated and/or proposed reserve or mitigation lands (e.g., preserved lands associated with a Conservation or Recovery Plan, or other conserved lands).

4. A cumulative effects analysis developed as described under CEQA Guidelines section 15130. The EIR should discuss the Project's cumulative impacts to natural resources and determine if that contribution would result in a significant impact. The EIR should include a list of present, past, and probable future projects producing related impacts to biological resources or shall include a summary of the projections contained in an adopted local, regional, or statewide plan, that consider conditions contributing to a cumulative effect. The cumulative analysis shall include impact analysis of vegetation and habitat reductions within

the area and their potential cumulative effects. Please include all potential direct and indirect Project-related impacts to riparian areas, wetlands, wildlife corridors or wildlife movement areas, aquatic habitats, sensitive species and/or special-status species, open space, and adjacent natural habitats in the cumulative effects analysis.

Mitigation Measures for Project Impacts to Biological Resources

The EIR should include appropriate and adequate avoidance, minimization, and/or mitigation measures for all direct, indirect, and cumulative impacts that are expected to occur as a result of the construction and long-term operation and maintenance of the Project. CDFW also recommends the environmental documentation provide scientifically supported discussion regarding adequate avoidance, minimization, and/or mitigation measures to address the Project's significant impacts upon fish and wildlife and their habitat. For individual projects, mitigation must be roughly proportional to the level of impacts, including cumulative impacts, in accordance with the provisions of CEQA (Guidelines § § 15126.4(a)(4)(B), 15064, 15065, and 16355). In order for mitigation measures to be effective, they must be specific, enforceable, and feasible actions that will improve environmental conditions. When proposing measures to avoid, minimize, or mitigate impacts, CDFW recommends consideration of the following:

1. *Fully Protected Species*: Several Fully Protected Species (Fish & G. Code § 3511) have the potential to occur within or adjacent to the Project area, including, but not limited to: white-tailed kite (*Elanus leucurus*). Fully protected species may not be taken or possessed at any time. Project activities described in the EIR should be designed to completely avoid any fully protected species that have the potential to be present within or adjacent to the Project area. CDFW also recommends the EIR fully analyze potential adverse impacts to fully protected species due to habitat modification, loss of foraging habitat, and/or interruption of migratory and breeding behaviors. CDFW recommends that the City of Sacramento include in the analysis how appropriate avoidance, minimization and mitigation measures will reduce indirect impacts to fully protected species.

2. *Species of Special Concern*: Several Species of Special Concern (SSC) have the potential to occur within or adjacent to the Project area, including, but not limited to: western pond turtle (*Actinemys marmorata*), purple martin (*Progne subis*), Sacramento splittail (*Pogonichthys macrolepidotus*), and green sturgeon (*Acipenser medirostris*). Project activities described in the EIR should be designed to avoid any SSC that have the potential to be present within or adjacent to the Project area. CDFW also recommends that the EIR fully analyze potential adverse impacts to SSC due to habitat modification, loss of foraging habitat, and/or interruption of migratory and breeding behaviors. CDFW recommends the City of Sacramento include in the analysis how appropriate avoidance, minimization and mitigation measures will reduce impacts to SSC.

3. *Sensitive Plant Communities*: CDFW considers sensitive plant communities to be imperiled habitats having both local and regional significance. Plant communities, alliances, and associations with a statewide ranking of S-1, S-2, S-3, and S-4 should be considered sensitive and declining at the local and regional level. These ranks can be obtained by querying the CNDDB and are included in *The Manual of California Vegetation* (Sawyer 2009). The EIR should include measures to fully avoid and otherwise protect sensitive plant communities from Project-related direct and indirect impacts.

4. *Native Wildlife Nursey Sites:* CDFW recommends the EIR fully analyze potential adverse impacts to native wildlife nursey sites, including but not limited to bat maternity roosts. Based on review of Project materials, aerial photography, and observation of the site from public roadways, the Project site contains potential nursery site habitat for structure and tree roosting bats and is near potential foraging habitat. Bats are considered non-game mammals and are afforded protection by state law from take and/or harassment, (Fish & G. Code, § 4150; Cal. Code of Regs, § 251.1). CDFW recommends that the EIR fully identify the Project's potential impacts to native wildlife nursery sites, and include appropriate avoidance, minimization and mitigation measures to reduce impacts or mitigate any potential significant impacts to bat nursery sites.

5. *Mitigation*: CDFW considers adverse Project-related impacts to sensitive species and habitats to be significant to both local and regional ecosystems, and the EIR should include mitigation measures for adverse Project-related impacts to these resources. Mitigation measures should emphasize avoidance and reduction of Project impacts. For unavoidable impacts, onsite habitat restoration, enhancement, or permanent protection should be evaluated and discussed in detail. If onsite mitigation is not feasible or would not be biologically viable and therefore not adequately mitigate the loss of biological functions and values, offsite mitigation through habitat creation and/or acquisition and preservation in perpetuity should be addressed.

   The EIR should include measures to perpetually protect the targeted habitat values within mitigation areas from direct and indirect adverse impacts in order to meet mitigation objectives to offset Project-induced qualitative and quantitative losses of biological values. Specific issues that should be addressed include restrictions on access, proposed land dedications, long-term monitoring and management programs, control of illegal dumping, water pollution, increased human intrusion, etc.

6. *Habitat Revegetation/Restoration Plans*: Plans for restoration and revegetation should be prepared by persons with expertise in the regional ecosystems and native plant restoration techniques. Plans should identify the assumptions used to develop the proposed restoration strategy. Each plan should include, at a minimum: (a) the location of restoration sites and assessment of appropriate reference sites; (b) the plant species to be used, sources of local propagules,

container sizes, and seeding rates; (c) a schematic depicting the mitigation area; (d) a local seed and cuttings and planting schedule; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation on site; (g) specific success criteria; (h) a detailed monitoring program; (i) contingency measures should the success criteria not be met; and (j) identification of the party responsible for meeting the success criteria and providing for conservation of the mitigation site in perpetuity. Monitoring of restoration areas should extend across a sufficient time frame to ensure that the new habitat is established, self-sustaining, and capable of surviving drought.

CDFW recommends that local onsite propagules from the Project area and nearby vicinity be collected and used for restoration purposes. Onsite seed collection should be appropriately timed to ensure the viability of the seeds when planted. Onsite vegetation mapping at the alliance and/or association level should be used to develop appropriate restoration goals and local plant palettes. Reference areas should be identified to help guide restoration efforts. Specific restoration plans should be developed for various Project components as appropriate. Restoration objectives should include protecting special habitat elements or re-creating them in areas affected by the Project. Examples may include retention of woody material, logs, snags, rocks, and brush piles. Fish and Game Code sections 1002, 1002.5 and 1003 authorize CDFW to issue permits for the take or possession of plants and wildlife for scientific, educational, and propagation purposes. Please see our website for more information on Scientific Collecting Permits at www.wildlife.ca.gov/Licensing/Scientific-Collecting#53949678-regulations-.

7. *Nesting Birds:* Please note that it is the Project proponent's responsibility to comply with all applicable laws related to nesting birds and birds of prey. Migratory non-game native bird species are protected by international treaty under the federal Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703 *et seq.*). CDFW implemented the MBTA by adopting the Fish and Game Code section 3513. Fish and Game Code sections 3503, 3503.5 and 3800 provide additional protection to nongame birds, birds of prey, their nests and eggs. Sections 3503, 3503.5, and 3513 of the Fish and Game Code afford protective measures as follows: section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the Fish and Game Code or any regulation made pursuant thereto; section 3503.5 states that is it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by the Fish and Game Code or any regulation adopted pursuant thereto; and section 3513 states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA.

Potential habitat for nesting birds and birds of prey is present within the Project area. The Project should disclose all potential activities that may incur a direct or indirect take to nongame nesting birds within the Project footprint and its vicinity. Appropriate avoidance, minimization, and/or mitigation measures to avoid take must be included in the EIR.

CDFW recommends the EIR include specific avoidance and minimization measures to ensure that impacts to nesting birds or their nests do not occur. Project-specific avoidance and minimization measures may include, but not be limited to: Project phasing and timing, monitoring of Project-related noise (where applicable), sound walls, and buffers, where appropriate. The EIR should also include specific avoidance and minimization measures that will be implemented should a nest be located within the Project site. In addition to larger, protocol level survey efforts (e.g. Swainson's hawk surveys) and scientific assessments, CDFW recommends a final preconstruction survey be required no more than three (3) days prior to vegetation clearing or ground disturbance activities, as instances of nesting could be missed if surveys are conducted earlier.

8. *Moving out of Harm's Way:* The Project is anticipated to result in the clearing of natural habitats that support native species. To avoid direct mortality, the City of Sacramento should state in the EIR a requirement for a qualified biologist with the proper handling permits, will be retained to be onsite prior to and during all ground- and habitat-disturbing activities. Furthermore, the EIR should describe that the qualified biologist with the proper permits may move out of harm's way special-status species or other wildlife of low or limited mobility that would otherwise be injured or killed from Project-related activities, as needed. The EIR should also describe qualified biologist qualifications and authorities to stop work to prevent direct mortality of special-status species. CDFW recommends fish and wildlife species be allowed to move out of harm's way on their own volition, if possible, and to assist their relocation as a last resort. It should be noted that the temporary relocation of onsite wildlife does not constitute effective mitigation for habitat loss.

   Translocation of Species: CDFW generally does not support the use of relocation, salvage, and/or transplantation as the sole mitigation for impacts to rare, threatened, or endangered species as these efforts are generally experimental in nature and largely unsuccessful. Therefore, the EIR should describe additional mitigation measures utilizing habitat restoration, conservation, and/or preservation, in addition to avoidance and minimization measures, if it is determined that there may be impacts to rare, threatened, or endangered species.

The EIR should incorporate mitigation performance standards that would ensure that impacts are reduced to a less-than-significant level. Mitigation measures proposed in the EIR should be made a condition of approval of the Project. Please note that obtaining a permit from CDFW by itself with no other mitigation proposal may constitute mitigation deferral. CEQA Guidelines section 15126.4, subdivision (a)(1)(B) states that formulation of mitigation measures should not be deferred until some future time. To avoid deferring mitigation in this way, the EIR should describe avoidance, minimization and mitigation measures that would be implemented should the impact occur.

California Endangered Species Act

CDFW is responsible for ensuring appropriate conservation of fish and wildlife resources including threatened, endangered, and/or candidate plant and animal species, pursuant to the CESA. CDFW recommends that a CESA Incidental Take Permit (ITP) be obtained if the Project has the potential to result in "take" (Fish & G. Code § 86 defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") of State-listed CESA species, either through construction or over the life of the Project.

State-listed species with the potential to occur in the area include, but are not limited to: Swainson's hawk (*Buteo swainsoni)*, delta smelt (*Hypomesus transpacificus*), longfin smelt (*Spirinchus thaleichthys*), Sacramento River winter-run and spring-run Chinook salmon (*Oncorhynchus tshawytscha*).

The EIR should disclose the potential of the Project to take State-listed species and how the impacts will be avoided, minimized, and mitigated. Please note that mitigation measures that are adequate to reduce impacts to a less-than significant level to meet CEQA requirements may not be enough for the issuance of an ITP. To issue an ITP, CDFW must demonstrate that the impacts of the authorized take will be minimized and fully mitigated (Fish & G. Code §2081 (b)). To facilitate the issuance of an ITP, if applicable, CDFW recommends the EIR include measures to minimize and fully mitigate the impacts to any State-listed species the Project has potential to take. CDFW encourages early consultation with staff to determine appropriate measures to facilitate future permitting processes and to engage with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service to coordinate specific measures if both State and federally listed species may be present within the Project vicinity.

Native Plant Protection Act

The Native Plant Protection Act (Fish & G. Code §1900 *et seq*.) prohibits the take or possession of State-listed rare and endangered plants, including any part or product thereof, unless authorized by CDFW or in certain limited circumstances. Take of State-listed rare and/or endangered plants due to Project activities may only be permitted through an ITP or other authorization issued by CDFW pursuant to California Code of Regulations, Title 14, section 786.9 subdivision (b).

Lake and Streambed Alteration Program

The EIR should identify all perennial, intermittent, and ephemeral rivers, streams, lakes, other hydrologically connected aquatic features, and any associated biological resources/habitats present within the entire Project footprint (including utilities, access and staging areas). The environmental document should analyze all potential temporary, permanent, direct, indirect and/or cumulative impacts to the above-mentioned features and associated biological resources/habitats that may occur because of the Project. If it is determined the Project will result in significant impacts to these resources the EIR shall propose appropriate avoidance, minimization and/or mitigation measures to reduce impacts to a less-than-significant level.

Section 1602 of the Fish and Game Code requires an entity to notify CDFW prior to commencing any activity that may do one or more of the following:

1. Substantially divert or obstruct the natural flow of any river, stream or lake;

2. Substantially change or use any material from the bed, channel or bank of any river, stream, or lake; or

3. Deposit debris, waste or other materials where it may pass into any river, stream or lake.

Please note that "any river, stream or lake" includes those that are episodic (i.e., those that are dry for periods of time) as well as those that are perennial (i.e., those that flow year-round). This includes ephemeral streams and watercourses with a subsurface flow. It may also apply to work undertaken within the flood plain of a body of water.

If upon review of an entity's notification, CDFW determines that the Project activities may substantially adversely affect an existing fish or wildlife resource, a Lake and Streambed Alteration (LSA) Agreement will be issued which will include reasonable measures necessary to protect the resource. CDFW's issuance of an LSA Agreement is a "project" subject to CEQA (see Pub. Resources Code 21065). To facilitate issuance of an LSA Agreement, if one is necessary, the EIR should fully identify the potential impacts to the lake, stream, or riparian resources, and provide adequate avoidance, mitigation, and monitoring and reporting commitments. Early consultation with CDFW is recommended, since modification of the Project may avoid or reduce impacts to fish and wildlife resources. Notifications for projects involving (1) sand, gravel or rock extraction, (2) timber harvesting operations, or (3) routine maintenance operations must be submitted using paper notification forms. All other LSA Notification types must be submitted online through CDFW's Environmental Permit Information Management System (EPIMS). For more information about EPIMS, please visit https://wildlife.ca.gov/Conservation/Environmental-Review/EPIMS. More information about LSA Notifications, paper forms and fees may be found at https://www.wildlife.ca.gov/Conservation/Environmental-Review/LSA.

Please note that other agencies may use specific methods and definitions to determine impacts to areas subject to their authorities. These methods and definitions often do not include all needed information for CDFW to determine the extent of fish and wildlife resources affected by activities subject to Notification under Fish and Game Code section 1602. Therefore, CDFW does not recommend relying solely on methods developed specifically for delineating areas subject to other agencies' jurisdiction (such as United States Army Corps of Engineers) when mapping lakes, streams, wetlands, floodplains, riparian areas, etc. in preparation for submitting a Notification of an LSA.

CDFW relies on the lead agency environmental document analysis when acting as a responsible agency issuing an LSA Agreement. CDFW recommends lead agencies coordinate with us as early as possible, since potential modification of the proposed Project may avoid or reduce impacts to fish and wildlife resources and expedite the Project approval process.

The following information will be required for the processing of an LSA Notification and CDFW recommends incorporating this information into any forthcoming CEQA document(s) to avoid subsequent documentation and Project delays:

1. Mapping and quantification of lakes, streams, and associated fish and wildlife habitat (e.g., riparian habitat, freshwater wetlands, etc.) that will be temporarily and/or permanently impacted by the Project, including impacts from access and staging areas. Please include an estimate of impact to each habitat type.

2. Discussion of specific avoidance, minimization, and mitigation measures to reduce Project impacts to fish and wildlife resources to a less-than-significant level. Please refer to section 15370 of the CEQA Guidelines.

Based on review of Project materials, aerial photography and observation of the site from public roadways, the Project site supports the Sacramento River, American River, and associated riparian habitat. CDFW recommends the EIR fully identify the Project's potential impacts to the stream and/or its associated vegetation and wetlands.

CHEMICAL USE

Rodenticides that control small mammal populations would also reduce available burrows, making the habitat no longer suitable for burrowing owl (*Athene cunicularia*) and other sensitive wildlife species. Lack of underground refugia could result is increase exposure to predators, heat, and other elements. As such, CDFW recommends the project avoid use of chemical rodenticides.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database, which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e)). Accordingly, please report any special-status species and natural communities detected during Project surveys to the CNDDB. The CNNDB field survey form can be found at the following link:
https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data. The completed form can be

submitted online or mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov.

FILING FEES

The Project, as proposed, would have an effect on fish and wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code § 711.4; Pub. Resources Code, § 21089.)

CONCLUSION

Pursuant to Public Resources Code sections 21092 and 21092.2, CDFW requests written notification of proposed actions and pending decisions regarding the Project. Written notifications shall be directed to: California Department of Fish and Wildlife North Central Region, 1701 Nimbus Road, Rancho Cordova, CA 95670.

CDFW appreciates the opportunity to comment on the Notice of Preparation of the EIR for the City of Sacramento Water + Treatment Plants Resiliency and Improvements Project and recommends that the City of Sacramento address CDFW's comments and concerns in the forthcoming EIR. CDFW personnel are available for consultation regarding biological resources and strategies to minimize impacts.

If you have any questions regarding the comments provided in this letter or wish to schedule a meeting and/or site visit, please contact Dylan Wood, Environmental Scientist at (916) 358-2384 or dylan.wood@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Kelley Barker
778EDA8AE45F4C9...
Kelley Barker
Environmental Program Manager

ec: Juan Torres, Senior Environmental Scientist (Supervisory)
Dylan Wood, Environmental Scientist
CEQACommentLetters@wildlife.ca.gov
Department of Fish and Wildlife

Office of Planning and Research, State Clearinghouse, Sacramento

Literature Cited

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A Manual of California Vegetation, 2nd ed. California Native Plant Society Press, Sacramento, California. http://vegetation.cnps.org/

Central Valley Regional Water Quality Control Board

6 May 2022

Scott Johnson
City of Sacramento,
Community Development Department
300 Richards Boulevard, 3rd Floor
Sacramento, CA 95811
srjohnson@cityofsacramento.org

COMMENTS TO REQUEST FOR REVIEW FOR THE NOTICE OF PREPARATION FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, CITY OF SACRAMENTO WATER AND TREATMENT PLANTS RESILIENCY AND IMPROVEMENTS PROJECT, SCH#2022040138, SACRAMENTO COUNTY

Pursuant to the State Clearinghouse's 6 April 2022 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Notice of Preparation for the Draft Environmental Impact Report* for the City of Sacramento Water and Treatment Plants Resiliency and Improvements Project, located in Sacramento County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore, our comments will address concerns surrounding those issues.

I. Regulatory Setting

<u>Basin Plan</u>

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues. For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website: http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Implementation Policy is available on page 74 at:
https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf

In part it states:

Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.

This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Construction General Permit Order No. 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). For more information on the Construction General Permit, visit the State Water Resources Control Board website at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]
The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

Industrial Storm Water General Permit
Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ. For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml

Clean Water Act Section 404 Permit
If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACE). If a Section 404 permit is required by the USACE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACE at (916) 557-5250.

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications. For more information on the Water Quality Certification, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/

Waste Discharge Requirements – Discharges to Waters of the State

If USACE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation. For more information on the Waste Discharges to Surface Water NPDES Program and WDR processes, visit the Central Valley Water Board website at:https://www.waterboards.ca.gov/centralvalley/water_issues/waste_to_surface_water/

Projects involving excavation or fill activities impacting less than 0.2 acre or 400 linear feet of non-jurisdictional waters of the state and projects involving dredging activities impacting less than 50 cubic yards of non-jurisdictional waters of the state may be eligible for coverage under the State Water Resources Control Board Water Quality Order No. 2004-0004-DWQ (General Order 2004-0004). For more information on the General Order 2004-0004, visit the State Water Resources Control Board website at: https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2004/wqo/wqo2004-0004.pdf

Dewatering Permit

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Threat Waiver and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2018-0085.pdf

Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Limited Threat Discharges to Surface Water* (Limited Threat General Order). A complete Notice of Intent must be submitted to the Central Valley Water Board to obtain coverage under the Limited Threat General Order. For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2016-0076-01.pdf

NPDES Permit

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit. For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/help/permit/

If you have questions regarding these comments, please contact me at (916) 464-4684 or Peter.Minkel2@waterboards.ca.gov.

Peter Minkel

Peter Minkel
Engineering Geologist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

May 6, 2022

Scott Johnson, Senior Planner
City of Sacramento Community Development Department
300 Richards Boulevard, 3rd Floor, Sacramento, CA 95811

Subject: **Water Treatment Plants Resiliency and Improvements Project**
Notice of Preparation for an Environmental Impact Report
State Clearinghouse # 2022040138

Dear Scott Johnson:

Thank you for providing the Sacramento Metropolitan Air Quality Management District (Sac Metro Air District) with the opportunity to review the Notice of Preparation (NOP) for an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA) for the Water Treatment Plants Resiliency and Improvements Project. This project would provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its useful life, and to meet the projected potable water demand.

CEQA Review
Please reference Sac Metro Air District's guidance on reviewing projects under CEQA, The Guide to Air Quality Assessment in Sacramento County (CEQA Guide), available on our website, in preparing the project EIR. The CEQA Guide includes recommended methods of quantifying emissions of for pollutants regulated by the Clean Air Act ("criteria pollutants") and greenhouse gases (GHGs), and thresholds of significance for these emissions to make CEQA significance determinations about project impacts. The CEQA Guide includes recommended mitigation approaches, for emissions that are determined significant according to these thresholds.

River District Specific Plan
Due to this project's location, it has potential to impact transportation connectivity in the River District Specific Plan (RDSP) area. This project is in proximity to RDSP transportation links including the junction of B Street and 5th Street, and Sequoia Pacific Boulevard. Sequoia Pacific Boulevard will ultimately link to a bridge crossing the American River from Truxel Road, addressed in the RDSP under Goal C2, calling for transportation connectivity. The project is also adjacent to proposed Class I bike paths on Bannon Street and Sequoia Pacific Boulevard, and a connection to Vista Park in the Railyards Specific Plan (see attached map).

Transportation connectivity helps reduce criteria pollutant and GHG emissions associated with transportation by providing shorter distances between destinations. Shorter distances are necessary for non-polluting bicycle and pedestrian transportation, and also reduce the lengths of polluting motor vehicle trips.

- Sac Metro Air District recommends that the EIR fully analyze project consistency with the RDSP circulation and land use measures.

This recommendation is consistent with the CEQA stipulation to address whether a project will "Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect."

Construction
All projects are subject to Sac Metro Air District rules and regulations in effect at the time of construction. Please visit our website to find a list of the most common rules that apply at the construction phase of projects. All projects undergoing CEQA review must implement Sac Metro Air District Basic Construction Emission Control Practices, also available on our website, in order to use the non-zero particulate matter CEQA thresholds of significance.

Conclusion
Thank you for your attention to our comments. If you have questions about them, please contact me at mwright@airquality.org or (279) 207-1157.

Sincerely,

Molly Wright

Molly Wright
Air Quality Planner / Analyst

c: Paul Philley, AICP, Program Supervisor, Sac Metro Air District

Attachment: RDSP Bicycle Circulation Map

Appendix B

Criteria Air Pollutant and Greenhouse Gas Emission Calculations

PROJECT COMPONENT

Treatment Plant Improvements and Existing Utility Upgrades

FWTP (includes Treatment Plant Improvements and Existing Utility Upgrades)

Type of equipment	Max. No. of Use Per Bldg/ Area Per Day (no.)	Size (hp)	Fuel (gal)	Total (hrs)	Daily Ave (hrs/day)
Aerial Lifts	1	90	2,298	859	1
Air Compressors	0	10	0	0	0
Bore/Drill Rigs	0	300	0	0	0
Concrete/Industrial Saws	2	2	98	1,645	2
Cranes	0	300	0	0	0
Crawler Tractors	1	300	8,001	898	1
Dumpers/Tenders	0	400	0	0	0
Excavators	1	400	9,964	838	1
Forklifts	1	100	1,230	414	0
Generator Sets	1	100	2,667	898	1
Graders	0	400	0	0	0
Paving Equipment	1	300	2,638	209	0
Plate Compactors	1	10	257	866	1
Pumps	1	10	589	1,984	2
Rollers	1	400	4,320	364	0
Concrete Pumps	2	350	0	1,000	0
Watertruck	1	275	3,667	449	0
Welders	1	25	180	242	0
Rubber Tired Loaders	2	250	2,608	986	1
Rubber Tired Backhoe	2	150	0	986	0
Concrete Truck	6	325	17,582	1,821	2
Boomtruck	1	350	13,730	1,320	1
Delivery Trucks (Equipment) - Sem	2	400	496	42	0
Delivery Trucks (rebar) - Semi	2	400	2,597	218	0
Dump Trucks (dirt) - Semi	2	325	6,954	2,023	2
Delivery Trucks (piles) - Semi	2	400	0	0	0
Total			79,878	18,062	15

SRWTP (Initial Phase) (includes Treatment Plant Improvements and Existing Utility Upgrades)

Type of equipment	Max. No. of Use Per Bldg/ Area Per Day (no.)	Size (hp)	Fuel (gal)	Total (hrs)	Daily Ave (hrs/day)
Aerial Lifts	1	90	5,097	1,906	2
Air Compressors	0	10	0	0	0
Bore/Drill Rigs	2	300	19,676	3,029	3
Concrete/Industrial Saws	4	2	260	4,381	4
Cranes	0	300	0	0	0
Crawler Tractors	2	300	27,928	3,133	3
Dumpers/Tenders	0	400	0	0	0
Excavators	2	400	28,983	2,439	2
Forklifts	2	100	6,062	2,040	2
Generator Sets	2	100	8,430	2,837	3
Graders	2	400	3,518	296	0
Paving Equipment	2	300	2,638	296	0
Plate Compactors	2	10	386	1,300	1
Pumps	4	10	7,944	26,736	26
Rollers	2	400	4,511	380	0
Concrete Pumps	4	350	0	1,000	0
Watertruck	2	275	5,120	627	1
Welders	4	25	3,510	4,726	5
Rubber Tired Loaders	4	250	12,621	4,774	5
Rubber Tired Backhoe	4	150	0	986	0
Concrete Truck	12	325	74,366	7,701	7
Boomtruck	2	350	20,473	1,969	2
Delivery Trucks (Equipment) - Sem	4	400	1,985	167	0.2
Delivery Trucks (rebar) - Semi	4	400	10,983	924	1
Dump Trucks (dirt) - Semi	4	325	8,830	2,569	2
Delivery Trucks (piles) - Semi	4	400	23,933	2,014	2
Total			277,257	76,229	71

SRWTP (Buildout)

Type of equipment	Max. No. of Use Per Bldg/ Area Per Day (no.)	Size (hp)	Fuel (gal)	Total (hrs)	Daily Ave (hrs/day)
Aerial Lifts	1	90	1,508	564	1
Air Compressors	0	10	0	0	0
Bore/Drill Rigs	1	300	6,782	1,044	2
Concrete/Industrial Saws	2	2	91	1,524	2
Cranes	0	300	0	0	0
Crawler Tractors	1	300	10,236	1,148	2
Dumpers/Tenders	0	400	0	0	0
Excavators	1	400	9,182	773	1
Forklifts	1	100	2,171	731	1
Generator Sets	1	100	3,412	1,148	2
Graders	1	400	2,482	209	0
Paving Equipment	1	300	1,861	209	0
Plate Compactors	1	10	143	480	1
Pumps	2	10	2,606	8,770	14
Rollers	1	400	2,978	251	0
Concrete Pumps	2	350	0	1,000	0
Watertruck	1	275	1,877	230	0
Welders	2	25	1,241	1,670	3
Rubber Tired Loaders	2	250	4,692	1,775	3
Rubber Tired Backhoe	2	150	0	0	0
Concrete Truck	6	325	17,334	1,795	3
Boomtruck	1	350	1,767	668	1
Delivery Trucks (Equipment) - Sem	2	400	1,198	101	0
Delivery Trucks (rebar) - Semi	2	400	2,560	215	0
Dump Trucks (dirt) - Semi	2	325	5,067	1,474	2
Delivery Trucks (piles) - Semi	2	400	1,411	119	0
Total			80,598	25,898	40

Sacramento River Water Intakes
Assumptions confirmed 10/27

Type of equipment	Max. No. of Use Per Bldg/ Area Per Day (no.)	Size (hp)	Fuel (gal)	Total (hrs)	Daily Ave (hrs/day)
Aerial Lifts	1	90		1,906	
Air Compressors	2	10		209	
Bore/Drill Rigs	2	300		1,010	
Concrete/Industrial Saws	2	2		4,112	
Cranes	1	300		1,320	
Crawler Tractors	3	300		898	
Dumpers/Tenders	6	400		986	
Excavators	3	400		838	
					*reduced from
Forklifts	2	100		375	assupmtion of 414
Generator Sets	3	50		898	
Graders	0	400			
Paving Equipment	1	300		418	
Plate Compactors	6	10		866	
Pumps	8	10		1,755	*25% of 3 years
Rollers	0	400			
Concrete Pumps	2	350		1,000	*from Schnable
Watertruck	2	275		449	
Welders	8	25		242	
Rubber Tired Loaders	3	250		986	
Rubber Tired Backhoe	0	150			
Concrete Truck	2	325		1,200	*from Schnable
Boomtruck	0	350			
Delivery Trucks (Equipment) - Sem	2	400			
Delivery Trucks (rebar) - Semi	2	400			
Dump Trucks (dirt) - Semi	5	325			
Delivery Trucks (piles) - Semi	2	400			
Total	68	6,322	-	19,468	-

Potable Water Transmission Pipelines

Type of equipment	Max. No. of Use Per Bldg/ Area Per Day (no.)	Size (hp)	Fuel (gal)	Total (hrs)	Daily Ave (hrs/day)
Aerial Lifts	0				
Air Compressors	0	10			
Bore/Drill Rigs	0	300			
Concrete/Industrial Saws	0	2			
Cranes	0	300			
Crawler Tractors	0	300			
Dumpers/Tenders	1	400	986		
Excavators	1	400	2,439		
Forklifts	0	100			
Generator Sets	0	100			
Graders	0	400			
Paving Equipment	1	300	296		
Plate Compactors	1	10	1,300		
Pumps	0	10			
Rollers	1	400	380		
Concrete Pumps	0	350			
Watertruck	0	275			
Welders	0	25			
Rubber Tired Loaders	2	250	4,774		
Rubber Tired Backhoe	0	150			
Concrete Truck	0	325			
Boomtruck	0	350			
Delivery Trucks (Equipment) - Sem	2	400			
Delivery Trucks (rebar) - Semi	0	400			
Dump Trucks (dirt) - Semi	2	325			
Delivery Trucks (piles) - Semi	0	400			
Total	11	6,282	10,175	-	-

Schedule for duration of intensive construction

FWTP

FWTP Treatment Plant Improvements and Existing Utility Upgrades (2 years)

Start date	**7/1/2026**	12/31/2026
	1/1/2027	12/31/2027
End date	1/1/2028	**7/1/2028**
Years	2.0	
workdays	523	
Total hours	4,707	

SRWTP

SRWTP Treatment Plant Improvements and Existing Utility Upgrades (3 years)

Start date	**1/1/2027**	12/31/2027
	1/1/2028	12/31/2028
	1/1/2029	12/31/2029
	1/1/2030	12/31/2030
End date	1/1/2031	**1/31/2031**
Years	4.1	
Workdays	1,066	
Total hours	9,594	

Sacramento River Water Intakes (4.5 years)

Start date	**1/1/2031**	12/31/2031
	1/1/2032	12/31/2032
	1/1/2033	12/31/2033
	1/1/2034	12/31/2034
End date	1/1/2035	**7/1/2035**
Years	4.5	
Workdays	1,173	
Total hours	10,557	

Potable Water Transmission Pipelines (3 years)

Start Date	**7/1/2032**	12/31/2032
	1/1/2033	12/31/2033
	1/1/2034	12/31/2034
End date	1/1/2035	**7/1/2035**
Years	3.0	
Workdays	782	
Total hours	7,038	

SRWTP buildout (2.5 years)

Start date	**1/1/2040**	12/31/2040
	1/1/2041	12/31/2041
End date	1/1/2042	**6/1/2042**
Years	2.4	
Workdays	630	
Total hours	5,670	

1 ton =	907,185	g
1 pound =	454	g
1 MT =	1,000,000	g

Average work days 9

GHG	CO2	CH4	N2O
GWP	1	25	298

	FWTP									OFFROAD emission factors				CAP Emissions (ppd)				OFFROAD emission factors			GHG Emissions (MT per year)			
Construction year	Type	Tier	HP	LF	Hours (avg)	Days	Quantity	TPY hp-hr	EF year	ROG	NOx	Ex PM-10	Ex PM2.5	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2	CH4	N2O	CO2e
	Concrete/Industrial Saws	Average	25	0.73	9	46	2	20757.56788	2026	0.593	4.532	0.169	0.156	0.01	0.08	0.00	0.00	594.535	0.024	0.005	9.01	0.00	0.00	9.04
	Crawler Tractors	Average	300	0.43	9	25	1	67963.59465	2026	0.265	2.724	0.115	0.105	0.01	0.09	0.00	0.00	527.271	0.021	0.004	15.41	0.00	0.00	15.46
	Excavators	Average	600	0.38	9	24	1	126962.2945	2026	0.114	0.681	0.024	0.022	0.01	0.04	0.00	0.00	527.153	0.021	0.004	25.43	0.00	0.00	25.52
	Forklifts	Average	100	0.2	9	12	1	10450.9675	2026	0.246	2.342	0.112	0.103	0.00	0.01	0.00	0.00	527.097	0.021	0.004	1.10	0.00	0.00	1.11
	Generator Sets	Average	50	0.74	9	25	1	11327.26577	2026	0.338	3.382	0.079	0.073	0.00	0.03	0.00	0.00	568.315	0.023	0.005	4.76	0.00	0.00	4.78
	Paving Equipment	Average	300	0.36	9	6	1	15809.71319	2026	0.155	1.341	0.055	0.05	0.00	0.01	0.00	0.00	528.621	0.021	0.004	3.01	0.00	0.00	3.02
	Plate Compactors	Average	25	0.43	9	24	1	5465.759082	2026	0.547	4.143	0.162	0.149	0.00	0.01	0.00	0.00	568.337	0.023	0.005	1.34	0.00	0.00	1.34
2026	Pumps	Average	25	0.74	9	56	1	12516.02294	2026	0.569	4.309	0.177	0.163	0.01	0.04	0.00	0.00	568.31	0.023	0.005	5.26	0.00	0.00	5.28
	Rollers	Average	600	0.38	9	10	1	55049.30019	2026	0.147	1.452	0.051	0.046	0.00	0.03	0.00	0.00	528.943	0.021	0.004	11.06	0.00	0.00	11.10
	Other Material Handling Equipment	Average	600	0.4	9	28	2	302868.0688	2026	0.138	0.923	0.031	0.029	0.02	0.12	0.00	0.00	527.861	0.021	0.004	63.95	0.00	0.00	64.16
	Other Material Handling Equipment	Average	300	0.4	9	13	1	33981.79732	2026	0.239	1.961	0.081	0.074	0.00	0.03	0.00	0.00	528	0.021	0.004	7.18	0.00	0.00	7.20
	Welders	Average	25	0.45	9	7	1	1525.950287	2026	0.573	4.335	0.176	0.162	0.00	0.00	0.00	0.00	568.341	0.023	0.005	0.39	0.00	0.00	0.39
	Rubber Tired Loaders	Average	300	0.36	9	28	2	149374.5315	2026	0.175	1.337	0.045	0.041	0.01	0.08	0.00	0.00	526.593	0.021	0.004	28.32	0.00	0.00	28.41
	Tractors/Loaders/Backhoes	Average	175	0.37	9	28	2	87135.1434	2026	0.156	1.074	0.053	0.048	0.01	0.04	0.00	0.00	526.226	0.021	0.004	16.97	0.00	0.00	17.02
	Off-Highway Trucks	Average	600	0.38	9	51	6	1654360.431	2026	0.176	1.011	0.036	0.033	0.12	0.70	0.02	0.02	529.168	0.021	0.004	332.67	0.01	0.00	333.74
	Other Material Handling Equipment	Average	600	0.4	9	37	1	199941.3843	2026	0.138	0.923	0.031	0.029	0.01	0.08	0.00	0.00	527.861	0.021	0.004	42.22	0.00	0.00	42.35
	Concrete/Industrial Saws	Average	25	0.73	9	91	2	41043.37285	2027	0.59	4.509	0.168	0.155	0.02	0.15	0.01	0.01	591.493	0.024	0.005	17.72	0.00	0.00	17.78
	Crawler Tractors	Average	300	0.43	9	50	1	134382.5621	2027	0.224	2.189	0.089	0.082	0.01	0.14	0.01	0.01	527.027	0.021	0.004	30.45	0.00	0.00	30.55
	Excavators	Average	600	0.38	9	46	1	251039.0822	2027	0.112	0.62	0.022	0.02	0.01	0.07	0.00	0.00	527.012	0.021	0.004	50.27	0.00	0.00	50.44
	Forklifts	Average	100	0.2	9	23	1	20664.413	2027	0.228	2.152	0.092	0.085	0.00	0.01	0.00	0.00	527.07	0.021	0.004	2.18	0.00	0.00	2.19
	Generator Sets	Average	50	0.74	9	50	1	22397.09369	2027	0.314	3.286	0.066	0.06	0.01	0.06	0.00	0.00	568.333	0.023	0.005	9.42	0.00	0.00	9.45
	Paving Equipment	Average	300	0.36	9	12	1	31260.11472	2027	0.147	1.164	0.048	0.044	0.00	0.01	0.00	0.00	529.152	0.021	0.004	5.95	0.00	0.00	5.97
	Plate Compactors	Average	25	0.43	9	48	1	10807.29637	2027	0.547	4.143	0.162	0.149	0.00	0.02	0.00	0.00	568.318	0.023	0.005	2.64	0.00	0.00	2.65
2027	Pumps	Average	25	0.74	9	110	1	24747.59082	2027	0.565	4.288	0.173	0.16	0.01	0.09	0.00	0.00	568.297	0.023	0.005	10.41	0.00	0.00	10.45
	Rollers	Average	600	0.38	9	20	1	108847.4799	2027	0.151	1.503	0.053	0.048	0.01	0.07	0.00	0.00	528.733	0.021	0.004	21.87	0.00	0.00	21.94
	Other Material Handling Equipment	Average	600	0.4	9	55	2	598852.7725	2027	0.14	0.903	0.031	0.029	0.04	0.24	0.01	0.01	527.861	0.021	0.004	126.44	0.01	0.00	126.86
	Other Material Handling Equipment	Average	300	0.4	9	25	1	67191.28107	2027	0.234	1.809	0.077	0.071	0.01	0.05	0.00	0.00	528.104	0.021	0.004	14.19	0.00	0.00	14.24
	Welders	Average	25	0.45	9	13	1	3017.219885	2027	0.568	4.316	0.173	0.159	0.00	0.01	0.00	0.00	568.317	0.023	0.005	0.77	0.00	0.00	0.77
	Rubber Tired Loaders	Average	300	0.36	9	55	2	295354.1874	2027	0.16	1.076	0.037	0.034	0.02	0.13	0.00	0.00	526.664	0.021	0.004	56.00	0.00	0.00	56.18
	Tractors/Loaders/Backhoes	Average	175	0.37	9	55	2	172289.9426	2027	0.15	0.974	0.047	0.044	0.01	0.07	0.00	0.00	525.934	0.021	0.004	33.53	0.00	0.00	33.64
	Off-Highway Trucks	Average	600	0.38	9	101	6	3271121.761	2027	0.176	0.965	0.034	0.031	0.24	1.32	0.05	0.04	529.01	0.021	0.004	657.57	0.03	0.00	659.71
	Other Material Handling Equipment	Average	600	0.4	9	73	1	395338.6463	2027	0.14	0.903	0.031	0.029	0.02	0.16	0.01	0.01	527.861	0.021	0.004	83.47	0.00	0.00	83.75
	Concrete/Industrial Saws	Average	25	0.73	9	45	2	20443.05927	2028	0.587	4.491	0.168	0.154	0.01	0.07	0.00	0.00	589.166	0.024	0.005	8.79	0.00	0.00	8.82
	Crawler Tractors	Average	300	0.43	9	25	1	66933.84321	2028	0.219	2.05	0.085	0.078	0.01	0.07	0.00	0.00	527.365	0.021	0.004	15.18	0.00	0.00	15.23
	Excavators	Average	600	0.38	9	23	1	125038.6233	2028	0.11	0.579	0.021	0.019	0.01	0.03	0.00	0.00	527.04	0.021	0.004	25.04	0.00	0.00	25.12
	Forklifts	Average	100	0.2	9	11	1	10292.6195	2028	0.216	2.032	0.079	0.072	0.00	0.00	0.00	0.00	527.025	0.021	0.004	1.08	0.00	0.00	1.09
	Generator Sets	Average	50	0.74	9	25	1	11155.64054	2028	0.292	3.197	0.053	0.049	0.00	0.03	0.00	0.00	568.314	0.023	0.005	4.69	0.00	0.00	4.71
	Paving Equipment	Average	300	0.36	9	6	1	15570.17208	2028	0.152	1.168	0.048	0.044	0.00	0.01	0.00	0.00	529.15	0.021	0.004	2.97	0.00	0.00	2.98
	Plate Compactors	Average	25	0.43	9	24	1	5382.944551	2028	0.547	4.143	0.162	0.149	0.00	0.01	0.00	0.00	568.389	0.023	0.005	1.32	0.00	0.00	1.32
2028	Pumps	Average	25	0.74	9	55	1	12326.38623	2028	0.561	4.27	0.171	0.157	0.01	0.04	0.00	0.00	568.344	0.023	0.005	5.18	0.00	0.00	5.20
	Rollers	Average	600	0.38	9	10	1	54215.21989	2028	0.144	1.294	0.047	0.044	0.00	0.03	0.00	0.00	530.685	0.022	0.004	10.93	0.00	0.00	10.97
	Other Material Handling Equipment	Average	600	0.4	9	28	2	298279.1587	2028	0.131	0.745	0.026	0.024	0.02	0.10	0.00	0.00	527.857	0.021	0.004	62.98	0.00	0.00	63.18
	Other Material Handling Equipment	Average	300	0.4	9	12	1	33466.92161	2028	0.22	1.608	0.068	0.063	0.00	0.02	0.00	0.00	528.007	0.021	0.004	7.07	0.00	0.00	7.09
	Welders	Average	25	0.45	9	7	1	1502.829828	2028	0.565	4.299	0.17	0.157	0.00	0.00	0.00	0.00	568.314	0.023	0.005	0.38	0.00	0.00	0.39
	Rubber Tired Loaders	Average	300	0.36	9	27	2	147111.2811	2028	0.157	0.964	0.033	0.031	0.01	0.06	0.00	0.00	526.776	0.021	0.004	27.90	0.00	0.00	27.99
	Tractors/Loaders/Backhoes	Average	175	0.37	9	27	2	85814.91396	2028	0.147	0.899	0.044	0.041	0.01	0.03	0.00	0.00	525.709	0.021	0.004	16.69	0.00	0.00	16.75
	Off-Highway Trucks	Average	600	0.38	9	50	6	1629294.364	2028	0.174	0.889	0.032	0.029	0.12	0.61	0.02	0.02	529.297	0.021	0.004	327.70	0.01	0.00	328.77
	Other Material Handling Equipment	Average	600	0.4	9	36	1	196911.9694	2028	0.131	0.745	0.026	0.024	0.01	0.06	0.00	0.00	527.857	0.021	0.004	41.58	0.00	0.00	41.71

	SRWTP (Phase 1)	Tier	HP	LF	Hours	Days	Quantity	hp-hr	EF year	ROG	NOx	Ex PM-10	Ex PM2.5	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2	CH4	N2O	CO2e
2027	Bore/Drill Rigs	Average	300	0.5	9	82	2	444943.7899	2027	0.115	1.028	0.034	0.032	0.03	0.25	0.01	0.01	525.419	0.021	0.004	116.89	0.00	0.00	117.27
	Concrete/Industrial Saws	Average	25	0.73	9	119	4	107263.6548	2027	0.59	4.509	0.168	0.155	0.05	0.39	0.01	0.01	591.493	0.024	0.005	46.32	0.00	0.00	46.48
	Crawler Tractors	Average	300	0.43	9	85	2	460280.6004	2027	0.224	2.189	0.089	0.082	0.05	0.48	0.02	0.02	527.027	0.021	0.004	104.31	0.00	0.00	104.65
	Excavators	Average	600	0.38	9	66	2	716493.4784	2027	0.112	0.62	0.022	0.02	0.03	0.19	0.01	0.01	527.012	0.021	0.004	143.49	0.01	0.00	143.96
	Forklifts	Average	100	0.2	9	55	2	99898.85178	2027	0.228	2.152	0.092	0.085	0.01	0.05	0.00	0.00	527.07	0.021	0.004	10.53	0.00	0.00	10.57
	Generator Sets	Average	50	0.74	9	77	2	69466.15385	2027	0.314	3.286	0.066	0.06	0.02	0.19	0.00	0.00	568.333	0.023	0.005	29.22	0.00	0.00	29.32
	Graders	Average	600	0.41	9	8	2	86967.3546	2027	0.24	2.318	0.087	0.08	0.01	0.09	0.00	0.00	522.633	0.021	0.004	18.64	0.00	0.00	18.70
	Paving Equipment	Average	300	0.36	9	8	2	43483.6773	2027	0.147	1.164	0.048	0.044	0.00	0.02	0.00	0.00	529.152	0.021	0.004	8.28	0.00	0.00	8.31
	Plate Compactors	Average	25	0.43	9	35	2	15918.55159	2027	0.547	4.143	0.162	0.149	0.00	0.03	0.00	0.00	568.318	0.023	0.005	3.89	0.00	0.00	3.90
	Pumps	Average	25	0.74	9	727	4	654605.6285	2027	0.565	4.288	0.173	0.16	0.30	2.29	0.09	0.09	568.297	0.023	0.005	275.29	0.01	0.00	276.29
	Rollers	Average	600	0.38	9	10	2	111506.2514	2027	0.151	1.503	0.053	0.048	0.01	0.07	0.00	0.00	528.733	0.021	0.004	22.40	0.00	0.00	22.48
	Other Material Handling Equipment	Average	600	0.4	9	27	4	587617.2608	2027	0.14	0.903	0.031	0.029	0.04	0.23	0.01	0.01	527.861	0.021	0.004	124.07	0.00	0.00	124.48
	Other Material Handling Equipment	Average	300	0.4	9	17	2	92056.12008	2027	0.234	1.809	0.077	0.071	0.01	0.07	0.00	0.00	528.104	0.021	0.004	19.45	0.00	0.00	19.51
	Welders	Average	25	0.45	9	129	4	115701.8386	2027	0.568	4.316	0.173	0.159	0.03	0.25	0.01	0.01	568.317	0.023	0.005	29.59	0.00	0.00	29.70
	Rubber Tired Loaders	Average	300	0.36	9	130	4	1402583.64	2027	0.16	1.076	0.037	0.034	0.09	0.60	0.02	0.02	526.664	0.021	0.004	265.93	0.01	0.00	266.80
	Tractors/Loaders/Backhoes	Average	175	0.37	9	27	4	169057.4859	2027	0.15	0.974	0.047	0.044	0.01	0.07	0.00	0.00	525.934	0.021	0.004	32.90	0.00	0.00	33.01
	Off-Highway Trucks	Average	600	0.38	9	210	12	13576075.7	2027	0.176	0.965	0.034	0.031	1.00	5.49	0.19	0.18	529.01	0.021	0.004	2,729.11	0.11	0.02	2,737.97
	Other Material Handling Equipment	Average	600	0.4	9	54	2	578426.9268	2027	0.14	0.903	0.031	0.029	0.04	0.23	0.01	0.01	527.861	0.021	0.004	122.13	0.00	0.00	122.53
2028	Bore/Drill Rigs	Average	300	0.5	9	82	2	443239.0244	2028	0.112	1.008	0.033	0.03	0.03	0.25	0.01	0.01	524.552	0.021	0.004	116.25	0.00	0.00	116.63
	Concrete/Industrial Saws	Average	25	0.73	9	119	4	106852.6829	2028	0.587	4.491	0.168	0.154	0.05	0.39	0.01	0.01	589.166	0.024	0.005	45.96	0.00	0.00	46.12
	Crawler Tractors	Average	300	0.43	9	85	2	458517.0732	2028	0.219	2.05	0.085	0.078	0.05	0.45	0.02	0.02	527.365	0.021	0.004	103.98	0.00	0.00	104.32
	Excavators	Average	600	0.38	9	66	2	713748.2927	2028	0.11	0.579	0.021	0.019	0.03	0.17	0.01	0.01	527.04	0.021	0.004	142.95	0.01	0.00	143.41
	Forklifts	Average	100	0.2	9	55	2	99516.09756	2028	0.216	2.032	0.079	0.072	0.00	0.04	0.00	0.00	527.025	0.021	0.004	10.49	0.00	0.00	10.52
	Generator Sets	Average	50	0.74	9	77	2	69200	2028	0.292	3.197	0.053	0.049	0.02	0.18	0.00	0.00	568.314	0.023	0.005	29.10	0.00	0.00	29.21
	Graders	Average	600	0.41	9	8	2	86634.14634	2028	0.239	2.285	0.084	0.078	0.01	0.09	0.00	0.00	520.049	0.021	0.004	18.47	0.00	0.00	18.53
	Paving Equipment	Average	300	0.36	9	8	2	43317.07317	2028	0.152	1.168	0.048	0.044	0.00	0.02	0.00	0.00	529.15	0.021	0.004	8.25	0.00	0.00	8.28
	Plate Compactors	Average	25	0.43	9	35	2	15857.56098	2028	0.547	4.143	0.162	0.149	0.00	0.03	0.00	0.00	568.389	0.023	0.005	3.88	0.00	0.00	3.89
	Pumps	Average	25	0.74	9	725	4	652097.561	2028	0.561	4.27	0.171	0.157	0.30	2.27	0.09	0.08	568.344	0.023	0.005	274.26	0.01	0.00	275.25
	Rollers	Average	600	0.38	9	10	2	111079.0244	2028	0.144	1.294	0.047	0.044	0.01	0.06	0.00	0.00	530.685	0.022	0.004	22.40	0.00	0.00	22.47
	Other Material Handling Equipment	Average	600	0.4	9	27	4	585365.8537	2028	0.131	0.745	0.026	0.024	0.03	0.19	0.01	0.01	527.857	0.021	0.004	123.60	0.00	0.00	124.00
	Other Material Handling Equipment	Average	300	0.4	9	17	2	91703.41463	2028	0.22	1.608	0.068	0.063	0.01	0.07	0.00	0.00	528.007	0.021	0.004	19.37	0.00	0.00	19.43
	Welders	Average	25	0.45	9	128	4	115258.5366	2028	0.565	4.299	0.17	0.157	0.03	0.25	0.01	0.01	568.314	0.023	0.005	29.48	0.00	0.00	29.58
	Rubber Tired Loaders	Average	300	0.36	9	129	4	1397209.756	2028	0.157	0.964	0.033	0.031	0.09	0.53	0.02	0.02	526.776	0.021	0.004	264.97	0.01	0.00	265.83
	Tractors/Loaders/Backhoes	Average	175	0.37	9	27	4	168409.7561	2028	0.147	0.899	0.044	0.041	0.01	0.06	0.00	0.00	525.709	0.021	0.004	32.76	0.00	0.00	32.86
	Off-Highway Trucks	Average	600	0.38	9	209	12	13524060.09	2028	0.174	0.889	0.032	0.029	0.99	5.04	0.18	0.16	529.297	0.021	0.004	2,720.13	0.11	0.02	2,728.96
	Other Material Handling Equipment	Average	600	0.4	9	53	2	576210.7317	2028	0.131	0.745	0.026	0.024	0.03	0.19	0.01	0.01	527.857	0.021	0.004	121.66	0.00	0.00	122.06
2029	Bore/Drill Rigs	Average	300	0.5	9	82	2	444943.7899	2029	0.111	0.974	0.032	0.029	0.03	0.24	0.01	0.01	525.142	0.021	0.004	116.83	0.00	0.00	117.21
	Concrete/Industrial Saws	Average	25	0.73	9	119	4	107263.6548	2029	0.585	4.474	0.167	0.154	0.05	0.39	0.01	0.01	586.916	0.024	0.005	45.96	0.00	0.00	46.12
	Crawler Tractors	Average	300	0.43	9	85	2	460280.6004	2029	0.21	1.858	0.078	0.072	0.05	0.41	0.02	0.02	527.287	0.021	0.004	104.36	0.00	0.00	104.70
	Excavators	Average	600	0.38	9	66	2	716493.4784	2029	0.108	0.549	0.02	0.018	0.03	0.16	0.01	0.01	527.304	0.021	0.004	143.57	0.01	0.00	144.04
	Forklifts	Average	100	0.2	9	55	2	99898.85178	2029	0.21	1.956	0.07	0.065	0.00	0.04	0.00	0.00	527.076	0.021	0.004	10.53	0.00	0.00	10.57
	Generator Sets	Average	50	0.74	9	77	2	69466.15385	2029	0.275	3.144	0.045	0.041	0.02	0.18	0.00	0.00	568.304	0.023	0.005	29.21	0.00	0.00	29.32
	Graders	Average	600	0.41	9	8	2	86967.3546	2029	0.197	1.679	0.061	0.056	0.01	0.07	0.00	0.00	525.026	0.021	0.004	18.72	0.00	0.00	18.78
	Paving Equipment	Average	300	0.36	9	8	2	43483.6773	2029	0.157	1.197	0.05	0.046	0.00	0.02	0.00	0.00	528.738	0.021	0.004	8.28	0.00	0.00	8.30
	Plate Compactors	Average	25	0.43	9	35	2	15918.55159	2029	0.547	4.143	0.162	0.149	0.00	0.03	0.00	0.00	568.343	0.023	0.005	3.89	0.00	0.00	3.90
	Pumps	Average	25	0.74	9	727	4	654605.6285	2029	0.559	4.255	0.168	0.155	0.30	2.27	0.09	0.08	568.32	0.023	0.005	275.30	0.01	0.00	276.30
	Rollers	Average	600	0.38	9	10	2	111506.2514	2029	0.146	1.297	0.048	0.044	0.01	0.06	0.00	0.00	531.116	0.022	0.004	22.50	0.00	0.00	22.58
	Other Material Handling Equipment	Average	600	0.4	9	27	4	587617.2608	2029	0.131	0.727	0.025	0.023	0.03	0.19	0.01	0.01	527.856	0.021	0.004	124.07	0.00	0.00	124.47
	Other Material Handling Equipment	Average	300	0.4	9	17	2	92056.12008	2029	0.207	1.449	0.059	0.054	0.01	0.06	0.00	0.00	528.016	0.021	0.004	19.44	0.00	0.00	19.51
	Welders	Average	25	0.45	9	129	4	115701.8386	2029	0.562	4.286	0.168	0.155	0.03	0.25	0.01	0.01	568.308	0.023	0.005	29.59	0.00	0.00	29.70
	Rubber Tired Loaders	Average	300	0.36	9	130	4	1402583.64	2029	0.158	0.906	0.032	0.029	0.09	0.50	0.02	0.02	526.689	0.021	0.004	265.94	0.01	0.00	266.81
	Tractors/Loaders/Backhoes	Average	175	0.37	9	27	4	169057.4859	2029	0.145	0.847	0.042	0.039	0.01	0.06	0.00	0.00	525.868	0.021	0.004	32.89	0.00	0.00	33.00
	Off-Highway Trucks	Average	600	0.38	9	210	12	13576075.7	2029	0.172	0.823	0.029	0.027	0.98	4.68	0.16	0.15	529.508	0.021	0.004	2,731.68	0.11	0.02	2,740.54
	Other Material Handling Equipment	Average	600	0.4	9	54	2	578426.9268	2029	0.131	0.727	0.025	0.023	0.03	0.19	0.01	0.01	527.856	0.021	0.004	122.13	0.00	0.00	122.53

	Bore/Drill Rigs	Average	300	0.5	9	82	2	444943.7899	2030	0.106	0.881	0.029	0.027	0.03	0.22	0.01	0.01	525.275	0.021	0.004	116.86	0.00	0.00	117.24
	Concrete/Industrial Saws	Average	25	0.73	9	119	4	107263.6548	2030	0.587	4.485	0.168	0.154	0.05	0.39	0.01	0.01	588.267	0.024	0.005	46.06	0.00	0.00	46.23
	Crawler Tractors	Average	300	0.43	9	85	2	460280.6004	2030	0.202	1.719	0.074	0.068	0.04	0.38	0.02	0.01	527.287	0.021	0.004	104.36	0.00	0.00	104.70
	Excavators	Average	600	0.38	9	66	2	716493.4784	2030	0.107	0.516	0.019	0.018	0.03	0.15	0.01	0.01	527.304	0.021	0.004	143.57	0.01	0.00	144.04
	Forklifts	Average	100	0.2	9	55	2	99898.85178	2030	0.203	1.909	0.064	0.059	0.00	0.04	0.00	0.00	527.076	0.021	0.004	10.53	0.00	0.00	10.57
	Generator Sets	Average	50	0.74	9	77	2	69466.15385	2030	0.261	3.107	0.038	0.035	0.01	0.18	0.00	0.00	568.301	0.023	0.005	29.21	0.00	0.00	29.32
	Graders	Average	600	0.41	9	8	2	86967.3546	2030	0.195	1.551	0.061	0.056	0.01	0.06	0.00	0.00	525.026	0.021	0.004	18.72	0.00	0.00	18.78
	Paving Equipment	Average	300	0.36	9	8	2	43483.6773	2030	0.153	1.136	0.045	0.041	0.00	0.02	0.00	0.00	528.738	0.021	0.004	8.28	0.00	0.00	8.30
2030	Plate Compactors	Average	25	0.43	9	35	2	15918.55159	2030	0.547	4.143	0.162	0.149	0.00	0.03	0.00	0.00	568.372	0.023	0.005	3.89	0.00	0.00	3.90
	Pumps	Average	25	0.74	9	727	4	654605.6285	2030	0.557	4.245	0.166	0.153	0.30	2.27	0.09	0.08	568.352	0.023	0.005	275.31	0.01	0.00	276.31
	Rollers	Average	600	0.38	9	10	2	111506.2514	2030	0.141	1.213	0.043	0.04	0.01	0.06	0.00	0.00	531.116	0.022	0.004	22.50	0.00	0.00	22.58
	Other Material Handling Equipment	Average	600	0.4	9	27	4	587617.2608	2030	0.129	0.651	0.024	0.022	0.03	0.17	0.01	0.01	527.856	0.021	0.004	124.07	0.00	0.00	124.47
	Other Material Handling Equipment	Average	300	0.4	9	17	2	92056.12008	2030	0.202	1.378	0.058	0.053	0.01	0.06	0.00	0.00	528.016	0.021	0.004	19.44	0.00	0.00	19.51
	Welders	Average	25	0.45	9	129	4	115701.8386	2030	0.561	4.277	0.166	0.153	0.03	0.25	0.01	0.01	568.333	0.023	0.005	29.59	0.00	0.00	29.70
	Rubber Tired Loaders	Average	300	0.36	9	130	4	1402583.64	2030	0.156	0.851	0.03	0.028	0.09	0.47	0.02	0.02	526.689	0.021	0.004	265.94	0.01	0.00	266.81
	Tractors/Loaders/Backhoes	Average	175	0.37	9	27	4	169057.4859	2030	0.141	0.8	0.04	0.037	0.01	0.06	0.00	0.00	525.868	0.021	0.004	32.89	0.00	0.00	33.00
	Off-Highway Trucks	Average	600	0.38	9	210	12	13576075.7	2030	0.169	0.779	0.028	0.026	0.96	4.43	0.16	0.15	529.508	0.021	0.004	2,731.68	0.11	0.02	2,740.54
	Other Material Handling Equipment	Average	600	0.4	9	54	2	578426.9268	2030	0.129	0.651	0.024	0.022	0.03	0.17	0.01	0.01	527.856	0.021	0.004	122.13	0.00	0.00	122.53
	Bore/Drill Rigs	Average	300	0.5	9	7	2	39209.606	2031	0.106	0.875	0.03	0.028	0.00	0.02	0.00	0.00	525.142	0.021	0.004	10.30	0.00	0.00	10.33
	Concrete/Industrial Saws	Average	25	0.73	9	11	4	9452.35272	2031	0.587	4.49	0.168	0.154	0.00	0.03	0.00	0.00	589.005	0.024	0.005	4.06	0.00	0.00	4.08
	Crawler Tractors	Average	300	0.43	9	8	2	40561.1257	2031	0.198	1.636	0.072	0.066	0.00	0.03	0.00	0.00	527.287	0.021	0.004	9.20	0.00	0.00	9.23
	Excavators	Average	600	0.38	9	6	2	63139.27205	2031	0.105	0.484	0.018	0.017	0.00	0.01	0.00	0.00	527.304	0.021	0.004	12.65	0.00	0.00	12.69
	Forklifts	Average	100	0.2	9	5	2	8803.347092	2031	0.196	1.832	0.057	0.053	0.00	0.00	0.00	0.00	527.076	0.021	0.004	0.93	0.00	0.00	0.93
	Generator Sets	Average	50	0.74	9	7	2	6121.538462	2031	0.25	3.077	0.033	0.03	0.00	0.02	0.00	0.00	568.336	0.023	0.005	2.57	0.00	0.00	2.58
	Graders	Average	600	0.41	9	1	2	7663.789869	2031	0.193	1.334	0.061	0.056	0.00	0.00	0.00	0.00	525.026	0.021	0.004	1.65	0.00	0.00	1.66
	Paving Equipment	Average	300	0.36	9	1	2	3831.894934	2031	0.156	1.121	0.047	0.043	0.00	0.00	0.00	0.00	528.731	0.021	0.004	0.73	0.00	0.00	0.73
2031	Plate Compactors	Average	25	0.43	9	3	2	1402.78424	2031	0.547	4.143	0.162	0.149	0.00	0.00	0.00	0.00	568.294	0.023	0.005	0.34	0.00	0.00	0.34
	Pumps	Average	25	0.74	9	64	4	57685.55347	2031	0.556	4.238	0.165	0.152	0.03	0.20	0.01	0.01	568.325	0.023	0.005	24.26	0.00	0.00	24.35
	Rollers	Average	600	0.38	9	1	2	9826.221388	2031	0.133	1.059	0.039	0.036	0.00	0.00	0.00	0.00	531.116	0.022	0.004	1.98	0.00	0.00	1.99
	Other Material Handling Equipment	Average	600	0.4	9	2	4	51782.36398	2031	0.126	0.611	0.024	0.022	0.00	0.01	0.00	0.00	527.856	0.021	0.004	10.93	0.00	0.00	10.97
	Other Material Handling Equipment	Average	300	0.4	9	2	2	8112.225141	2031	0.197	1.286	0.057	0.052	0.00	0.00	0.00	0.00	528.016	0.021	0.004	1.71	0.00	0.00	1.72
	Welders	Average	25	0.45	9	11	4	10195.94747	2031	0.56	4.271	0.165	0.152	0.00	0.02	0.00	0.00	568.324	0.023	0.005	2.61	0.00	0.00	2.62
	Rubber Tired Loaders	Average	300	0.36	9	11	4	123599.3246	2031	0.155	0.799	0.029	0.027	0.01	0.04	0.00	0.00	526.689	0.021	0.004	23.44	0.00	0.00	23.51
	Tractors/Loaders/Backhoes	Average	175	0.37	9	2	4	14897.78612	2031	0.138	0.752	0.038	0.035	0.00	0.00	0.00	0.00	525.868	0.021	0.004	2.90	0.00	0.00	2.91
	Off-Highway Trucks	Average	600	0.38	9	18	12	1196359.162	2031	0.167	0.731	0.028	0.025	0.08	0.37	0.01	0.01	529.508	0.021	0.004	240.72	0.01	0.00	241.50
	Other Material Handling Equipment	Average	600	0.4	9	5	2	50972.4878	2031	0.126	0.611	0.024	0.022	0.00	0.01	0.00	0.00	527.856	0.021	0.004	10.76	0.00	0.00	10.80

	Potable Transmission Pipelines	Tier	HP	LF	Hours	Days	Quantity	hp-hr	EF year	ROG	NOx	Ex PM-10	Ex PM2.5	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2	CH4	N2O	CO2e
2032	Tractors/Loaders/Backhoes	Average	600	0.37	9	19	1	99,901	2032	0.122	0.548	0.023	0.021	0.00	0.02	0.00	0.00	529.211	0.021	0.004	19.56	0.00	0.00	19.62
	Excavators	Average	600	0.38	9	46	1	246,982	2032	0.105	0.467	0.018	0.017	0.01	0.05	0.00	0.00	527.304	0.021	0.004	49.49	0.00	0.00	49.65
	Paving Equipment	Average	300	0.36	9	6	1	14,989	2032	0.141	0.926	0.035	0.032	0.00	0.01	0.00	0.00	528.738	0.021	0.004	2.85	0.00	0.00	2.86
	Plate Compactors	Average	25	0.43	9	24	1	5,487	2032	0.547	4.143	0.162	0.149	0.00	0.01	0.00	0.00	568.291	0.023	0.005	1.34	0.00	0.00	1.35
	Rollers	Average	600	0.38	9	7	1	38,437	2032	0.127	0.936	0.033	0.031	0.00	0.02	0.00	0.00	531.116	0.022	0.004	7.76	0.00	0.00	7.78
	Rubber Tired Loaders	Average	300	0.36	9	90	2	483,485	2032	0.152	0.737	0.027	0.025	0.03	0.14	0.01	0.00	526.689	0.021	0.004	91.67	0.00	0.00	91.97
2033	Tractors/Loaders/Backhoes	Average	600	0.37	9	36	1	196775.4476	2033	0.121	0.53	0.022	0.02	0.01	0.04	0.00	0.00	529.211	0.021	0.004	38.53	0.00	0.00	38.66
	Excavators	Average	600	0.38	9	90	1	486480.6138	2033	0.104	0.445	0.017	0.016	0.02	0.09	0.00	0.00	527.304	0.021	0.004	97.48	0.00	0.00	97.80
	Paving Equipment	Average	300	0.36	9	11	2	59048.59335	2033	0.133	0.798	0.027	0.025	0.00	0.02	0.00	0.00	528.738	0.021	0.004	11.24	0.00	0.00	11.28
	Plate Compactors	Average	25	0.43	9	48	1	10808.28645	2033	0.547	4.143	0.162	0.149	0.00	0.02	0.00	0.00	568.358	0.023	0.005	2.64	0.00	0.00	2.65
	Rollers	Average	600	0.38	9	14	1	75709.87212	2033	0.124	0.882	0.033	0.031	0.00	0.03	0.00	0.00	531.116	0.022	0.004	15.28	0.00	0.00	15.33
	Rubber Tired Loaders	Average	300	0.36	9	176	1	476159.0793	2033	0.15	0.691	0.026	0.024	0.03	0.13	0.00	0.00	526.689	0.021	0.004	90.28	0.00	0.00	90.58
2034	Tractors/Loaders/Backhoes	Average	600	0.37	9	36	1	196775.4476	2034	0.119	0.512	0.02	0.019	0.01	0.04	0.00	0.00	529.211	0.021	0.004	38.53	0.00	0.00	38.66
	Excavators	Average	600	0.38	9	90	1	486480.6138	2034	0.103	0.425	0.016	0.014	0.02	0.09	0.00	0.00	527.304	0.021	0.004	97.48	0.00	0.00	97.80
	Paving Equipment	Average	300	0.36	9	11	2	59048.59335	2034	0.13	0.77	0.026	0.024	0.00	0.02	0.00	0.00	528.738	0.021	0.004	11.24	0.00	0.00	11.28
	Plate Compactors	Average	25	0.43	9	48	1	10808.28645	2034	0.547	4.143	0.162	0.149	0.00	0.02	0.00	0.00	568.347	0.023	0.005	2.64	0.00	0.00	2.65
	Rollers	Average	600	0.38	9	14	1	75709.87212	2034	0.12	0.759	0.031	0.028	0.00	0.02	0.00	0.00	531.116	0.022	0.004	15.28	0.00	0.00	15.33
	Rubber Tired Loaders	Average	300	0.36	9	176	1	476159.0793	2034	0.148	0.649	0.024	0.022	0.03	0.12	0.00	0.00	526.689	0.021	0.004	90.28	0.00	0.00	90.58
2035	Tractors/Loaders/Backhoes	Average	600	0.37	9	18	1	98387.72379	2035	0.118	0.487	0.019	0.017	0.00	0.02	0.00	0.00	529.212	0.021	0.004	19.27	0.00	0.00	19.33
	Excavators	Average	600	0.38	9	33	1	178437.0732	2035	0.102	0.408	0.015	0.014	0.01	0.03	0.00	0.00	527.304	0.021	0.004	35.75	0.00	0.00	35.87
	Paving Equipment	Average	300	0.36	9	4	2	21658.53659	2035	0.125	0.669	0.024	0.022	0.00	0.01	0.00	0.00	528.738	0.021	0.004	4.12	0.00	0.00	4.14
	Plate Compactors	Average	25	0.43	9	18	1	3964.390244	2035	0.547	4.143	0.162	0.149	0.00	0.01	0.00	0.00	568.362	0.023	0.005	0.97	0.00	0.00	0.97
	Rollers	Average	600	0.38	9	5	1	27769.7561	2035	0.118	0.725	0.031	0.028	0.00	0.01	0.00	0.00	531.116	0.022	0.004	5.60	0.00	0.00	5.62
	Rubber Tired Loaders	Average	300	0.36	9	65	1	174651.2195	2035	0.146	0.605	0.022	0.021	0.01	0.04	0.00	0.00	526.689	0.021	0.004	33.12	0.00	0.00	33.22
	SRWTP (Phase 2)	Tier	HP	LF	Hours	Days	Quantity	hp-hr	EF year	ROG	NOx	Ex PM-10	Ex PM2.5	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2	CH4	N2O	CO2e
2040	Bore/Drill Rigs	Average	300	0.5	9	48	1	129754.2857	2040	0.086	0.486	0.016	0.015	0.0062	0.035	0.001144	0.001073	525.142	0.021	0.004	34.069713	0.00136	3E-04	34.181107
	Concrete/Industrial Saws	Average	25	0.73	9	70	2	31573.54286	2040	0.581	4.439	0.166	0.153	0.0148	0.113	0.004218	0.003887	582.321	0.024	0.005	13.421734	0.00055	1E-04	13.469906
	Crawler Tractors	Average	300	0.43	9	53	1	142729.7143	2040	0.155	0.965	0.043	0.04	0.0105	0.065	0.002909	0.002706	527.287	0.021	0.004	32.361595	0.00129	2E-04	32.466974
	Excavators	Average	600	0.38	9	36	1	192036.3429	2040	0.097	0.329	0.012	0.011	0.0078	0.026	0.000965	0.000885	527.304	0.021	0.004	38.479382	0.00153	3E-04	38.604678
	Forklifts	Average	100	0.2	9	34	1	30276	2040	0.165	1.541	0.025	0.023	0.0011	0.01	0.000167	0.000154	527.076	0.021	0.004	3.1915506	0.00013	2E-05	3.2019474
	Generator Sets	Average	50	0.74	9	53	1	23788.28571	2040	0.226	2.941	0.013	0.012	0.0044	0.057	0.000252	0.000233	568.301	0.023	0.005	10.003991	0.0004	9E-05	10.040342
	Graders	Average	600	0.41	9	10	1	51901.71429	2040	0.127	0.319	0.013	0.012	0.003	0.007	0.000305	0.000281	525.026	0.021	0.004	11.172397	0.00045	9E-05	11.208935
	Paving Equipment	Average	300	0.36	9	10	1	25950.85714	2040	0.116	0.497	0.021	0.019	0.0012	0.005	0.000216	0.000196	528.738	0.021	0.004	4.9396335	0.0002	4E-05	4.9556743
	Plate Compactors	Average	25	0.43	9	22	1	4973.914286	2040	0.547	4.143	0.162	0.149	0.0013	0.01	0.000382	0.000351	568.358	0.023	0.005	1.2155945	4.9E-05	1E-05	1.2200111
	Pumps	Average	25	0.74	9	404	2	181656	2040	0.555	4.226	0.162	0.149	0.0822	0.626	0.024005	0.022079	568.32	0.023	0.005	76.396666	0.00309	7E-04	76.674255
	Rollers	Average	600	0.38	9	12	1	62282.05714	2040	0.103	0.624	0.022	0.02	0.0027	0.016	0.000574	0.000522	531.116	0.022	0.004	12.570019	0.00052	9E-05	12.611247
	Other Material Handling Equipment	Average	600	0.4	9	46	2	497142.8571	2040	0.113	0.432	0.016	0.014	0.0248	0.095	0.003507	0.003069	527.856	0.021	0.004	104.96794	0.00418	8E-04	105.30937
	Other Material Handling Equipment	Average	300	0.4	9	11	1	28545.94286	2040	0.14	0.461	0.018	0.017	0.0018	0.006	0.000227	0.000214	528.016	0.021	0.004	6.0290858	0.00024	5E-05	6.0486912
	Welders	Average	25	0.45	9	77	2	34601.14286	2040	0.559	4.26	0.162	0.149	0.0096	0.073	0.00278	0.002557	568.319	0.023	0.005	8.8490191	0.00036	8E-05	8.8811722
	Rubber Tired Loaders	Average	300	0.36	9	82	2	441164.5714	2040	0.136	0.435	0.017	0.016	0.0238	0.076	0.002976	0.002801	526.689	0.021	0.004	83.64835	0.00334	6E-04	83.921042
	Tractors/Loaders/Backhoes	Average	175	0.37	9	45	2	143028	2040	0.118	0.49	0.023	0.021	0.0069	0.029	0.001342	0.001225	525.868	0.021	0.004	28	0.00111	2E-04	27.919988
	Off-Highway Trucks	Average	600	0.38	9	83	6	2677252.683	2040	0.152	0.418	0.017	0.016	0.1705	0.469	0.019065	0.017943	529.508	0.021	0.004	539	0.02136	0.004	540.44495
	Other Material Handling Equipment	Average	600	0.4	9	31	1	166085.4857	2040	0.113	0.432	0.016	0.014	0.0083	0.032	0.001172	0.001025	527.856	0.021	0.004	35.067688	0.0014	3E-04	35.181756

	Bore/Drill Rigs	Average	300	0.5	9	48	1	129754.2857	2041	0.084	0.445	0.015	0.014	0.006	0.032	0.001073	0.001001	525.142	0.021	0.004	34.069713	0.00136	3E-04	34.181107
	Concrete/Industrial Saws	Average	25	0.73	9	70	2	31573.54286	2041	0.581	4.439	0.166	0.153	0.0148	0.113	0.004218	0.003887	582.321	0.024	0.005	13.421734	0.00055	1E-04	13.469906
	Crawler Tractors	Average	300	0.43	9	53	1	142729.7143	2041	0.153	0.937	0.042	0.039	0.0104	0.063	0.002841	0.002638	527.287	0.021	0.004	32.361595	0.00129	2E-04	32.466974
	Excavators	Average	600	0.38	9	36	1	192036.3429	2041	0.096	0.318	0.012	0.011	0.0077	0.026	0.000965	0.000885	527.304	0.021	0.004	38.479382	0.00153	3E-04	38.604678
	Forklifts	Average	100	0.2	9	34	1	30276	2041	0.163	1.528	0.024	0.022	0.0011	0.01	0.00016	0.000147	527.076	0.021	0.004	3.1915506	0.00013	2E-05	3.2019474
	Generator Sets	Average	50	0.74	9	53	1	23788.28571	2041	0.226	2.941	0.013	0.012	0.0044	0.057	0.000252	0.000233	568.301	0.023	0.005	10.003991	0.0004	9E-05	10.040342
	Graders	Average	600	0.41	9	10	1	51901.71429	2041	0.127	0.319	0.013	0.012	0.003	0.007	0.000305	0.000281	525.026	0.021	0.004	11.172397	0.00045	9E-05	11.208935
	Paving Equipment	Average	300	0.36	9	10	1	25950.85714	2041	0.114	0.478	0.019	0.017	0.0012	0.005	0.000196	0.000175	528.738	0.021	0.004	4.9396335	0.0002	4E-05	4.9556743
2041	Plate Compactors	Average	25	0.43	9	22	1	4973.914286	2041	0.547	4.143	0.162	0.149	0.0013	0.01	0.000382	0.000351	568.358	0.023	0.005	1.2155945	4.9E-05	1E-05	1.2200111
	Pumps	Average	25	0.74	9	404	2	181656	2041	0.555	4.226	0.162	0.149	0.0822	0.626	0.024005	0.022079	568.32	0.023	0.005	76.396666	0.00309	7E-04	76.674255
	Rollers	Average	600	0.38	9	12	1	62282.05714	2041	0.103	0.624	0.022	0.02	0.0027	0.016	0.000574	0.000522	531.116	0.022	0.004	12.570019	0.00052	9E-05	12.611247
	Other Material Handling Equipment	Average	600	0.4	9	46	2	497142.8571	2041	0.112	0.425	0.016	0.014	0.0246	0.093	0.003507	0.003069	527.856	0.021	0.004	104.96794	0.00418	8E-04	105.30937
	Other Material Handling Equipment	Average	300	0.4	9	11	1	28545.94286	2041	0.139	0.451	0.018	0.017	0.0017	0.006	0.000227	0.000214	528.016	0.021	0.004	6.0290858	0.00024	5E-05	6.0486912
	Welders	Average	25	0.45	9	77	2	34601.14286	2041	0.559	4.26	0.162	0.149	0.0096	0.073	0.00278	0.002557	568.319	0.023	0.005	8.8490191	0.00036	8E-05	8.8811722
	Rubber Tired Loaders	Average	300	0.36	9	82	2	441164.5714	2041	0.134	0.413	0.016	0.014	0.0235	0.072	0.002801	0.002451	526.689	0.021	0.004	83.64835	0.00334	6E-04	83.921042
	Tractors/Loaders/Backhoes	Average	175	0.37	9	45	2	143028	2041	0.117	0.471	0.022	0.02	0.0068	0.027	0.001283	0.001167	525.868	0.021	0.004	27.829124	0.00111	2E-04	27.919988
	Off-Highway Trucks	Average	600	0.38	9	83	6	2677252.683	2041	0.152	0.402	0.016	0.015	0.1705	0.451	0.017943	0.016822	529.508	0.021	0.004	538.69815	0.02136	0.004	540.44495
	Other Material Handling Equipment	Average	600	0.4	9	31	1	166085.4857	2041	0.112	0.425	0.016	0.014	0.0082	0.031	0.001172	0.001025	527.856	0.021	0.004	35.067688	0.0014	3E-04	35.181756
	Bore/Drill Rigs	Average	300	0.5	9	20	1	53691.42857	2042	0.083	0.426	0.015	0.014	0.0025	0.013	0.000444	0.000414	525.142	0.021	0.004	14.097812	0.00056	1E-04	14.143906
	Concrete/Industrial Saws	Average	25	0.73	9	29	2	13064.91429	2042	0.581	4.439	0.166	0.153	0.0061	0.047	0.001745	0.001609	582.321	0.024	0.005	5.553821	0.00023	5E-05	5.5737541
	Crawler Tractors	Average	300	0.43	9	22	1	59060.57143	2042	0.152	0.911	0.041	0.037	0.0043	0.026	0.001148	0.001036	527.287	0.021	0.004	13.391005	0.00053	1E-04	13.43461
	Excavators	Average	600	0.38	9	15	1	79463.31429	2042	0.096	0.313	0.012	0.011	0.0032	0.01	0.000399	0.000366	527.304	0.021	0.004	15.922503	0.00063	1E-04	15.97435
	Forklifts	Average	100	0.2	9	14	1	12528	2042	0.162	1.516	0.023	0.021	0.0004	0.004	6.35E-05	5.8E-05	527.076	0.021	0.004	1.3206416	5.3E-05	1E-05	1.3249437
	Generator Sets	Average	50	0.74	9	22	1	9843.428571	2042	0.226	2.941	0.013	0.012	0.0018	0.024	0.000104	9.64E-05	568.301	0.023	0.005	4.1395824	0.00017	4E-05	4.1546242
	Graders	Average	600	0.41	9	4	1	21476.57143	2042	0.127	0.319	0.013	0.012	0.0012	0.003	0.000126	0.000116	525.026	0.021	0.004	4.6230609	0.00018	4E-05	4.6381798
	Paving Equipment	Average	300	0.36	9	4	1	10738.28571	2042	0.113	0.471	0.018	0.017	0.0005	0.002	7.67E-05	7.24E-05	528.731	0.021	0.004	2.0439592	8.1E-05	2E-05	2.0505968
2042	Plate Compactors	Average	25	0.43	9	9	1	2058.171429	2042	0.547	4.143	0.162	0.149	0.0005	0.004	0.000158	0.000145	568.358	0.023	0.005	0.5030046	2E-05	4E-06	0.5048322
	Pumps	Average	25	0.74	9	167	2	75168	2042	0.555	4.226	0.162	0.149	0.034	0.259	0.009933	0.009136	568.32	0.023	0.005	31.612414	0.00128	3E-04	31.727278
	Rollers	Average	600	0.38	9	5	1	25771.88571	2042	0.099	0.559	0.02	0.018	0.0011	0.006	0.000216	0.000194	531.116	0.022	0.004	5.2013871	0.00022	4E-05	5.2184471
	Other Material Handling Equipment	Average	600	0.4	9	19	2	205714.2857	2042	0.111	0.403	0.015	0.014	0.0101	0.037	0.001361	0.00127	527.856	0.021	0.004	43.435008	0.00173	3E-04	43.576293
	Other Material Handling Equipment	Average	300	0.4	9	4	1	11812.11429	2042	0.136	0.421	0.015	0.014	0.0007	0.002	7.81E-05	7.29E-05	528.016	0.021	0.004	2.4947941	9.9E-05	2E-05	2.5029067
	Welders	Average	25	0.45	9	32	2	14317.71429	2042	0.559	4.26	0.162	0.149	0.004	0.03	0.001151	0.001058	568.319	0.023	0.005	3.6616631	0.00015	3E-05	3.6749678
	Rubber Tired Loaders	Average	300	0.36	9	34	2	182550.8571	2042	0.133	0.401	0.015	0.014	0.0096	0.029	0.001087	0.001014	526.689	0.021	0.004	34.61311	0.00138	3E-04	34.725949
	Tractors/Loaders/Backhoes	Average	175	0.37	9	19	2	59184	2042	0.116	0.461	0.022	0.02	0.0028	0.011	0.000531	0.000483	525.868	0.021	0.004	11.5155	0.00046	9E-05	11.553099
	Off-Highway Trucks	Average	600	0.38	9	34	6	1107828.697	2042	0.151	0.392	0.016	0.014	0.0701	0.182	0.007425	0.006497	529.508	0.021	0.004	222.90958	0.00884	0.002	223.63239
	Other Material Handling Equipment	Average	600	0.4	9	13	1	68725.02857	2042	0.111	0.403	0.015	0.014	0.0034	0.012	0.000455	0.000424	527.856	0.021	0.004	14.510767	0.00058	1E-04	14.557968

	Sacramento River Water Intakes	Tier	HP	LF	Hours	Days	Quantity	hp-hr	EF year	ROG	NOx	Ex PM-10	Ex PM2.5	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2	CH4	N2O	CO2e
	Air Compressors	Average	25	0.48	9	5	2	2,323	2031	0.564	4.313	0.165	0.152	0.0007	0.005	0.000203	0.000187	569.416	0.023	0.005	0.6349125	2.6E-05	6E-06	0.6372151
	Bore/Drill Rigs	Average	300	0.5	9	25	2	134,785	2031	0.106	0.875	0.03	0.028	0.0079	0.065	0.002229	0.00208	525.142	0.021	0.004	35.390756	0.00142	3E-04	35.50647
	Concrete/Industrial Saws	Average	25	0.73	9	102	2	45,750	2031	0.587	4.49	0.168	0.154	0.0216	0.165	0.006185	0.005669	589.005	0.024	0.005	19.671097	0.0008	2E-04	19.740897
	Cranes	Average	300	0.29	9	33	1	88,134	2031	0.209	1.784	0.077	0.071	0.0059	0.05	0.002169	0.002	527.578	0.021	0.004	13.484276	0.00054	1E-04	13.52816
	Crawler Tractors	Average	300	0.43	9	22	3	179,750	2031	0.198	1.636	0.072	0.066	0.0169	0.139	0.006134	0.005623	527.287	0.021	0.004	40.755232	0.00162	3E-04	40.887943
	Tractors/Loaders/Backhoes	Average	600	0.37	9	24	6	790,129	2031	0.123	0.571	0.024	0.022	0.0396	0.184	0.007734	0.00709	529.211	0.021	0.004	154.71366	0.00614	0.001	155.21562
	Excavators	Average	600	0.38	9	21	3	335,789	2031	0.105	0.484	0.018	0.017	0.0148	0.068	0.002532	0.002391	527.304	0.021	0.004	67.283865	0.00268	5E-04	67.502954
	Forklifts	Average	100	0.2	9	9	2	16,688	2031	0.196	1.832	0.057	0.053	0.0007	0.007	0.00021	0.000195	527.076	0.021	0.004	1.7591667	7E-05	1E-05	1.7648974
2031	Generator Sets	Average	50	0.74	9	22	3	29,958	2031	0.25	3.077	0.033	0.03	0.0061	0.075	0.000806	0.000733	568.336	0.023	0.005	12.599505	0.00051	1E-04	12.645284
	Paving Equipment	Average	300	0.36	9	10	1	27,902	2031	0.156	1.121	0.047	0.043	0.0017	0.012	0.00052	0.000476	528.731	0.021	0.004	5.3110123	0.00021	4E-05	5.3282593
	Plate Compactors	Average	25	0.43	9	21	6	28,912	2031	0.547	4.143	0.162	0.149	0.0075	0.057	0.00222	0.002042	568.294	0.023	0.005	7.0650219	0.00029	6E-05	7.090694
	Pumps	Average	25	0.74	9	43	8	78,100	2031	0.556	4.238	0.165	0.152	0.0354	0.27	0.010512	0.009683	568.325	0.023	0.005	32.845667	0.00133	3E-04	32.965012
	Other Material Handling Equipment	Average	600	0.4	9	25	2	267,008	2031	0.126	0.611	0.024	0.022	0.0148	0.072	0.002826	0.00259	527.856	0.021	0.004	56.376641	0.00224	4E-04	56.560022
	Off-Highway Trucks	Average	300	0.38	9	11	2	59,917	2031	0.175	0.871	0.033	0.03	0.0044	0.022	0.000828	0.000753	526.347	0.021	0.004	11.984015	0.00048	9E-05	12.023108
	Welders	Average	25	0.45	9	6	8	10,762	2031	0.56	4.271	0.165	0.152	0.003	0.023	0.000881	0.000811	568.324	0.023	0.005	2.7523847	0.00011	2E-05	2.7623855
	Rubber Tired Loaders	Average	300	0.36	9	24	3	197,532	2031	0.155	0.799	0.029	0.027	0.0122	0.063	0.002273	0.002116	526.689	0.021	0.004	37.453708	0.00149	3E-04	37.575806
	Other Material Handling Equipment	Average	600	0.4	9	30	2	320,409	2031	0.126	0.611	0.024	0.022	0.0178	0.086	0.003391	0.003108	527.856	0.021	0.004	67.651969	0.00269	5E-04	67.872026
	Air Compressors	Average	25	0.48	9	5	2	2,332	2032	0.564	4.309	0.164	0.151	0.0007	0.005	0.000202	0.000186	569.407	0.023	0.005	0.6373351	2.6E-05	6E-06	0.6396464
	Bore/Drill Rigs	Average	300	0.5	9	25	2	135,302	2032	0.104	0.836	0.029	0.027	0.0078	0.062	0.002163	0.002013	525.142	0.021	0.004	35.526353	0.00142	3E-04	35.64251
	Concrete/Industrial Saws	Average	25	0.73	9	102	2	45,925	2032	0.585	4.474	0.167	0.154	0.0216	0.165	0.006172	0.005691	586.839	0.024	0.005	19.673849	0.0008	2E-04	19.743917
	Cranes	Average	300	0.29	9	33	1	88,472	2032	0.203	1.68	0.072	0.066	0.0057	0.048	0.002036	0.001867	527.578	0.021	0.004	13.53594	0.00054	1E-04	13.579992
	Crawler Tractors	Average	300	0.43	9	22	3	180,438	2032	0.193	1.525	0.067	0.062	0.0165	0.13	0.00573	0.005303	527.287	0.021	0.004	40.911382	0.00163	3E-04	41.044602
	Tractors/Loaders/Backhoes	Average	600	0.37	9	24	6	793,156	2032	0.122	0.548	0.023	0.021	0.0395	0.177	0.00744	0.006793	529.211	0.021	0.004	155.30643	0.00616	0.001	155.81031
	Excavators	Average	600	0.38	9	21	3	337,075	2032	0.105	0.467	0.018	0.017	0.0148	0.066	0.002541	0.0024	527.304	0.021	0.004	67.541658	0.00269	5E-04	67.761586
	Forklifts	Average	100	0.2	9	9	2	16,752	2032	0.191	1.774	0.053	0.049	0.0007	0.007	0.000196	0.000181	527.076	0.021	0.004	1.7659068	7E-05	1E-05	1.7716594
2032	Generator Sets	Average	50	0.74	9	22	3	30,073	2032	0.241	3.051	0.028	0.026	0.0059	0.075	0.000687	0.000638	568.308	0.023	0.005	12.647156	0.00051	1E-04	12.693111
	Paving Equipment	Average	300	0.36	9	10	1	28,009	2032	0.141	0.926	0.035	0.032	0.0016	0.01	0.000389	0.000356	528.738	0.021	0.004	5.3314316	0.00021	4E-05	5.3487446
	Plate Compactors	Average	25	0.43	9	21	6	29,022	2032	0.547	4.143	0.162	0.149	0.0075	0.057	0.002229	0.00205	568.291	0.023	0.005	7.0920535	0.00029	6E-05	7.117824
	Pumps	Average	25	0.74	9	44	8	78,399	2032	0.556	4.234	0.164	0.151	0.0356	0.271	0.010488	0.009657	568.328	0.023	0.005	32.971687	0.00133	3E-04	33.091488
	Other Material Handling Equipment	Average	600	0.4	9	25	2	268,031	2032	0.124	0.58	0.024	0.022	0.0147	0.069	0.002836	0.0026	527.856	0.021	0.004	56.592643	0.00225	4E-04	56.776727
	Off-Highway Trucks	Average	300	0.38	9	11	2	60,146	2032	0.169	0.802	0.03	0.027	0.0043	0.02	0.000756	0.00068	526.347	0.021	0.004	12.029931	0.00048	9E-05	12.069174
	Welders	Average	25	0.45	9	6	8	10,803	2032	0.559	4.267	0.164	0.151	0.003	0.023	0.000879	0.000809	568.336	0.023	0.005	2.7629886	0.00011	2E-05	2.7730277
	Rubber Tired Loaders	Average	300	0.36	9	24	3	198,289	2032	0.152	0.737	0.027	0.025	0.012	0.058	0.002125	0.001967	526.689	0.021	0.004	37.597209	0.0015	3E-04	37.719775
	Other Material Handling Equipment	Average	600	0.4	9	30	2	321,637	2032	0.124	0.58	0.024	0.022	0.0176	0.082	0.003404	0.00312	527.856	0.021	0.004	67.911172	0.0027	5E-04	68.132072
	Air Compressors	Average	25	0.48	9	5	2	2314.066496	2033	0.564	4.307	0.164	0.151	0.0007	0.005	0.000201	0.000185	569.58	0.023	0.005	0.6326621	2.6E-05	6E-06	0.6349558
	Bore/Drill Rigs	Average	300	0.5	9	25	2	134269.0537	2033	0.1	0.755	0.026	0.024	0.0074	0.056	0.001924	0.001776	525.142	0.021	0.004	35.25516	0.00141	3E-04	35.37043
	Concrete/Industrial Saws	Average	25	0.73	9	101	2	45574.25405	2033	0.584	4.462	0.167	0.153	0.0214	0.164	0.006124	0.005611	585.302	0.024	0.005	19.472532	0.0008	2E-04	19.542065
	Cranes	Average	300	0.29	9	33	1	87796.21483	2033	0.197	1.587	0.068	0.062	0.0055	0.045	0.001908	0.00174	527.578	0.021	0.004	13.432612	0.00053	1E-04	13.476328
	Crawler Tractors	Average	300	0.43	9	22	3	179060.8696	2033	0.188	1.455	0.063	0.058	0.016	0.123	0.005347	0.004923	527.287	0.021	0.004	40.599082	0.00162	3E-04	40.731284
	Tractors/Loaders/Backhoes	Average	600	0.37	9	24	6	787101.7903	2033	0.121	0.53	0.022	0.02	0.0388	0.17	0.007063	0.00642	529.211	0.021	0.004	154.12088	0.00612	0.001	154.62092
	Excavators	Average	600	0.38	9	21	3	334502.3018	2033	0.104	0.445	0.017	0.016	0.0146	0.062	0.002382	0.002242	527.304	0.021	0.004	67.026073	0.00267	5E-04	67.244322
	Forklifts	Average	100	0.2	9	9	2	16624.04092	2033	0.186	1.733	0.048	0.044	0.0007	0.006	0.000176	0.000161	527.076	0.021	0.004	1.7524266	7E-05	1E-05	1.7581353
2033	Generator Sets	Average	50	0.74	9	22	3	29843.47826	2033	0.235	3.027	0.024	0.022	0.0057	0.074	0.000584	0.000536	568.314	0.023	0.005	12.550745	0.00051	1E-04	12.596349
	Paving Equipment	Average	300	0.36	9	10	1	27795.39642	2033	0.133	0.798	0.027	0.025	0.0015	0.009	0.000298	0.000276	528.738	0.021	0.004	5.2907336	0.00021	4E-05	5.3079145
	Plate Compactors	Average	25	0.43	9	21	6	28800.81841	2033	0.547	4.143	0.162	0.149	0.0075	0.057	0.002212	0.002034	568.358	0.023	0.005	7.0387455	0.00028	6E-05	7.0643192
	Pumps	Average	25	0.74	9	43	8	77800.51151	2033	0.556	4.23	0.163	0.15	0.0353	0.268	0.010344	0.009519	568.301	0.023	0.005	32.71844	0.00132	3E-04	32.837327
	Other Material Handling Equipment	Average	600	0.4	9	25	2	265984.6547	2033	0.124	0.553	0.023	0.022	0.0145	0.065	0.002697	0.00258	527.855	0.021	0.004	56.160532	0.00223	4E-04	56.34321
	Off-Highway Trucks	Average	300	0.38	9	11	2	59686.95652	2033	0.166	0.734	0.028	0.025	0.0042	0.018	0.0007	0.000625	526.347	0.021	0.004	11.938099	0.00048	9E-05	11.977043
	Welders	Average	25	0.45	9	6	8	10720.95482	2033	0.559	4.263	0.163	0.15	0.003	0.023	0.000867	0.000798	568.317	0.023	0.005	2.7418054	0.00011	2E-05	2.7517678
	Rubber Tired Loaders	Average	300	0.36	9	24	3	196775.4476	2033	0.15	0.691	0.026	0.024	0.0117	0.054	0.00203	0.001874	526.689	0.021	0.004	37.310207	0.00149	3E-04	37.431838
	Other Material Handling Equipment	Average	600	0.4	9	30	2	319181.5857	2033	0.124	0.553	0.023	0.022	0.0175	0.078	0.003237	0.003096	527.855	0.021	0.004	67.392638	0.00268	5E-04	67.611852

	Air Compressors	Average	25	0.48	9	5	2	2314.066496	2034	0.564	4.307	0.163	0.15	0.0007	0.005	0.0002	0.000184	569.799	0.023	0.005	0.6329053	2.6E-05	6E-06	0.635199
	Bore/Drill Rigs	Average	300	0.5	9	25	2	134269.0537	2034	0.099	0.724	0.025	0.023	0.0073	0.054	0.00185	0.001702	525.142	0.021	0.004	35.25516	0.00141	3E-04	35.37043
	Concrete/Industrial Saws	Average	25	0.73	9	101	2	45574.25405	2034	0.585	4.472	0.167	0.154	0.0215	0.164	0.006124	0.005648	586.602	0.024	0.005	19.515782	0.0008	2E-04	19.585315
	Cranes	Average	300	0.29	9	33	1	87796.21483	2034	0.192	1.499	0.064	0.059	0.0054	0.042	0.001796	0.001656	527.578	0.021	0.004	13.432612	0.00053	1E-04	13.476328
	Crawler Tractors	Average	300	0.43	9	22	3	179060.8696	2034	0.183	1.384	0.059	0.054	0.0155	0.117	0.005008	0.004583	527.287	0.021	0.004	40.599082	0.00162	3E-04	40.731284
	Tractors/Loaders/Backhoes	Average	600	0.37	9	24	6	787101.7903	2034	0.119	0.512	0.02	0.019	0.0382	0.164	0.00642	0.006099	529.211	0.021	0.004	154.12088	0.00612	0.001	154.62092
	Excavators	Average	600	0.38	9	21	3	334502.3018	2034	0.103	0.425	0.016	0.014	0.0144	0.06	0.002242	0.001962	527.304	0.021	0.004	67.026073	0.00267	5E-04	67.244322
	Forklifts	Average	100	0.2	9	9	2	16624.04092	2034	0.182	1.703	0.045	0.041	0.0007	0.006	0.000165	0.00015	527.076	0.021	0.004	1.7524266	7E-05	1E-05	1.7581353
2034	Generator Sets	Average	50	0.74	9	22	3	29843.47826	2034	0.231	3.008	0.021	0.02	0.0056	0.073	0.000511	0.000487	568.314	0.023	0.005	12.550745	0.00051	1E-04	12.596349
	Paving Equipment	Average	300	0.36	9	10	1	27795.39642	2034	0.13	0.77	0.026	0.024	0.0014	0.008	0.000287	0.000265	528.738	0.021	0.004	5.2907336	0.00021	4E-05	5.3079145
	Plate Compactors	Average	25	0.43	9	21	6	28800.81841	2034	0.547	4.143	0.162	0.149	0.0075	0.057	0.002212	0.002034	568.347	0.023	0.005	7.0386093	0.00028	6E-05	7.0641829
	Pumps	Average	25	0.74	9	43	8	77800.51151	2034	0.556	4.228	0.163	0.15	0.0353	0.268	0.010344	0.009519	568.339	0.023	0.005	32.720628	0.00132	3E-04	32.839515
	Other Material Handling Equipment	Average	600	0.4	9	25	2	265984.6547	2034	0.124	0.543	0.024	0.022	0.0145	0.064	0.002815	0.00258	527.856	0.021	0.004	56.160638	0.00223	4E-04	56.343317
	Off-Highway Trucks	Average	300	0.38	9	11	2	59686.95652	2034	0.165	0.703	0.027	0.025	0.0041	0.018	0.000675	0.000625	526.352	0.021	0.004	11.938213	0.00048	9E-05	11.977156
	Welders	Average	25	0.45	9	6	8	10720.95482	2034	0.559	4.261	0.163	0.15	0.003	0.023	0.000867	0.000798	568.307	0.023	0.005	2.7417572	0.00011	2E-05	2.7517196
	Rubber Tired Loaders	Average	300	0.36	9	24	3	196775.4476	2034	0.148	0.649	0.024	0.022	0.0116	0.051	0.001874	0.001718	526.689	0.021	0.004	37.310207	0.00149	3E-04	37.431838
	Other Material Handling Equipment	Average	600	0.4	9	30	2	319181.5857	2034	0.124	0.543	0.024	0.022	0.0175	0.076	0.003378	0.003096	527.856	0.021	0.004	67.392766	0.00268	5E-04	67.61198
	Air Compressors	Average	25	0.48	9	3	2	1157.033248	2035	0.564	4.305	0.163	0.15	0.0003	0.003	9.98E-05	9.18E-05	569.747	0.023	0.005	0.3164238	1.3E-05	3E-06	0.3175706
	Bore/Drill Rigs	Average	300	0.5	9	12	2	67134.52685	2035	0.095	0.68	0.022	0.02	0.0035	0.025	0.000814	0.00074	525.142	0.021	0.004	17.62758	0.0007	1E-04	17.685215
	Concrete/Industrial Saws	Average	25	0.73	9	51	2	22787.12702	2035	0.584	4.469	0.167	0.154	0.0107	0.082	0.003062	0.002824	586.211	0.024	0.005	9.7513871	0.0004	8E-05	9.7861534
	Cranes	Average	300	0.29	9	16	1	43898.10742	2035	0.185	1.409	0.06	0.055	0.0026	0.02	0.000842	0.000772	527.578	0.021	0.004	6.716306	0.00027	5E-05	6.7381641
	Crawler Tractors	Average	300	0.43	9	11	3	89530.43478	2035	0.179	1.314	0.055	0.051	0.0076	0.056	0.002334	0.002164	527.287	0.021	0.004	20.299541	0.00081	2E-04	20.365642
	Tractors/Loaders/Backhoes	Average	600	0.37	9	12	6	393550.8951	2035	0.118	0.487	0.019	0.017	0.0189	0.078	0.00305	0.002729	529.212	0.021	0.004	77.060587	0.00306	6E-04	77.310606
	Excavators	Average	600	0.38	9	10	3	167251.1509	2035	0.102	0.408	0.015	0.014	0.0071	0.029	0.001051	0.000981	527.304	0.021	0.004	33.513036	0.00133	3E-04	33.622161
	Forklifts	Average	100	0.2	9	5	2	8312.02046	2035	0.178	1.669	0.04	0.036	0.0003	0.003	7.33E-05	6.6E-05	527.076	0.021	0.004	0.8762133	3.5E-05	7E-06	0.8790676
2035	Generator Sets	Average	50	0.74	9	11	3	14921.73913	2035	0.229	2.992	0.019	0.017	0.0028	0.036	0.000231	0.000207	568.291	0.023	0.005	6.2751186	0.00025	6E-05	6.2979205
	Paving Equipment	Average	300	0.36	9	5	1	13897.69821	2035	0.125	0.669	0.024	0.022	0.0007	0.004	0.000132	0.000121	528.738	0.021	0.004	2.6453668	0.00011	2E-05	2.6539573
	Plate Compactors	Average	25	0.43	9	11	6	14400.40921	2035	0.547	4.143	0.162	0.149	0.0037	0.028	0.001106	0.001017	568.362	0.023	0.005	3.5193975	0.00014	3E-05	3.5321844
	Pumps	Average	25	0.74	9	22	8	38900.25575	2035	0.556	4.227	0.162	0.149	0.0176	0.134	0.00514	0.004728	568.332	0.023	0.005	16.360113	0.00066	1E-04	16.419556
	Other Material Handling Equipment	Average	600	0.4	9	12	2	132992.3274	2035	0.121	0.508	0.021	0.019	0.0071	0.03	0.001231	0.001114	527.856	0.021	0.004	28.080319	0.00112	2E-04	28.171658
	Off-Highway Trucks	Average	300	0.38	9	6	2	29843.47826	2035	0.163	0.677	0.026	0.024	0.002	0.008	0.000325	0.0003	526.347	0.021	0.004	5.9690496	0.00024	5E-05	5.9885213
	Welders	Average	25	0.45	9	3	8	5360.477408	2035	0.559	4.26	0.162	0.149	0.0015	0.011	0.000431	0.000396	568.326	0.023	0.005	1.3709244	5.5E-05	1E-05	1.3759056
	Rubber Tired Loaders	Average	300	0.36	9	12	3	98387.72379	2035	0.146	0.605	0.022	0.021	0.0057	0.024	0.000859	0.00082	526.689	0.021	0.004	18.655103	0.00074	1E-04	18.715919
	Other Material Handling Equipment	Average	600	0.4	9	15	2	159590.7928	2035	0.121	0.508	0.021	0.019	0.0085	0.036	0.001478	0.001337	527.856	0.021	0.004	33.696383	0.00134	3E-04	33.80599

FWTP

	CAP Emissions Summary (tpy)				GHG Emissions Summary(MT per year)			
	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2e
2025	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2026	0.21	1.39	0.05	0.05	568.1	0.0	0.0	569.9
2027	0.41	2.59	0.09	0.09	1122.9	0.0	0.0	1126.6
2028	0.20	1.18	0.04	0.04	559.5	0.0	0.0	561.3
2029	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2030	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2031	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2032	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2033	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2034	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2035	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2036	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2037	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2038	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2039	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2040	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2041	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2042	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0

	CAP Emissions Summary (ppd)			
	ROG	NOx	Ex PM-10	Ex PM2.5
2025	0.0	0.0	0.0	0.0
2026	1.6	10.7	0.4	0.4
2027	3.2	19.9	0.7	0.7
2028	1.6	9.1	0.3	0.3
2029	0.0	0.0	0.0	0.0
2030	0.0	0.0	0.0	0.0
2031	0.0	0.0	0.0	0.0
2032	0.0	0.0	0.0	0.0
2033	0.0	0.0	0.0	0.0
2034	0.0	0.0	0.0	0.0
2035	0.0	0.0	0.0	0.0
2036	0.0	0.0	0.0	0.0
2037	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0
2040	0.0	0.0	0.0	0.0
2041	0.0	0.0	0.0	0.0
2042	0.0	0.0	0.0	0.0

TOTAL PROJECT

	CAP Emissions Summary (tpy)				GHG Emissions Summary(MT per year)			
	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2e
2025	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2026	0.21	1.39	0.05	0.05	568.1	0.0	0.0	569.9
2027	2.14	13.57	0.49	0.45	5225.3	0.2	0.0	5242.5
2028	1.89	11.45	0.42	0.39	4647.4	0.2	0.0	4662.7
2029	1.68	9.79	0.36	0.33	4104.9	0.2	0.0	4118.4
2030	1.65	9.38	0.34	0.32	4105.1	0.2	0.0	4118.5
2031	0.36	2.16	0.08	0.07	929.5	0.0	0.0	932.5
2032	0.26	1.57	0.06	0.05	742.5	0.0	0.0	745.0
2033	0.27	1.61	0.06	0.06	820.9	0.0	0.0	823.6
2034	0.27	1.56	0.06	0.05	820.9	0.0	0.0	823.6
2035	0.13	0.72	0.03	0.02	381.6	0.0	0.0	382.8
2036	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2037	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2038	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2039	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
2040	0.38	1.75	0.07	0.06	1042.9	0.0	0.0	1046.3
2041	0.38	1.72	0.06	0.06	1042.9	0.0	0.0	1046.3
2042	0.16	0.70	0.03	0.02	431.5	0.0	0.0	433.0

	CAP Emissions Summary (ppd)			
	ROG	NOx	Ex PM-10	Ex PM2.5
2025	0.0	0.0	0.0	0.0
2026	1.6	10.7	0.4	0.4
2027	16.4	104.4	3.8	3.5
2028	14.6	88.1	3.2	3.0
2029	12.9	75.3	2.7	2.5
2030	12.7	72.2	2.7	2.5
2031	2.7	16.6	0.6	0.6
2032	2.0	12.1	0.5	0.4
2033	2.1	12.4	0.5	0.4
2034	2.1	12.0	0.5	0.4
2035	1.0	5.5	0.2	0.2
2036	0.0	0.0	0.0	0.0
2037	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0
2040	2.9	13.5	0.5	0.5
2041	2.9	13.2	0.5	0.5
2042	1.2	5.4	0.2	0.2

SRWTP (Phase 1)

	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2e
2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2027	1.72	10.98	0.40	0.37	4102.43	0.16	0.03	4115.90
2028	1.69	10.27	0.38	0.35	4087.94	0.16	0.03	4101.36
2029	1.68	9.79	0.36	0.33	4104.90	0.16	0.03	4118.38
2030	1.65	9.38	0.34	0.32	4105.06	0.16	0.03	4118.53
2031	0.14	0.79	0.03	0.03	361.75	0.01	0.00	362.94
2032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2036	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CAP Emissions Summary (ppd)

	ROG	NOx	Ex PM-10	Ex PM2.5
2025	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0
2027	13.3	84.5	3.1	2.8
2028	13.0	79.0	2.9	2.7
2029	12.9	75.3	2.7	2.5
2030	12.7	72.2	2.7	2.5
2031	1.1	6.1	0.2	0.2
2032	0.0	0.0	0.0	0.0
2033	0.0	0.0	0.0	0.0
2034	0.0	0.0	0.0	0.0
2035	0.0	0.0	0.0	0.0
2036	0.0	0.0	0.0	0.0
2037	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0
2040	0.0	0.0	0.0	0.0
2041	0.0	0.0	0.0	0.0
2042	0.0	0.0	0.0	0.0

Potable Transmission Pipelines

	CAP Emissions Summary (tpy)				GHG Emissions Summary(MT per year)			
	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2e
2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2032	0.05	0.24	0.01	0.01	172.67	0.01	0.00	173.24
2033	0.07	0.33	0.01	0.01	255.45	0.01	0.00	256.29
2034	0.07	0.31	0.01	0.01	255.45	0.01	0.00	256.29
2035	0.03	0.11	0.00	0.00	98.83	0.00	0.00	99.15
2036	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	CAP Emissions Summary (ppd)			
	ROG	NOx	Ex PM-10	Ex PM2.5
2025	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	0.0
2030	0.0	0.0	0.0	0.0
2031	0.0	0.0	0.0	0.0
2032	0.4	1.9	0.1	0.1
2033	0.5	2.6	0.1	0.1
2034	0.5	2.4	0.1	0.1
2035	0.2	0.9	0.0	0.0
2036	0.0	0.0	0.0	0.0
2037	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0
2040	0.0	0.0	0.0	0.0
2041	0.0	0.0	0.0	0.0
2042	0.0	0.0	0.0	0.0

SRWTP (Phase 2)

	CAP Emissions Summary (tpy)				GHG Emissions Summary(MT per year)			
	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2e
2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2031	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2032	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2033	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2034	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2036	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2040	0.38	1.75	0.07	0.06	1042.91	0.04	0.01	1046.34
2041	0.38	1.72	0.06	0.06	1042.91	0.04	0.01	1046.34
2042	0.16	0.70	0.03	0.02	431.55	0.02	0.00	432.97

	CAP Emissions Summary (ppd)			
	ROG	NOx	Ex PM-10	Ex PM2.5
2025	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	0.0
2030	0.0	0.0	0.0	0.0
2031	0.0	0.0	0.0	0.0
2032	0.0	0.0	0.0	0.0
2033	0.0	0.0	0.0	0.0
2034	0.0	0.0	0.0	0.0
2035	0.0	0.0	0.0	0.0
2036	0.0	0.0	0.0	0.0
2037	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0
2040	2.9	13.5	0.5	0.5
2041	2.9	13.2	0.5	0.5
2042	1.2	5.4	0.2	0.2

Sacramento River Water Intakes

	CAP Emissions Summary (tpy)				GHG Emissions Summary(MT per year)			
	ROG	NOx	Ex PM-10	Ex PM2.5	CO2	CH4	N2O	CO2e
2025	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2028	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2031	0.21	1.36	0.05	0.05	567.73	0.02	0.00	569.61
2032	0.21	1.33	0.05	0.05	569.84	0.02	0.00	571.72
2033	0.21	1.28	0.05	0.04	565.43	0.02	0.00	567.30
2034	0.20	1.25	0.05	0.04	565.48	0.02	0.00	567.35
2035	0.10	0.61	0.02	0.02	282.73	0.01	0.00	283.67
2036	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2037	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2038	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2039	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2040	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2041	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2042	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	CAP Emissions Summary (ppd)			
	ROG	NOx	Ex PM-10	Ex PM2.5
2025	0.0	0.0	0.0	0.0
2026	0.0	0.0	0.0	0.0
2027	0.0	0.0	0.0	0.0
2028	0.0	0.0	0.0	0.0
2029	0.0	0.0	0.0	0.0
2030	0.0	0.0	0.0	0.0
2031	1.6	10.5	0.4	0.4
2032	1.6	10.2	0.4	0.4
2033	1.6	9.8	0.4	0.3
2034	1.6	9.6	0.4	0.3
2035	0.8	4.7	0.2	0.2
2036	0.0	0.0	0.0	0.0
2037	0.0	0.0	0.0	0.0
2038	0.0	0.0	0.0	0.0
2039	0.0	0.0	0.0	0.0
2040	0.0	0.0	0.0	0.0
2041	0.0	0.0	0.0	0.0
2042	0.0	0.0	0.0	0.0

	SRWTP (Phase 1)	Tier	HP	LF	Hours (avg)	Days	Quantity	hp-hr	EF year	ROG	NOx	Ex PM-10	Ex PM2.5	ROG	NOx	Ex PM-10	Ex PM2.5
2027	Bore/Drill Rigs	Tier 4 Final	599	0.5	9	82	2	888404.4338	2027	0.05	0.26	0.01	0.01	0.02	0.13	0.00	0.00
	Concrete/Industrial Saws	Tier 4 Final	49	0.73	9	119	4	210236.7634	2027	0.09	2.75	0.01	0.01	0.02	0.47	0.00	0.00
	Crawler Tractors	Tier 4 Final	599	0.43	9	85	2	919026.9321	2027	0.05	0.26	0.01	0.01	0.02	0.11	0.00	0.00
	Excavators	Tier 4 Final	599	0.38	9	66	2	715299.3226	2027	0.05	0.26	0.01	0.01	0.01	0.08	0.00	0.00
	Forklifts	Tier 4 Final	119	0.2	9	55	2	118879.6336	2027	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Generator Sets	Tier 4 Final	119	0.74	9	77	2	165329.4462	2027	0.05	0.26	0.01	0.01	0.01	0.04	0.00	0.00
	Graders	Tier 4 Final	599	0.41	9	8	2	86822.40901	2027	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Paving Equipment	Tier 4 Final	599	0.36	9	8	2	86822.40901	2027	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Plate Compactors	Tier 4 Final	49	0.43	9	35	2	31200.36113	2027	0.09	2.75	0.01	0.01	0.00	0.04	0.00	0.00
	Pumps	Tier 4 Final	49	0.74	9	727	4	1283027.032	2027	0.09	2.75	0.01	0.01	0.09	2.88	0.01	0.01
	Rollers	Tier 4 Final	599	0.38	9	10	2	111320.4077	2027	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	27	4	586637.8987	2027	0.05	0.26	0.01	0.01	0.01	0.07	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	299	0.4	9	17	2	91749.26634	2027	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Welders	Tier 4 Final	49	0.45	9	129	4	226775.6038	2027	0.09	2.75	0.01	0.01	0.01	0.31	0.00	0.00
	Rubber Tired Loaders	Tier 4 Final	299	0.36	9	130	4	1397908.361	2027	0.05	0.26	0.01	0.01	0.03	0.14	0.01	0.01
	Tractors/Loaders/Backhoes	Tier 4 Final	174	0.37	9	27	4	168091.4432	2027	0.05	0.26	0.01	0.01	0.00	0.02	0.00	0.00
	Off-Highway Trucks	Tier 4 Final	599	0.38	9	210	12	13553448.91	2027	0.05	0.26	0.01	0.01	0.28	1.48	0.06	0.06
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	54	2	577462.882	2027	0.05	0.26	0.01	0.01	0.01	0.07	0.00	0.00
2028	Bore/Drill Rigs	Tier 4 Final	599	0.5	9	82	2	885000.5854	2028	0.05	0.26	0.01	0.01	0.02	0.13	0.00	0.00
	Concrete/Industrial Saws	Tier 4 Final	49	0.73	9	119	4	209431.2585	2028	0.09	2.75	0.01	0.01	0.02	0.46	0.00	0.00
	Crawler Tractors	Tier 4 Final	599	0.43	9	85	2	915505.7561	2028	0.05	0.26	0.01	0.01	0.02	0.11	0.00	0.00
	Excavators	Tier 4 Final	599	0.38	9	66	2	712558.7122	2028	0.05	0.26	0.01	0.01	0.01	0.08	0.00	0.00
	Forklifts	Tier 4 Final	119	0.2	9	55	2	118424.1561	2028	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Generator Sets	Tier 4 Final	119	0.74	9	77	2	164696	2028	0.05	0.26	0.01	0.01	0.01	0.03	0.00	0.00
	Graders	Tier 4 Final	599	0.41	9	8	2	86489.7561	2028	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Paving Equipment	Tier 4 Final	599	0.36	9	8	2	86489.7561	2028	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Plate Compactors	Tier 4 Final	49	0.43	9	35	2	31080.81951	2028	0.09	2.75	0.01	0.01	0.00	0.04	0.00	0.00
	Pumps	Tier 4 Final	49	0.74	9	725	4	1278111.22	2028	0.09	2.75	0.01	0.01	0.09	2.87	0.01	0.01
	Rollers	Tier 4 Final	599	0.38	9	10	2	110893.8927	2028	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	27	4	584390.2439	2028	0.05	0.26	0.01	0.01	0.01	0.07	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	299	0.4	9	17	2	91397.73659	2028	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Welders	Tier 4 Final	49	0.45	9	128	4	225906.7317	2028	0.09	2.75	0.01	0.01	0.01	0.31	0.00	0.00
	Rubber Tired Loaders	Tier 4 Final	299	0.36	9	129	4	1392552.39	2028	0.05	0.26	0.01	0.01	0.03	0.14	0.01	0.01
	Tractors/Loaders/Backhoes	Tier 4 Final	174	0.37	9	27	4	167447.4146	2028	0.05	0.26	0.01	0.01	0.00	0.02	0.00	0.00
	Off-Highway Trucks	Tier 4 Final	599	0.38	9	209	12	13501519.99	2028	0.05	0.26	0.01	0.01	0.28	1.47	0.06	0.06
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	53	2	575250.3805	2028	0.05	0.26	0.01	0.01	0.01	0.07	0.00	0.00
2029	Bore/Drill Rigs	Tier 4 Final	599	0.5	9	82	2	888404.4338	2029	0.05	0.26	0.01	0.01	0.02	0.13	0.00	0.00
	Concrete/Industrial Saws	Tier 4 Final	49	0.73	9	119	4	210236.7634	2029	0.09	2.75	0.01	0.01	0.02	0.47	0.00	0.00
	Crawler Tractors	Tier 4 Final	599	0.43	9	85	2	919026.9321	2029	0.05	0.26	0.01	0.01	0.02	0.11	0.00	0.00
	Excavators	Tier 4 Final	599	0.38	9	66	2	715299.3226	2029	0.05	0.26	0.01	0.01	0.01	0.08	0.00	0.00
	Forklifts	Tier 4 Final	119	0.2	9	55	2	118879.6336	2029	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Generator Sets	Tier 4 Final	119	0.74	9	77	2	165329.4462	2029	0.05	0.26	0.01	0.01	0.01	0.04	0.00	0.00
	Graders	Tier 4 Final	599	0.41	9	8	2	86822.40901	2029	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Paving Equipment	Tier 4 Final	599	0.36	9	8	2	86822.40901	2029	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Plate Compactors	Tier 4 Final	49	0.43	9	35	2	31200.36113	2029	0.09	2.75	0.01	0.01	0.00	0.04	0.00	0.00
	Pumps	Tier 4 Final	49	0.74	9	727	4	1283027.032	2029	0.09	2.75	0.01	0.01	0.09	2.88	0.01	0.01
	Rollers	Tier 4 Final	599	0.38	9	10	2	111320.4077	2029	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	27	4	586637.8987	2029	0.05	0.26	0.01	0.01	0.01	0.07	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	299	0.4	9	17	2	91749.26634	2029	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Welders	Tier 4 Final	49	0.45	9	129	4	226775.6038	2029	0.09	2.75	0.01	0.01	0.01	0.31	0.00	0.00
	Rubber Tired Loaders	Tier 4 Final	299	0.36	9	130	4	1397908.361	2029	0.05	0.26	0.01	0.01	0.03	0.14	0.01	0.01
	Tractors/Loaders/Backhoes	Tier 4 Final	174	0.37	9	27	4	168091.4432	2029	0.05	0.26	0.01	0.01	0.00	0.02	0.00	0.00
	Off-Highway Trucks	Tier 4 Final	599	0.38	9	210	12	13553448.91	2029	0.05	0.26	0.01	0.01	0.28	1.48	0.06	0.06
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	54	2	577462.882	2029	0.05	0.26	0.01	0.01	0.01	0.07	0.00	0.00

		Tier	HP	LF	Hours (avg)	Days	Quantity	hp-hr	EF year	ROG	NOx	Ex PM-10	Ex PM2.5	ROG	NOx	Ex PM-10	Ex PM2.5
2030	Bore/Drill Rigs	Tier 4 Final	599	0.5	9	82	2	888404.4338	2030	0.05	0.26	0.01	0.01	0.02	0.13	0.00	0.00
	Concrete/Industrial Saws	Tier 4 Final	49	0.73	9	119	4	210236.7634	2030	0.09	2.75	0.01	0.01	0.02	0.47	0.00	0.00
	Crawler Tractors	Tier 4 Final	599	0.43	9	85	2	919026.9321	2030	0.05	0.26	0.01	0.01	0.02	0.11	0.00	0.00
	Excavators	Tier 4 Final	599	0.38	9	66	2	715299.3226	2030	0.05	0.26	0.01	0.01	0.01	0.08	0.00	0.00
	Forklifts	Tier 4 Final	119	0.2	9	55	2	118879.6336	2030	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Generator Sets	Tier 4 Final	119	0.74	9	77	2	165329.4462	2030	0.05	0.26	0.01	0.01	0.01	0.04	0.00	0.00
	Graders	Tier 4 Final	599	0.41	9	8	2	86822.40901	2030	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Paving Equipment	Tier 4 Final	599	0.36	9	8	2	86822.40901	2030	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Plate Compactors	Tier 4 Final	49	0.43	9	35	2	31200.36113	2030	0.09	2.75	0.01	0.01	0.00	0.04	0.00	0.00
	Pumps	Tier 4 Final	49	0.74	9	727	4	1283027.032	2030	0.09	2.75	0.01	0.01	0.09	2.88	0.01	0.01
	Rollers	Tier 4 Final	599	0.38	9	10	2	111320.4077	2030	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	27	4	586637.8987	2030	0.05	0.26	0.01	0.01	0.01	0.07	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	299	0.4	9	17	2	91749.26634	2030	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Welders	Tier 4 Final	49	0.45	9	129	4	226775.6038	2030	0.09	2.75	0.01	0.01	0.01	0.31	0.00	0.00
	Rubber Tired Loaders	Tier 4 Final	299	0.36	9	130	4	1397908.361	2030	0.05	0.26	0.01	0.01	0.03	0.14	0.01	0.01
	Tractors/Loaders/Backhoes	Tier 4 Final	174	0.37	9	27	4	168091.4432	2030	0.05	0.26	0.01	0.01	0.00	0.02	0.00	0.00
	Off-Highway Trucks	Tier 4 Final	599	0.38	9	210	12	13553448.91	2030	0.05	0.26	0.01	0.01	0.28	1.48	0.06	0.06
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	54	2	577462.882	2030	0.05	0.26	0.01	0.01	0.01	0.07	0.00	0.00
2031	Bore/Drill Rigs	Tier 4 Final	599	0.5	9	7	2	78288.51332	2031	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Concrete/Industrial Saws	Tier 4 Final	49	0.73	9	11	4	18526.61133	2031	0.09	2.75	0.01	0.01	0.00	0.04	0.00	0.00
	Crawler Tractors	Tier 4 Final	599	0.43	9	8	2	80987.04765	2031	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Excavators	Tier 4 Final	599	0.38	9	6	2	63034.03992	2031	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Forklifts	Tier 4 Final	119	0.2	9	5	2	10475.98304	2031	0.05	0.26	0.01	0.01	0.00	0.00	0.00	0.00
	Generator Sets	Tier 4 Final	119	0.74	9	7	2	14569.26154	2031	0.05	0.26	0.01	0.01	0.00	0.00	0.00	0.00
	Graders	Tier 4 Final	599	0.41	9	1	2	7651.016886	2031	0.05	0.26	0.01	0.01	0.00	0.00	0.00	0.00
	Paving Equipment	Tier 4 Final	599	0.36	9	1	2	7651.016886	2031	0.05	0.26	0.01	0.01	0.00	0.00	0.00	0.00
	Plate Compactors	Tier 4 Final	49	0.43	9	3	2	2749.457111	2031	0.09	2.75	0.01	0.01	0.00	0.00	0.00	0.00
	Pumps	Tier 4 Final	49	0.74	9	64	4	113063.6848	2031	0.09	2.75	0.01	0.01	0.01	0.25	0.00	0.00
	Rollers	Tier 4 Final	599	0.38	9	1	2	9809.844353	2031	0.05	0.26	0.01	0.01	0.00	0.00	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	2	4	51696.06004	2031	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Other Material Handling Equipment	Tier 4 Final	299	0.4	9	2	2	8085.18439	2031	0.05	0.26	0.01	0.01	0.00	0.00	0.00	0.00
	Welders	Tier 4 Final	49	0.45	9	11	4	19984.05704	2031	0.09	2.75	0.01	0.01	0.00	0.03	0.00	0.00
	Rubber Tired Loaders	Tier 4 Final	299	0.36	9	11	4	123187.3268	2031	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00
	Tractors/Loaders/Backhoes	Tier 4 Final	174	0.37	9	2	4	14812.65591	2031	0.05	0.26	0.01	0.01	0.00	0.00	0.00	0.00
	Off-Highway Trucks	Tier 4 Final	599	0.38	9	18	12	1194365.23	2031	0.05	0.26	0.01	0.01	0.03	0.13	0.01	0.01
	Other Material Handling Equipment	Tier 4 Final	599	0.4	9	5	2	50887.53366	2031	0.05	0.26	0.01	0.01	0.00	0.01	0.00	0.00

FWTP Treatment Plant Improvements and Existing Utility Upgrades (2 years)			SRWTP Treatment Plant Improvements and Existing Utility Upgrades			Sacramento River Water Intakes			Potable Water Transmission Pipelines			SRWTP buildout		
Start date	**7/1/2026**	12/31/2026	Start date	**1/1/2027**	12/31/2027	Start date	**1/1/2031**	12/31/2031	Start Date	**7/1/2032**	12/31/2032	Start date	**1/1/2040**	12/31/2040
	1/1/2027	12/31/2027		1/1/2028	12/31/2028		1/1/2032	12/31/2032		1/1/2033	12/31/2033		1/1/2041	12/31/2041
End date	1/1/2028	**7/1/2028**		1/1/2029	12/31/2029		1/1/2033	12/31/2033		1/1/2034	12/31/2034	End date	1/1/2042	**6/1/2042**
				1/1/2030	12/31/2030		1/1/2034	12/31/2034	End date	1/1/2035	**7/1/2035**			
			End date	1/1/2031	**1/31/2031**	End date	1/1/2035	**7/1/2035**						
Workdays	523		Workdays	1,066		Workdays	1,173			Workdays	782	Workdays	630	
Total hours	4,707		Total hours	9,594		Total hours	10,557			Total hours	7,038	Total hours	5,670	

Phase		No. of workers/ day	Ave daily truck trips (trips/day)	Trips/day (one-way)	Start date	End date	EF Year	Workdays/ year	Total trips (one-way trips/year)	Trip length (one way)	Miles per year)	EMFAC2021 Emission factors (g/mile)						CAP Emissions (tons per year)						EMFAC2021 Emission factors			GHG Emissions (MT per year)			
												ROG	**NOx**	**Ex PM10**	**Ex PM2.5**	**Total PM10**	**Total PM2.5**	**ROG**	**NOx**	**Ex PM10**	**Ex PM2.5**	**Total PM10**	**Total PM2.5**	**CO_2**	**CH_4**	**N_2O**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
FWTP Treatment Plant Improvements and Existing Utility Upgrades	Worker trips	12		24	7/1/2026	12/31/2026	2026	132	3,168	15	47,520	0.0164	0.0759	0.0016	0.0014	0.0128	0.0067	0.0009	0.004	0.000	0.000	0.001	0.000	320.346	0.004	0.007	15.22	0.00	0.00	**15.32**
	Truck trips		24	24	7/1/2026	12/31/2027	2026	393	9,432	20	188,640	0.0307	2.7684	0.0298	0.0285	0.1485	0.0665	0.0064	0.576	0.006	0.006	0.031	0.014	1633.326	0.0014	0.2573	308.11	0.00	0.05	**322.58**
	Worker trips	12		24	1/1/2027	12/31/2027	2027	261	6,264	15	93,960	0.0148	0.0688	0.0015	0.0014	0.0128	0.0066	0.0015	0.007	0.000	0.000	0.001	0.001	314.654	0.0036	0.0061	29.56	0.00	0.00	**29.75**
	Truck trips		24	24	1/1/2027	12/31/2027	2027	261	6,264	20	125,280	0.0293	2.6317	0.0292	0.0280	0.1482	0.0661	0.0040	0.363	0.004	0.004	0.020	0.009	1604.399	0.0014	0.2528	201.00	0.00	0.03	**210.44**
	Worker trips	12		24	1/1/2028	7/1/2028	2028	130	3,120	15	46,800	0.0134	0.0624	0.0014	0.0013	0.0127	0.0066	0.0007	0.003	0.000	0.000	0.001	0.000	308.190	0.0033	0.0058	14.42	0.00	0.00	**14.51**
	Truck trips		24	24	1/1/2028	7/1/2028	2028	130	3,120	20	62,400	0.0278	2.5003	0.0287	0.0275	0.1479	0.0657	0.0019	0.172	0.002	0.002	0.010	0.005	1574.940	0.0013	0.2481	98.28	0.00	0.02	**102.89**
SRWTP Treatment Plant Improvements and Existing Utility Upgrades	Worker trips	14		28	1/1/2027	12/31/2027	2027	261	7,308	15	109,620	0.0148	0.0688	0.0015	0.0014	0.0128	0.0066	0.0018	0.008	0.000	0.000	0.002	0.001	314.654	0.0036	0.0061	34.49	0.00	0.00	**34.70**
	Truck trips		56	56	1/1/2027	12/31/2027	2027	261	14,616	20	292,320	0.0293	2.6317	0.0292	0.0280	0.1482	0.0661	0.0094	0.848	0.009	0.009	0.048	0.021	1604.399	0.0014	0.2528	469.00	0.00	0.07	**491.03**
	Worker trips	14		28	1/1/2028	12/31/2028	2028	260	7,280	15	109,200	0.0134	0.0624	0.0014	0.0013	0.0127	0.0066	0.0016	0.008	0.000	0.000	0.002	0.001	308.190	0.0033	0.0058	33.65	0.00	0.00	**33.85**
	Truck trips		56	56	1/1/2028	12/31/2028	2028	260	14,560	20	291,200	0.0278	2.5003	0.0287	0.0275	0.1479	0.0657	0.0089	0.803	0.009	0.009	0.047	0.021	1574.940	0.0013	0.2481	458.62	0.00	0.07	**480.16**
	Worker trips	14		28	1/1/2029	12/31/2029	2029	261	7,308	15	109,620	0.0121	0.0567	0.0013	0.0012	0.0126	0.0065	0.0015	0.007	0.000	0.000	0.002	0.001	302.746	0.0030	0.0054	33.19	0.00	0.00	**33.37**
	Truck trips		56	56	1/1/2029	12/31/2029	2029	261	14,616	20	292,320	0.0265	2.3801	0.0282	0.0270	0.1476	0.0653	0.0085	0.767	0.009	0.009	0.048	0.021	1546.814	0.0012	0.2437	452.16	0.00	0.07	**473.40**
	Worker trips	14		28	1/1/2030	12/31/2030	2030	261	7,308	15	109,620	0.0110	0.0516	0.0012	0.0011	0.0125	0.0064	0.0013	0.006	0.000	0.000	0.002	0.001	297.671	0.0027	0.0051	32.63	0.00	0.00	**32.81**
	Truck trips		56	56	1/1/2030	12/31/2030	2030	261	14,616	20	292,320	0.0249	2.2546	0.0276	0.0264	0.1471	0.0647	0.0080	0.727	0.009	0.009	0.047	0.021	1519.671	0.0012	0.2394	444.23	0.00	0.07	**465.10**
	Worker trips	14		28	1/1/2031	1/31/2031	2031	23	644	15	9,660	0.0134	0.0624	0.0014	0.0011	0.0125	0.0064	0.0001	0.001	0.000	0.000	0.000	0.000	308.190	0.0033	0.0058	2.98	0.00	0.00	**2.99**
	Truck trips		56	56	1/1/2031	1/31/2031	2031	23	1,288	20	25,760	0.0232	2.1307	0.0270	0.0258	0.1465	0.0641	0.0007	0.061	0.001	0.001	0.004	0.002	1493.260	0.0011	0.2353	38.47	0.00	0.01	**40.27**
Sacramento River Water Intakes	Worker trips	45		90	1/1/2031	12/31/2031	2031	261	23,490	15	352,350	0.0134	0.0624	0.0014	0.0011	0.0125	0.0064	0.0052	0.024	0.001	0.000	0.005	0.002	308.190	0.0033	0.0058	108.59	0.00	0.00	**109.23**
	Truck trips		16	16	1/1/2031	12/31/2031	2031	261	4,176	20	83,520	0.0232	2.1307	0.0270	0.0258	0.1465	0.0641	0.0021	0.196	0.002	0.002	0.013	0.006	1493.260	0.0011	0.2353	124.72	0.00	0.02	**130.57**
	Worker trips	45		90	1/1/2032	12/31/2032	2032	262	23,580	15	353,700	0.0090	0.0428	0.0011	0.0010	0.0124	0.0063	0.0035	0.017	0.000	0.000	0.005	0.002	288.609	0.0023	0.0046	102.08	0.00	0.00	**102.59**
	Truck trips		16	16	1/1/2032	12/31/2032	2032	262	4,192	20	83,840	0.0218	2.0282	0.0265	0.0254	0.1462	0.0637	0.0020	0.187	0.002	0.002	0.014	0.006	1469.471	0.0010	0.2315	123.20	0.00	0.02	**128.99**
	Worker trips	45		90	1/1/2033	12/31/2033	2033	260	23,400	15	351,000	0.0082	0.0395	0.0010	0.0009	0.0123	0.0062	0.0032	0.015	0.000	0.000	0.005	0.002	284.640	0.0021	0.0045	99.91	0.00	0.00	**100.39**
	Truck trips		16	16	1/1/2033	12/31/2033	2033	260	4,160	20	83,200	0.0205	1.9335	0.0261	0.0250	0.1459	0.0634	0.0019	0.177	0.002	0.002	0.013	0.006	1447.681	0.0010	0.2281	120.45	0.00	0.02	**126.10**
	Worker trips	45		90	1/1/2034	12/31/2034	2034	260	23,400	15	351,000	0.0074	0.0365	0.0010	0.0009	0.0123	0.0062	0.0029	0.014	0.000	0.000	0.005	0.002	281.003	0.0020	0.0043	98.63	0.00	0.00	**99.10**
	Truck trips		16	16	1/1/2034	12/31/2034	2034	260	4,160	20	83,200	0.0193	1.8432	0.0257	0.0246	0.1455	0.0630	0.0018	0.169	0.002	0.002	0.013	0.006	1427.678	0.0009	0.2249	118.78	0.00	0.02	**124.36**
	Worker trips	45		90	1/1/2035	7/1/2035	2035	130	11,700	15	175,500	0.0068	0.0341	0.0009	0.0008	0.0122	0.0061	0.0013	0.007	0.000	0.000	0.002	0.001	277.717	0.0019	0.0041	48.74	0.00	0.00	**48.96**
	Truck trips		16	16	1/1/2035	7/1/2035	2035	130	2,080	20	41,600	0.0181	1.7647	0.0254	0.0243	0.1453	0.0627	0.0008	0.081	0.001	0.001	0.007	0.003	1410.082	0.0008	0.2222	58.66	0.00	0.01	**61.41**
Potable Water Transmission Pipelines	Worker trips	10		20	7/1/2032	12/31/2032	2032	132	2,640	15	39,600	0.0090	0.0428	0.0011	0.0010	0.0124	0.0063	0.0004	0.002	0.000	0.000	0.001	0.000	288.609	0.0023	0.0046	11.43	0.00	0.00	**11.49**
	Truck trips		12	12	7/1/2032	12/31/2032	2032	132	1,584	20	31,680	0.0218	2.0282	0.0265	0.0254	0.1462	0.0637	0.0008	0.071	0.001	0.001	0.005	0.002	1469.471	0.0010	0.2315	46.55	0.00	0.01	**48.74**
	Worker trips	10		20	1/1/2033	12/31/2033	2033	260	5,200	15	78,000	0.0082	0.0395	0.0010	0.0009	0.0123	0.0062	0.0007	0.003	0.000	0.000	0.001	0.001	284.640	0.0021	0.0045	22.20	0.00	0.00	**22.31**
	Truck trips		12	12	1/1/2033	12/31/2033	2033	260	3,120	20	62,400	0.0205	1.9335	0.0261	0.0250	0.1459	0.0634	0.0014	0.133	0.002	0.002	0.010	0.004	1447.681	0.0010	0.2281	90.34	0.00	0.01	**94.58**
	Worker trips	10		20	1/1/2034	12/31/2034	2034	260	5,200	15	78,000	0.0074	0.0365	0.0010	0.0009	0.0123	0.0062	0.0006	0.003	0.000	0.000	0.001	0.001	281.003	0.0020	0.0043	21.92	0.00	0.00	**22.02**
	Truck trips		12	12	1/1/2034	12/31/2034	2034	260	3,120	20	62,400	0.0193	1.8432	0.0257	0.0246	0.1455	0.0630	0.0013	0.127	0.002	0.002	0.010	0.004	1427.678	0.0009	0.2249	89.09	0.00	0.01	**93.27**
	Worker trips	10		20	1/1/2035	7/1/2035	2035	130	2,600	15	39,000	0.0068	0.0341	0.0009	0.0008	0.0122	0.0061	0.0003	0.001	0.000	0.000	0.001	0.000	277.717	0.0019	0.0041	10.83	0.00	0.00	**10.88**
	Truck trips		12	12	1/1/2035	7/1/2035	2035	130	1,560	20	31,200	0.0181	1.7647	0.0254	0.0243	0.1453	0.0627	0.0006	0.061	0.001	0.001	0.005	0.002	1410.082	0.0008	0.2222	43.99	0.00	0.01	**46.06**
SRWTP Phase 2	Worker trips	14		28	1/1/2040	12/31/2040	2040	261	7,308	15	109,620	0.0045	0.0258	0.0007	0.0006	0.0120	0.0059	0.0005	0.003	0.000	0.000	0.001	0.001	266.129	0.0014	0.0036	29.17	0.00	0.00	**29.30**
	Truck trips		28	28	1/1/2040	12/31/2040	2040	261	7,308	20	146,160	0.0147	1.4929	0.0251	0.0240	0.1449	0.0624	0.0024	0.241	0.004	0.004	0.023	0.010	1348.190	0.0007	0.2124	197.05	0.00	0.03	**206.31**
	Worker trips	14		28	1/1/2041	12/31/2041	2041	261	7,308	15	109,620	0.0042	0.0247	0.0006	0.0006	0.0119	0.0059	0.0005	0.003	0.000	0.000	0.001	0.001	264.597	0.0013	0.0035	29.01	0.00	0.00	**29.12**
	Truck trips		28	28	1/1/2041	12/31/2041	2041	261	7,308	20	146,160	0.0143	1.4586	0.0251	0.0240	0.1449	0.0624	0.0023	0.235	0.004	0.004	0.023	0.010	1339.722	0.0007	0.2111	195.81	0.00	0.03	**205.01**
	Worker trips	14		28	1/1/2042	6/1/2042	2042	108	3,024	15	45,360	0.0039	0.0237	0.0006	0.0006	0.0119	0.0059	0.0002	0.0012	0.0000	0.0000	0.0006	0.0003	263.2658	0.0013	0.0035	11.9417	0.0001	0.0002	**11.9904**
	Truck trips		28	28	1/1/2042	6/1/2042	2042	108	3,024	20	60,480	0.0139	1.4286	0.0251	0.0241	0.1448	0.0624	0.0009	0.0952	0.0017	0.0016	0.0097	0.0042	1332.4339	0.0006	0.2099	80.5856	0.0000	0.0127	**84.3701**

Year	CAP Emissions FWTP Summary (tpy)					
	ROG	NOx	Ex PM10	Ex PM2.5	Total PM10	Total PM2.5
2025	0.000	0.000	0.000	0.000	0.000	0.000
2026	0.007	0.580	0.006	0.006	0.032	0.014
2027	0.006	0.371	0.004	0.004	0.022	0.010
2028	0.003	0.175	0.002	0.002	0.011	0.005
2029	0.000	0.000	0.000	0.000	0.000	0.000
2030	0.000	0.000	0.000	0.000	0.000	0.000
2031	0.000	0.000	0.000	0.000	0.000	0.000
2032	0.000	0.000	0.000	0.000	0.000	0.000
2033	0.000	0.000	0.000	0.000	0.000	0.000
2034	0.000	0.000	0.000	0.000	0.000	0.000
2035	0.000	0.000	0.000	0.000	0.000	0.000
2040	0.000	0.000	0.000	0.000	0.000	0.000
2041	0.000	0.000	0.000	0.000	0.000	0.000
2042	0.000	0.000	0.000	0.000	0.000	0.000

Year	CAP Emissions SRWTP Phase 1 Summary (tpy)			
	ROG	NOx	Ex PM10	Ex PM2.5
2025	0.000	0.000	0.000	0.000
2026	0.000	0.000	0.000	0.000
2027	0.011	0.856	0.010	0.009
2028	0.011	0.810	0.009	0.009
2029	0.010	0.774	0.009	0.009
2030	0.009	0.733	0.009	0.009
2031	0.001	0.061	0.001	0.001
2032	0.000	0.000	0.000	0.000
2033	0.000	0.000	0.000	0.000
2034	0.000	0.000	0.000	0.000
2035	0.000	0.000	0.000	0.000
2040	0.000	0.000	0.000	0.000
2041	0.000	0.000	0.000	0.000
2042	0.000	0.000	0.000	0.000

	CAP Emissions Summary SRWTP Phase 2 (tpy)					
	ROG	NOx	Ex PM10	Ex PM2.5	Total PM10	Total PM2.5
2025	0.000	0.000	0.000	0.000	0.000	0.000
2026	0.000	0.000	0.000	0.000	0.000	0.000
2027	0.000	0.000	0.000	0.000	0.000	0.000
2028	0.000	0.000	0.000	0.000	0.000	0.000
2029	0.000	0.000	0.000	0.000	0.000	0.000
2030	0.000	0.000	0.000	0.000	0.000	0.000
2031	0.000	0.000	0.000	0.000	0.000	0.000
2032	0.000	0.000	0.000	0.000	0.000	0.000
2033	0.000	0.000	0.000	0.000	0.000	0.000
2034	0.000	0.000	0.000	0.000	0.000	0.000
2035	0.000	0.000	0.000	0.000	0.000	0.000
2036	0.000	0.000	0.000	0.000	0.000	0.000
2037	0.000	0.000	0.000	0.000	0.000	0.000
2038	0.000	0.000	0.000	0.000	0.000	0.000
2039	0.000	0.000	0.000	0.000	0.000	0.000
2040	0.003	0.244	0.004	0.004	0.025	0.011
2041	0.003	0.238	0.004	0.004	0.025	0.011
2042	0.001	0.096	0.002	0.002	0.010	0.004

	CAP Emissions Summary New Water Intake (tpy)			
	ROG	NOx	Ex PM10	Ex PM2.5
2025	0.000	0.000	0.000	0.000
2026	0.000	0.000	0.000	0.000
2027	0.000	0.000	0.000	0.000
2028	0.000	0.000	0.000	0.000
2029	0.000	0.000	0.000	0.000
2030	0.000	0.000	0.000	0.000
2031	0.007	0.220	0.003	0.003
2032	0.006	0.204	0.003	0.003
2033	0.005	0.193	0.003	0.003
2034	0.005	0.183	0.003	0.003
2035	0.002	0.088	0.001	0.001
2036	0.000	0.000	0.000	0.000
2037	0.000	0.000	0.000	0.000
2038	0.000	0.000	0.000	0.000
2039	0.000	0.000	0.000	0.000
2040	0.000	0.000	0.000	0.000
2041	0.000	0.000	0.000	0.000
2042	0.000	0.000	0.000	0.000

	CAP Emissions Summary Potable Water Transmission Pipelines (tpy)					
	ROG	NOx	Ex PM10	Ex PM2.5	Total PM10	Total PM2.5
2025	0.000	0.000	0.000	0.000	0.000	0.000
2026	0.000	0.000	0.000	0.000	0.000	0.000
2027	0.000	0.000	0.000	0.000	0.000	0.000
2028	0.000	0.000	0.000	0.000	0.000	0.000
2029	0.000	0.000	0.000	0.000	0.000	0.000
2030	0.000	0.000	0.000	0.000	0.000	0.000
2031	0.000	0.000	0.000	0.000	0.000	0.000
2032	0.001	0.073	0.001	0.001	0.006	0.003
2033	0.002	0.136	0.002	0.002	0.011	0.005
2034	0.002	0.130	0.002	0.002	0.011	0.005
2035	0.001	0.062	0.001	0.001	0.006	0.002
2036	0.000	0.000	0.000	0.000	0.000	0.000
2037	0.000	0.000	0.000	0.000	0.000	0.000
2038	0.000	0.000	0.000	0.000	0.000	0.000
2039	0.000	0.000	0.000	0.000	0.000	0.000
2040	0.000	0.000	0.000	0.000	0.000	0.000
2041	0.000	0.000	0.000	0.000	0.000	0.000
2042	0.000	0.000	0.000	0.000	0.000	0.000

	CAP Emissions FWTP Summary (ppd)					
	ROG	NOx	Ex PM10	Ex PM2.5	Total PM10	Total PM2.5
2025	0.000	0.000	0.000	0.000	0.000	0.000
2026	0.056	4.459	0.048	0.046	0.243	0.109
2027	0.043	2.850	0.032	0.031	0.168	0.076
2028	0.020	1.348	0.016	0.015	0.083	0.037
2029	0.000	0.000	0.000	0.000	0.000	0.000
2030	0.000	0.000	0.000	0.000	0.000	0.000
2031	0.000	0.000	0.000	0.000	0.000	0.000
2032	0.000	0.000	0.000	0.000	0.000	0.000
2033	0.000	0.000	0.000	0.000	0.000	0.000
2034	0.000	0.000	0.000	0.000	0.000	0.000
2035	0.000	0.000	0.000	0.000	0.000	0.000
2036	0.000	0.000	0.000	0.000	0.000	0.000
2037	0.000	0.000	0.000	0.000	0.000	0.000
2038	0.000	0.000	0.000	0.000	0.000	0.000
2039	0.000	0.000	0.000	0.000	0.000	0.000
2040	0.000	0.000	0.000	0.000	0.000	0.000
2041	0.000	0.000	0.000	0.000	0.000	0.000
2042	0.000	0.000	0.000	0.000	0.000	0.000

CAP Emissions SRWTP Phase 1 Summary (ppd)			
ROG	NOx	Ex PM10	Ex PM2.5
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.086	6.587	0.074	0.071
0.081	6.232	0.072	0.069
0.077	5.952	0.071	0.068
0.072	5.636	0.070	0.066
0.006	0.471	0.006	0.006
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000

	CAP Emissions Summary SRWTP Phase 2 (ppd)					
	ROG	NOx	Ex PM10	Ex PM2.5	Total PM10	Total PM2.5
2025	0.000	0.000	0.000	0.000	0.000	0.000
2026	0.000	0.000	0.000	0.000	0.000	0.000
2027	0.000	0.000	0.000	0.000	0.000	0.000
2028	0.000	0.000	0.000	0.000	0.000	0.000
2029	0.000	0.000	0.000	0.000	0.000	0.000
2030	0.000	0.000	0.000	0.000	0.000	0.000
2031	0.000	0.000	0.000	0.000	0.000	0.000
2032	0.000	0.000	0.000	0.000	0.000	0.000
2033	0.000	0.000	0.000	0.000	0.000	0.000
2034	0.000	0.000	0.000	0.000	0.000	0.000
2035	0.000	0.000	0.000	0.000	0.000	0.000
2036	0.000	0.000	0.000	0.000	0.000	0.000
2037	0.000	0.000	0.000	0.000	0.000	0.000
2038	0.000	0.000	0.000	0.000	0.000	0.000
2039	0.000	0.000	0.000	0.000	0.000	0.000
2040	0.022	1.874	0.032	0.030	0.191	0.083
2041	0.022	1.831	0.032	0.030	0.191	0.083
2042	0.009	0.742	0.013	0.013	0.079	0.034

CAP Emissions Summary New Water Intake (ppd)			
ROG	NOx	Ex PM10	Ex PM2.5
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.056	1.695	0.023	0.021
0.042	1.570	0.022	0.021
0.039	1.482	0.021	0.020
0.036	1.409	0.021	0.020
0.016	0.673	0.010	0.010
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000

	CAP Emissions Summary Potable Water Transmission Lines (ppd)					
	ROG	NOx	Ex PM10	Ex PM2.5	Total PM10	Total PM2.5
2032	0.009	0.559	0.007	0.007	0.043	0.019
2033	0.016	1.049	0.014	0.014	0.085	0.038
2034	0.015	0.999	0.014	0.014	0.085	0.037
2035	0.007	0.478	0.007	0.007	0.042	0.019

	GHG Emissions Summary (MT per year)			
	CO_2	CH_4	N_2O	CO_2e
2025	0.0000	0.0000	0.0000	**0.0**
2026	323.3335	0.0005	0.0489	**337.9**
2027	734.0543	0.0013	0.1068	**765.9**
2028	604.9764	0.0010	0.0886	**631.4**
2029	485.3516	0.0007	0.0718	**506.8**
2030	476.8609	0.0006	0.0706	**497.9**
2031	274.7513	0.0013	0.0278	**283.1**
2032	283.2631	0.0010	0.0286	**291.8**
2033	332.8928	0.0011	0.0351	**343.4**
2034	328.4204	0.0010	0.0346	**338.8**
2035	162.2242	0.0005	0.0171	**167.3**
2040	226.2246	0.0003	0.0314	**235.6**
2041	224.8189	0.0002	0.0312	**234.1**
2042	92.5273	0.0001	0.0129	**96.4**

	GHG Emissions FWTP (MT per year)			
	CO_2	CH_4	N_2O	CO_2e
2026	323.33	0.00	0.05	337.90
2027	230.56	0.00	0.03	240.19
2028	112.70	0.00	0.02	117.40

	GHG Emissions SRWTP Phase 1 (MT per year)			
	CO_2	CH_4	N_2O	CO_2e
2027	503.49	0.00	0.07	525.73
2028	492.28	0.00	0.07	514.02
2029	485.35	0.00	0.07	506.78
2030	626.90	0.00	0.08	650.39

	GHG Emissions SRWTP Phase 2 (MT per year)			
	CO_2	CH_4	N_2O	CO_2e
2040	226.22	0.00	0.03	235.60
2041	224.82	0.00	0.03	234.13
2042	92.5273	0.0001	0.0129	96.3604

	GHG Emissions New Water Intake (MT per year)			
	CO_2	CH_4	N_2O	CO_2e
2031	233.3078	0.0012	0.0217	239.8002
2032	225.2813	0.0009	0.0211	231.5779
2033	220.3556	0.0008	0.0205	226.4972
2034	217.4150	0.0008	0.0202	223.4585
2035	107.40	0.00	0.01	110.38

	GHG Emissions Potable Water Transmission Lines (MT per year)			
	CO_2	CH_4	N_2O	CO_2e
2032	57.9817	0.0001	0.0075	60.2253
2033	112.5372	0.0002	0.0146	116.8876
2034	111.0054	0.0002	0.0144	115.2927
2035	54.8255	0.0001	0.0071	56.9415

Sacramento Water
Operational On-site Fugitive Dust Calculations
All project components

Material Movement

Phase Name	Total (CY)	Net Annual Trips
FWTP	69,250	8,656
SRWTP phase 1	232,000	29,000
SRWTP phase 2	58,700	7,338
Potable Water Transmission Pipelines	9,000	2,519
Sacramento River Water Intakes	20,150	1,125

Emission Reduction on PM

Speed < 25 mph	44%	*unpaved roads*
Watering 2x daily	55%	*unpaved roads*

Construction Schedule

Phase Number	Phase Name	Phase Type	Start Date	End Date	Duration (Yrs)	Day/Year
	FWTP	Grading	7/1/2026	7/1/2028	2.00	260
	SRWTP phase 1	Grading	1/1/2027	1/31/2031	4.08	260
	SRWTP phase 2	Grading	1/1/2040	6/1/2042	2.42	260
	Potable Water Transmission Pipelines	Grading	7/1/2032	7/1/2035	3.00	260
	Sacramento River Water Intakes	Grading	1/1/2031	7/1/2035	4.50	260

Off-Road Equipment Info

Phase Number	Phase Name	Offroad Equipment Type	NAME MATCH Offroad Equipment Type	Fuel Type	Amount	Days Used	Hours/ Day Usage	Annual Hours Use	Acre grade d/8-hr	Acre Graded per yr
	FWTP	Crawler Tractors	Crawler Tractors	Diesel	1	29	9	261	0.5	16.313
	SRWTP phase 1	Crawler Tractors	Crawler Tractors	Diesel	2	59	9	1062	0.5	66.375
	SRWTP phase 1	Graders	Graders	Diesel	2	6	9	108	0.5	6.75
	SRWTP phase 2	Crawler Tractors	Crawler Tractors	Diesel	1	53	9	477	0.5	29.813
	SRWTP phase 2	Graders	Graders	Diesel	1	10	9	90	0.5	5.625
	Sacramento River Water Intakes	Crawler Tractors	Crawler Tractors	Diesel	3	22	9	594	0.5	37.125

Grading Emissions Estimates

Constants

S =	7.1	mph
$F_{PM2.5}$ =	0.031	
F_{PM10} =	0.6	
Wb =	12	ft
UC_1 =	43560	sqft/acre
UC_2 =	5280	ft/mi

Emission Factors

EF_{PM15} =	2.57	lb/VMT
EF_{TSP} =	5.37	lb/VMT
EF_{PM10} =	1.54	lb/VMT
$EF_{PM2.5}$ =	0.17	lb/VMT

Grading Activity

Phase Name	Phase Type	Activity Type	**Area Graded** Acres	**Grading VMT** total VMT
FWTP	Grading	Grading	16.31	11.21
SRWTP phase 1	Grading	Grading	73.13	50.27
SRWTP phase 2	Grading	Grading	35.44	24.36
Sacramento Rive	Grading	Grading	37.13	25.52

Grading Emissions

Phase Name	Phase Type	Activity Type	**PM10** Lbs/yr	**PM2.5** Lbs/yr
FWTP	Grading	Grading	17.299	1.868
SRWTP phase 1	Grading	Grading	77.549	8.373
SRWTP phase 2	Grading	Grading	37.581	4.058
Sacramento Rive	Grading	Grading	39.371	4.251

Bulldozing Emissions Estimates

Constants

C_{TSP} =	5.7	
C_{PM15} =	1	
M =	7.9	%
s =	6.9	%
F_{PM10} =	0.75	
$F_{PM2.5}$ =	0.105	

Emission Factors

EF_{TSP} =	3.94	lb/hr
EF_{PM15} =	1.00	lb/hr
EF_{PM10} =	0.75	lb/hr
$EF_{PM2.5}$ =	0.41	lb/hr

C_{TSP} =	5.7	
C_{PM15} =	1	
M =	7.9	%
s =	6.9	%
F_{PM10} =	0.75	
$F_{PM2.5}$ =	0.105	

Dozer Activity

Phase Name	Phase Type	Activity Type	Equipment Type	**Dozer Activity** Hours
FWTP	Grading	Bulldozing	Rubber Tired Dozers	0.0
SRWTP phase 1	Grading	Bulldozing	Rubber Tired Dozers	0.0
SRWTP phase 2	Grading	Bulldozing	Rubber Tired Dozers	0.0
Sacramento Rive	Grading	Bulldozing	Rubber Tired Dozers	0.0

Bulldozing Emissions

Phase Name	Phase Type	Activity Type	**PM10** Lbs/yr	**PM2.5** Lbs/yr
FWTP	Grading	Bulldozing	0.000	0.000
SRWTP phase 1	Grading	Bulldozing	0.000	0.000
SRWTP phase 2	Grading	Bulldozing	0.000	0.000
Sacramento Rive	Grading	Bulldozing	0.000	0.000

Truck Loading Emissions Estimates

Constants			Emission Factors		
K_{PM10} =	0.35		EF_{PM10} =	0.00	lb/short ton
$K_{PM2.5}$ =	0.053		$EF_{PM2.5}$ =	0.00	lb/short ton
U =	2.7	m/s			
M =	12	%			
UC_1 =	2.23694	mph/[m/s]			
UC_2 =	1.2641662	short ton/cubic yard			

Truck Loading Activity

Phase Name	Phase Type	Activity Type	**Material Movement** short ton
FWTP	Grading	Material Movement	87543.509
SRWTP phase 1	Grading	Material Movement	293286.558
SRWTP phase 2	Grading	Material Movement	74206.556
Sacramento Rive	Grading	Material Movement	25472.949

Truck Loading Emissions

Phase Name	Phase Type	Activity Type	**PM10** Lbs/yr	**PM2.5** Lbs/yr
FWTP	Grading	Material Movement	5	1
SRWTP phase 1	Grading	Material Movement	8	1
SRWTP phase 2	Grading	Material Movement	4	1
Sacramento Rive	Grading	Material Movement	1	0

On-site, Unpaved Roads Emissions Estimates

	Constants			Emission Factors		
Google earth Distance =	0	m	EF_{PM10} =	2.09	lb/vmt	*see road dust tab for calculations*
UC_1 =	1609.34	m/mile	$EF_{PM2.5}$ =	0.21	lb/vmt	*see road dust tab for calculations*
	0					

Emission Factors w/ control requirements

EF_{PM10} =	0.53	lb/vmt
$EF_{PM2.5}$ =	0.05	lb/vmt

Truck Loading Activity

Phase Name	Phase Type	Activity Type	**Unpaved Distance** miles
FWTP	Grading	On-site Unpaved Roads	0
SRWTP phase 1	Grading	On-site Unpaved Roads	0
SRWTP phase 2	Grading	On-site Unpaved Roads	0
Sacramento Rive	Grading	On-site Unpaved Roads	0

Truck Loading Emissions

Phase Name	Phase Type	Activity Type	**PM10** Lbs/yr	**PM2.5** Lbs/yr
FWTP	Grading	On-site Unpaved Roads	0.0	0.0
SRWTP phase 1	Grading	On-site Unpaved Roads	0.0	0.0
SRWTP phase 2	Grading	On-site Unpaved Roads	0.0	0.0
Sacramento Rive	Grading	On-site Unpaved Roads	0.0	0.0

Annual Onsite Fugitive Dust Emissions

FWTP

7/1/2026 7/1/2028

Activity Type	PM10 Lbs/yr	PM2.5 Lbs/yr	PM10 tpy	PM2.5 tpy	PM10 ppd	PM2.5 ppd
Grading	17.3	1.9	0.009	0.001	0.067	0.007
Bulldozing	0.0	0.0	0.000	0.000	0.000	0.000
Material Movement	5.1	0.8	0.003	0.000	0.020	0.003
On-site Unpaved Roads	0.0	0.0	0.000	0.000	0.000	0.000
			0.011	0.001	0.086	0.010

SRWTP phase 1

1/1/2027 1/31/2031

Activity Type	PM10 Lbs/yr	PM2.5 Lbs/yr	PM10 tpy	PM2.5 tpy	PM10 ppd	PM2.5 ppd
Grading	77.5	8.4	0.039	0.004	0.298	0.032
Bulldozing	0.0	0.0	0.000	0.000	0.000	0.000
Material Movement	8.4	1.3	0.004	0.001	0.032	0.005
On-site Unpaved Roads	0.0	0.0	0.000	0.000	0.000	0.000
			0.043	0.005	0.330	0.037

SRWTP phase 2

1/1/2040 6/1/2042

Activity Type	PM10 Lbs/yr	PM2.5 Lbs/yr	PM10 tpy	PM2.5 tpy	PM10 ppd	PM2.5 ppd
Grading	37.6	4.1	0.019	0.002	0.145	0.016
Bulldozing	0.0	0.0	0.000	0.000	0.000	0.000
Material Movement	3.6	0.5	0.002	0.000	0.014	0.002
On-site Unpaved Roads	0.0	0.0	0.000	0.000	0.000	0.000
			0.021	0.002	0.158	0.018

Sacramento River Water Intakes

1/1/2031 7/1/2035

Activity Type	PM10 Lbs/yr	PM2.5 Lbs/yr	PM10 tpy	PM2.5 tpy	PM10 ppd	PM2.5 ppd
Grading	39.4	4.3	0.020	0.002	0.151	0.016
Bulldozing	0.0	0.0	0.000	0.000	0.000	0.000
Material Movement	0.7	0.1	0.000	0.000	0.003	0.000
On-site Unpaved Roads	0.0	0.0	0.000	0.000	0.000	0.000
			0.020	0.002	0.154	0.017

	PPD		TPY	
	FUG PM	FUG PM2.5	FUG PM10	FUG PM2.5
2025				
2026	0.09	0.01	0.01	0.00
2027	0.42	0.05	0.05	0.01
2028	0.42	0.05	0.05	0.00
2029	0.33	0.04	0.04	0.01
2030	0.33	0.04	0.04	0.00
2031	0.15	0.02	0.02	0.00
2032	0.15	0.02	0.02	0.00
2033	0.15	0.02	0.02	0.00
2034	0.15	0.02	0.02	0.00
2035	0.15	0.02	0.02	0.00
2036				
2037				
2038				
2039				
2040	0.16	0.02	0.02	0.00
2041	0.16	0.02	0.02	0.00
2042	0.16	0.02	0.02	0.00

Water Plus - AP42 Mitigated Emissions Calculations for *Off-Site Fugitive Dust Emissions* from Heavy Duty Trucks

Accounts for trucks driving to and from the site

Background Information

Conversions

Tons	Pounds	Grams
1	2000	907185

Mile	Feet
1	5280

Year	Day
1	260

Vehicle Weight

80000	pounds
40	tons

CA Vehicle Code - VEH
Div 15, Ch 5, Art 1, 35551

Roadway Travel Fractions and VMT Estimates

County	Sacramento
Freeway	0.37
Major	0.32
Collector	0.1
Local	0.21

SOURCE:
CARB MPM 7.9, March 2021, Table 2

Silt Loading Content

County	Sacramento
Freeway	0.015
Major	0.032
Collector	0.032
Local	0.32

SOURCE:
CARB MPM 7.9, March 2021, Table 4

Composite Silt Load

0.08619

Operational Trips

	Annual One-Way Trips	Trip Length	VMT/ Year
FWTP	4328	20	86563
SRWTP phase 1	7102	20	142041
SRWTP phase 2	3036	20	60724
Potable Water Transmission Pipelines	375	20	7500
Water Intakes	560	20	11194

AP42 Paved Roads - Re-entrained PAVED Road Dust and Emission Factors for PM10

Calculation Methodology: CARB Miscellaneous Process Methodology - Paved Road Dust, March 2021. This methodology is based on USEPA AP-42, Paved Roads, Section 13.2.1, Revised January 2011. 2021_paved_roads_7_9.pdf (ca.gov)

USEPA AP-42, Paved Roads, Section 13.2.1, Revised January 2011 http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf

Road Dust Equation	E [lb/VMT] = k*(sL)^0.91 * (W)^1.02 * (1-P/4N)

Variables	PM10	Where:	Source:
		E = the particulate emission factor in units of pounds of particulate matter per VMT	*calculation*
k (lb/VMT)	0.0022	k = the U.S. EPA AP-42 particle size multiplier (PM10 = 0.0022 lb/VMT)	*Table 13.2.1-1, USEPA AP-42 Section 13.2.1, revised January 2011*
sL	0.08619	sL = the roadway-specific silt loading in grams/square meter (g/m2)	*Calculated above (silt loading factor)*
W	40	W = the maximum weight of fully loaded tractor trailer traveling the road (California Vehicle Code = 40 tons)	*CA Vehicle Code VEH Div 15, Ch 5, Art 1, 35551*
P	74	P = number of “wet” days, when at least one site per county received at least 0.01 inch of precipitation during the annual averaging period	*Table 5 of CARB MPM 7.9, 2021*
N	365	N = the number of days in the annual averaging period (default = 365)	annual days (365)

Emission Factor

0.009665	lbs/mi

Off-Site Fugitive Dust Emissions of PM10

	FWTP	SRWTP phase 1	SRWTP phase 2	Potable Water Transmission Pipe	Sacramento River Water Intakes
lb/year PM10	836.623	1372.819	586.8963	72.48719	108.1938446
PPD PM10	3.217781	5.280072	2.257293	0.278797	0.416130171
TPY PM10	0.418311	0.686409	0.293448	0.036244	0.054096922

	PPD		TPY	
	FUG PM10	FUG PM2.5	FUG PM10	FUG PM2.5
2025				
2026	3.22	0.48	0.42	0.06
2027	8.50	1.27	1.10	0.17
2028	8.50	1.27	1.10	0.17
2029	5.28	0.79	0.69	0.10
2030	5.28	0.79	0.69	0.79
2031	0.42	0.06	0.05	0.01
2032	0.69	0.10	0.09	0.01
2033	0.69	0.10	0.09	0.01
2034	0.69	0.10	0.09	0.01
2035	0.69	0.10	0.09	0.01
2036				
2037				
2038				
2039				
2040	2.26	0.34	0.29	0.04
2041	2.26	0.34	0.29	0.04
2042	2.26	0.34	0.29	0.04

CARB Miscellaneous Process Methodology - Paved Road Dust - Emission Factors for PM2.5

Calculation Methodology: CARB Miscellaneous Process Methodology - Paved Road Dust, Table 6, March 2021.
Excerpt from this document describing how to calculate PM2.5 emissions based off of PM10 emissions:

2021_paved_roads_7_9.pdf (ca.gov)

Particle Size Weight Fractions-Carb Speciation Profiles

CARB's database system maintains particulate emissions as Total PM (total particulate matter) using CARB's specification profile #471 for paved road dust based on paved road dust sampling conducted in California and on evaluations conducted by CARB and MRI. It is estimated that PM10 is 45.72% of Total PM. Based on 2006 updates to CARB speciation profiles for PM2.5 (particulate matter less than 2.5 microns in diameter), PM2.5 is estimated to be 6.86% of Total PM, or 15% of PM10.

Total PM = PM10/0.4572
PM2.5 = [PM10 x (0.0686/0.4572)]
=PM10 x 15%
PM2.5 emission factor = 0.00966 * 15%
Emission Factor
0.00145 lbs/mi

Source:
calculation
Table 13.2.1-1, USEPA AP-42 Section 13.2.1, revised January 2011
Calculated above (silt loading factor)
Table 7 of CARB, 2018.
Table 5 of CARB MPM 7.9, 2021
annual days (365)

Off-Site Fugitive Dust Emissions of PM2.5

FWTP

lb/year	PM2.5
	125.49345

PPD	PM2.5
	0.4826671

TPY	PM2.5
	0.0627467

SRWTP phase 1

lb/year	PM2.5
	205.9228

PPD	PM2.5
	0.792011

TPY	PM2.5
	0.102961

SRWTP phase 2

lb/year	PM2.5
	88.03444

PPD	PM2.5
	0.338594

TPY	PM2.5
	0.044017

Potable Water Transmission Pipelir

lb/year	PM2.5
	10.87308

PPD	PM2.5
	0.04182

TPY	PM2.5
	0.005437

Sacramento River Water Intakes

lb/year	PM2.5
	16.22908

PPD	PM2.5
	0.06242

TPY	PM2.5
	0.008115

UNMITIGATED Project Total Emissions

	CAP Emissions Summary (ppd)				Emissions Summary (tpy)		GHG Emissions Summary(MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2026	1.69	15.14	3.74	0.89	0.49	0.12	891.4	0.0	0.1	908
2027	16.58	**113.80**	12.82	4.91	1.67	0.64	5959.4	0.2	0.1	6,008
2028	14.67	**95.66**	12.25	4.37	1.59	0.57	5252.4	0.2	0.1	5,294
2029	13.00	81.25	8.42	3.43	1.09	0.45	4590.3	0.2	0.1	4,625
2030	12.80	77.80	8.33	3.35	1.08	1.12	4581.9	0.2	0.1	4,616
2031	2.80	18.76	1.23	0.68	0.16	0.09	1204.2	0.0	0.0	1,216
2032	2.04	14.20	1.34	0.57	0.17	0.07	1025.8	0.0	0.0	1,037
2033	2.17	14.90	1.35	0.59	0.18	0.08	1153.8	0.0	0.0	1,167
2034	2.15	14.44	1.33	0.57	0.17	0.07	1149.4	0.0	0.0	1,162
2035	1.00	6.69	1.07	0.33	0.14	0.04	543.8	0.0	0.0	550
2040	2.95	15.34	2.96	0.86	0.38	0.11	1269.1	0.0	0.0	1,282
2041	2.94	15.06	2.94	0.84	0.38	0.11	1267.7	0.0	0.0	1,280
2042	1.21	6.13	2.63	0.55	0.34	0.07	524.1	0.0	0.0	529

UNMITIGATED Project Emissions by Component

	CAP Emissions Summary FWTP (ppd)				Emissions Summary (tpy)		GHG Emissions Summary FWTP (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2025	0.00	0.00	3.30	0.49	0.43	0.06	323.33	0.00	0.05	337.90
2026	1.69	15.14	3.74	0.89	0.48	0.11	798.63	0.02	0.04	810.11
2027	3.23	22.75	4.05	1.18	0.52	0.15	1235.60	0.04	0.02	1243.97

	CAP Emissions Summary SRWTP Phase 1 (ppd)				Emissions Summary (tpy)		GHG Emissions Summary SRWTP Phase 1 (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2027	13.34	91.05	8.77	3.73	1.14	0.49	4605.92	0.16	0.11	4641.63
2028	13.10	85.25	8.60	3.56	1.12	0.46	4580.21	0.16	0.10	4615.37
2029	13.00	81.25	8.42	3.43	1.09	0.45	4590.25	0.16	0.10	4625.15
2030	12.80	77.80	8.33	3.35	1.08	0.44	4731.95	0.17	0.11	4768.92
2031	1.12	6.57	5.85	1.05	0.76	0.14	361.75	0.01	0.00	362.94

	CAP Emissions Summary SRWTP Phase 2 (ppd)				Emissions Summary (tpy)		GHG Emissions Summary SRWTP Phase 2 (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2040	2.95	15.34	2.96	0.86	0.38	0.11	1269.14	0.04	0.04	1281.94
2041	2.94	15.06	2.94	0.84	0.38	0.11	1267.73	0.04	0.04	1280.48
2042	1.21	6.13	2.63	0.55	0.34	0.07	524.08	0.02	0.02	529.33

	CAP Emissions Summary New Water Intake (ppd)				Emissions Summary (tpy)		GHG Emissions Summary New Water Intake (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2031	1.68	12.19	0.99	0.47	0.13	0.06	801.04	0.02	0.03	809.41
2032	1.65	11.77	0.98	0.46	0.13	0.06	795.12	0.02	0.03	803.29
2033	1.62	11.30	0.96	0.44	0.12	0.06	785.79	0.02	0.02	793.80
2034	1.61	11.03	0.95	0.43	0.12	0.06	782.89	0.02	0.02	790.80
2035	0.79	5.34	0.75	0.25	0.10	0.03	390.13	0.01	0.01	394.04

	CAP Emissions Summary Potable Water Transmission Pipelines (ppd)				Emissions Summary (tpy)		GHG Emissions Summary Potable Water Transmission Pipelines (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2032	0.05	0.32	0.29	0.05	0.41	0.35	57.98	0.00	0.01	60.23
2033	0.07	0.47	0.29	0.06	0.40	0.34	112.54	0.00	0.01	116.89
2034	0.07	0.44	0.29	0.05	0.21	0.16	111.01	0.00	0.01	115.29
2035	0.03	0.18	0.28	0.05	0.04	0.01	54.83	0.00	0.01	56.94

MITIGATED Project Total Emissions

	CAP Emissions Summary (ppd)				Emissions Summary (tpy)		GHG Emissions Summary(MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2026	1.69	15.14	3.74	0.89	0.49	0.12	891.4	0.0	0.1	908
2027	7.47	74.47	10.48	2.83	1.36	0.37	5959.4	0.2	0.1	6,008
2028	5.79	61.59	10.08	2.45	1.31	0.32	5252.4	0.2	0.1	5,294
2029	4.22	51.08	6.43	1.64	0.84	0.21	4590.3	0.2	0.1	4,625
2030	4.22	50.77	6.43	1.64	0.84	0.90	4581.9	0.2	0.1	4,616
2031	2.05	16.64	1.06	0.54	0.14	0.07	1204.2	0.0	0.0	1,216
2032	2.04	14.20	1.34	0.57	0.17	0.07	1025.8	0.0	0.0	1,037
2033	2.17	14.90	1.35	0.59	0.18	0.08	1153.8	0.0	0.0	1,167
2034	2.15	14.44	1.33	0.57	0.17	0.07	1149.4	0.0	0.0	1,162
2035	1.00	6.69	1.07	0.33	0.14	0.04	543.8	0.0	0.0	550
2040	2.95	15.34	2.96	0.86	0.38	0.11	1269.1	0.0	0.0	1,282
2041	2.94	15.06	2.94	0.84	0.38	0.11	1267.7	0.0	0.0	1,280
2042	1.21	6.13	2.63	0.55	0.34	0.07	524.1	0.0	0.0	529
										29,675

MITIGATED Project Emissions by Component

	CAP Emissions Summary FWTP (ppd)				Emissions Summary (tpy)		GHG Emissions Summary FWTP (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2026	1.69	15.14	3.74	0.89	0.48	0.11	891.40	0.02	0.05	907.83
2027	3.23	22.75	4.05	1.18	0.52	0.15	1353.47	0.05	0.04	1366.75
2028	1.57	10.40	3.65	0.81	0.47	0.10	672.19	0.02	0.02	678.72

	CAP Emissions Summary SRWTP Phase 1 (ppd)				Emissions Summary (tpy)		GHG Emissions Summary SRWTP Phase 1 (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2027	4.23	51.72	6.43	1.65	0.84	0.21	4605.92	0.16	0.11	4641.63
2028	4.21	51.19	6.43	1.64	0.84	0.21	4580.21	0.16	0.10	4615.37
2029	4.22	51.08	6.43	1.64	0.84	0.21	4590.25	0.16	0.10	4625.15
2030	4.22	50.77	6.43	1.64	0.84	0.21	4731.95	0.17	0.11	4768.92
2031	0.37	4.45	5.68	0.90	0.76	0.14	361.75	0.01	0.00	362.94

	CAP Emissions Summary SRWTP Phase 2 (ppd)				Emissions Summary (tpy)		GHG Emissions Summary SRWTP Phase 2 (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2040	2.95	15.34	2.96	0.86	0.38	0.11	1269.14	0.04	0.04	1281.94
2041	2.94	15.06	2.94	0.84	0.38	0.11	1267.73	0.04	0.04	1280.48
2042	1.21	6.13	2.63	0.55	0.34	0.07	524.08	0.02	0.02	529.33

	CAP Emissions Summary New Water Intake (ppd)				Emissions Summary (tpy)		GHG Emissions Summary New Water Intake (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2031	1.68	12.19	0.99	0.47	0.13	0.06	801.04	0.02	0.03	809.41
2032	1.65	11.77	0.98	0.46	0.13	0.06	795.12	0.02	0.03	803.29
2033	1.62	11.30	0.96	0.44	0.12	0.06	785.79	0.02	0.02	793.80
2034	1.61	11.03	0.95	0.43	0.12	0.06	782.89	0.02	0.02	790.80
2035	0.79	5.34	0.75	0.25	0.10	0.03	390.13	0.01	0.01	394.04

	CAP Emissions Summary Potable Water Transmission Pipelines (ppd)				Emissions Summary (tpy)		GHG Emissions Summary Potable Water Transmission Pipelines (MT per year)			
	ROG	NOx	Total PM 10	Total PM 2.5	Total PM 10	Total PM 2.5	CO2	CH4	N2O	CO2e
2032	0.05	0.32	0.29	0.05	0.41	0.35	57.98	0.00	0.01	60.23
2033	0.07	0.47	0.29	0.06	0.40	0.34	112.54	0.00	0.01	116.89
2034	0.07	0.44	0.29	0.05	0.21	0.16	111.01	0.00	0.01	115.29
2035	0.03	0.18	0.28	0.05	0.04	0.01	54.83	0.00	0.01	56.94

Appendix C

Biological Resources Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: July 31, 2023
Project Code: 2023-0111189
Project Name: Water+ Treatment Plants Resiliency and Improvements Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Note: IPaC has provided all available attachments because this project is in multiple field office jurisdictions.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

This project's location is within the jurisdiction of multiple offices. However, only one species list document will be provided for all offices. The species and critical habitats in this document reflect the aggregation of those that fall in each of the affiliated office's jurisdiction. Other offices affiliated with the project:

San Francisco Bay-Delta Fish And Wildlife
650 Capitol Mall
Suite 8-300
Sacramento, CA 95814
(916) 930-5603

PROJECT SUMMARY

Project Code: 2023-0111189
Project Name: Water+ Treatment Plants Resiliency and Improvements Project
Project Type: Water Supply Facility - Maintenance / Modification
Project Description: The City is proposing the Water+ Treatment Plants Resiliency and Improvements Project to provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its useful life, and to meet the projected potable water demand.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.5932144,-121.50176075244485,14z

Counties: Sacramento County, California

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

BIRDS

NAME	STATUS
Least Bell's Vireo *Vireo bellii pusillus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5945	Endangered

AMPHIBIANS

NAME	STATUS
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

FISHES

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened
Longfin Smelt *Spirinchus thaleichthys* Population: San Francisco Bay-Delta DPS No critical habitat has been designated for this species.	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

CRUSTACEANS

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Jan 1 to Aug 31
Belding's Savannah Sparrow *Passerculus sandwichensis beldingi* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8	Breeds Apr 1 to Aug 15

NAME	BREEDING SEASON
Bullock's Oriole *Icterus bullockii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 21 to Jul 25
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Aug 31
Common Yellowthroat *Geothlypis trichas sinuosa* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Lawrence's Goldfinch *Carduelis lawrencei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Nuttall's Woodpecker *Picoides nuttallii* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse *Baeolophus inornatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Tricolored Blackbird *Agelaius tricolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3910	Breeds Mar 15 to Aug 10

NAME	BREEDING SEASON
Western Grebe *aechmophorus occidentalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Wrentit *Chamaea fasciata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 10
Yellow-billed Magpie *Pica nuttalli* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9726	Breeds Apr 1 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

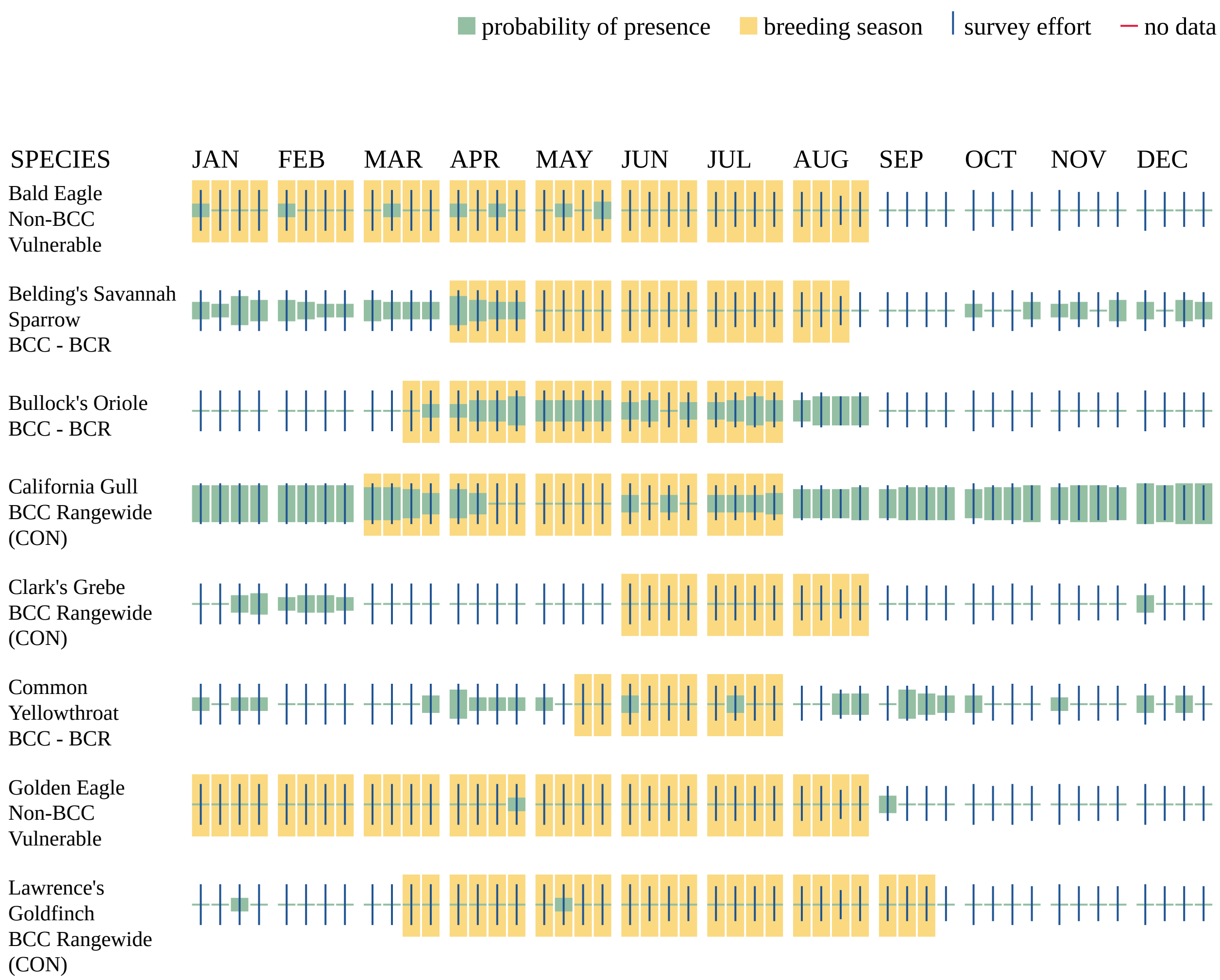
1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

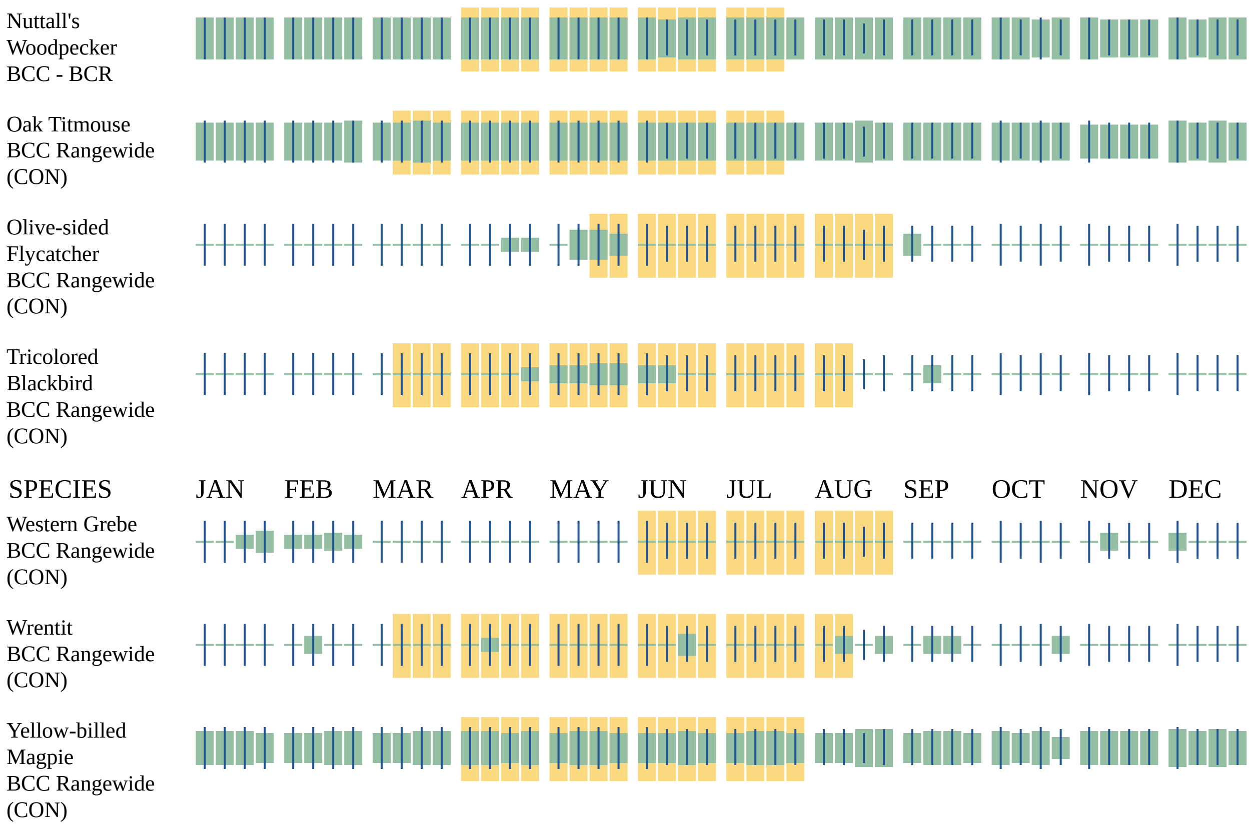
Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

MIGRATORY BIRDS FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles)

potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R2UBH

FRESHWATER FORESTED/SHRUB WETLAND

- PFOC

IPAC USER CONTACT INFORMATION

Agency: Sacramento city
Name: Jessica Orsolini
Address: 2600 Capitol Avenue
Address Line 2: Suite 200
City: Sacramento
State: CA
Zip: 95816
Email horseyjess@gmail.com
Phone: 9167705035

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: July 31, 2023
Project Code: 2023-0111192
Project Name: Water+ Treatment Plants Resiliency and Improvements Project - Fairbairn WTP

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

PROJECT SUMMARY

Project Code: 2023-0111192

Project Name: Water+ Treatment Plants Resiliency and Improvements Project - Fairbairn WTP

Project Type: Water Supply Facility - Maintenance / Modification

Project Description: The City is proposing the Water+ Treatment Plants Resiliency and Improvements Project to provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its useful life, and to meet the projected potable water demand.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@38.55623695,-121.41690139208731,14z

Counties: Sacramento County, California

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

AMPHIBIANS

NAME	STATUS
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

CRUSTACEANS

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency:	Sacramento city
Name:	Jessica Orsolini
Address:	2600 Capitol Avenue
Address Line 2:	Suite 200
City:	Sacramento
State:	CA
Zip:	95816
Email	horseyjess@gmail.com
Phone:	9167705035

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Taylor Monument (3812165) OR Rio Linda (3812164) OR Citrus Heights (3812163) OR Sacramento East (3812154) OR Sacramento West (3812155) OR Carmichael (3812153) OR Clarksburg (3812145) OR Florin (3812144) OR Elk Grove (3812143))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Acipenser medirostris pop. 1 green sturgeon - southern DPS	AFCAA01031	Threatened	None	G2T1	S1	
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S2	SSC
Andrena subapasta An andrenid bee	IIHYM35210	None	None	G1G2	S1S2	
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Archoplites interruptus Sacramento perch	AFCQB07010	None	None	G1	S1	SSC
Ardea alba great egret	ABNGA04040	None	None	G5	S4	
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Astragalus tener var. ferrisiae Ferris' milk-vetch	PDFAB0F8R3	None	None	G2T1	S1	1B.1
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S2	SSC
Bombus pensylvanicus American bumble bee	IIHYM24260	None	None	G3G4	S2	
Branchinecta lynchi vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S3	
Branchinecta mesovallensis midvalley fairy shrimp	ICBRA03150	None	None	G2	S2S3	
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S4	
Carex comosa bristly sedge	PMCYP032Y0	None	None	G5	S2	2B.1
Centromadia parryi ssp. parryi pappose tarplant	PDAST4R0P2	None	None	G3T2	S2	1B.2
Cicindela hirticollis abrupta Sacramento Valley tiger beetle	IICOL02106	None	None	G5TH	SH	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Coccyzus americanus occidentalis western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
Cuscuta obtusiflora var. glandulosa Peruvian dodder	PDCUS01111	None	None	G5T4?	SH	2B.2
Desmocerus californicus dimorphus valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T3	S3	
Downingia pusilla dwarf downingia	PDCAM060C0	None	None	GU	S2	2B.2
Dumontia oregonensis hairy water flea	ICBRA23010	None	None	G1G3	S1	
Egretta thula snowy egret	ABNGA06030	None	None	G5	S4	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Elderberry Savanna Elderberry Savanna	CTT63440CA	None	None	G2	S2.1	
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Falco columbarius merlin	ABNKD06030	None	None	G5	S3S4	WL
Fritillaria agrestis stinkbells	PMLIL0V010	None	None	G3	S3	4.2
Gonidea angulata western ridged mussel	IMBIV19010	None	None	G3	S2	
Gratiola heterosepala Boggs Lake hedge-hyssop	PDSCR0R060	None	Endangered	G2	S2	1B.2
Great Valley Cottonwood Riparian Forest Great Valley Cottonwood Riparian Forest	CTT61410CA	None	None	G2	S2.1	
Great Valley Valley Oak Riparian Forest Great Valley Valley Oak Riparian Forest	CTT61430CA	None	None	G1	S1.1	
Hibiscus lasiocarpos var. occidentalis woolly rose-mallow	PDMAL0H0R3	None	None	G5T3	S3	1B.2
Hydrochara rickseckeri Ricksecker's water scavenger beetle	IICOL5V010	None	None	G2?	S2?	
Hypomesus transpacificus Delta smelt	AFCHB01040	Threatened	Endangered	G1	S1	
Juncus leiospermus var. ahartii Ahart's dwarf rush	PMJUN011L1	None	None	G2T1	S1	1B.2
Lasiurus cinereus hoary bat	AMACC05032	None	None	G3G4	S4	
Lasthenia chrysantha alkali-sink goldfields	PDAST5L030	None	None	G2	S2	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3T1	S2	FP
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1
Lepidium latipes var. heckardii Heckard's pepper-grass	PDBRA1M0K1	None	None	G4T1	S1	1B.2
Lepidurus packardi vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G3	S3	
Lilaeopsis masonii Mason's lilaeopsis	PDAPI19030	None	Rare	G2	S2	1B.1
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Melospiza melodia pop. 1 song sparrow ("Modesto" population)	ABPBXA3013	None	None	G5T3?Q	S3?	SSC
Nannopterum auritum double-crested cormorant	ABNFD01020	None	None	G5	S4	WL
Northern Claypan Vernal Pool Northern Claypan Vernal Pool	CTT44120CA	None	None	G1	S1.1	
Northern Hardpan Vernal Pool Northern Hardpan Vernal Pool	CTT44110CA	None	None	G3	S3.1	
Northern Volcanic Mud Flow Vernal Pool Northern Volcanic Mud Flow Vernal Pool	CTT44132CA	None	None	G1	S1.1	
Nycticorax nycticorax black-crowned night heron	ABNGA11010	None	None	G5	S4	
Oncorhynchus mykiss irideus pop. 11 steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
Oncorhynchus tshawytscha pop. 11 chinook salmon - Central Valley spring-run ESU	AFCHA0205L	Threatened	Threatened	G5T2Q	S2	
Oncorhynchus tshawytscha pop. 7 chinook salmon - Sacramento River winter-run ESU	AFCHA0205B	Endangered	Endangered	G5T1Q	S2	
Orcuttia tenuis slender Orcutt grass	PMPOA4G050	Threatened	Endangered	G2	S2	1B.1
Orcuttia viscida Sacramento Orcutt grass	PMPOA4G070	Endangered	Endangered	G1	S1	1B.1
Pogonichthys macrolepidotus Sacramento splittail	AFCJB34020	None	None	G3	S3	SSC
Progne subis purple martin	ABPAU01010	None	None	G5	S3	SSC
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S3	
Sagittaria sanfordii Sanford's arrowhead	PMALI040Q0	None	None	G3	S3	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Spea hammondii western spadefoot	AAABF02020	None	None	G2G3	S3S4	SSC
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	
Symphyotrichum lentum Suisun Marsh aster	PDASTE8470	None	None	G2	S2	1B.2
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Thamnophis gigas giant gartersnake	ARADB36150	Threatened	Threatened	G2	S2	
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Vireo bellii pusillus least Bell's vireo	ABPBW01114	Endangered	Endangered	G5T2	S3	
Xanthocephalus xanthocephalus yellow-headed blackbird	ABPBXB3010	None	None	G5	S3	SSC

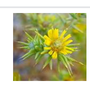
Record Count: 68

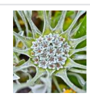
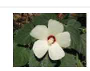
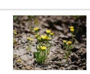
CALIFORNIA NATIVE PLANT SOCIETY

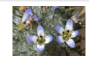
Search Results

22 matches found. Click on scientific name for details

Search Criteria: Quad is one of [3812165:3812155:3812145:3812164:3812154:3812144:3812163:3812153:3812143]

▲ SCIENTIFIC NAME	COMMON NAME	FAMILY	LIFEFORM	BLOOMING PERIOD	FED LIST	STATE LIST	CA RARE PLANT RANK	GENERAL HABITATS	MICROHABITATS	LOWEST ELEVATION (FT)	HIGHEST ELEVATION (FT)	PHOTO
Astragalus tener var. ferrisiae	Ferris' milk-vetch	Fabaceae	annual herb	Apr-May	None	None	1B.1	Meadows and seeps (vernally mesic), Valley and foothill grassland (subalkaline flats)		5	245	No Photo Available
Brodiaea rosea ssp. vallicola	valley brodiaea	Themidaceae	perennial bulbiferous herb	Apr-May(Jun)	None	None	4.2	Valley and foothill grassland, Vernal pools	Alluvial Terraces, Gravelly, Sandy	35	1100	 © 2011 Steven Perry
Carex comosa	bristly sedge	Cyperaceae	perennial rhizomatous herb	May-Sep	None	None	2B.1	Coastal prairie, Marshes and swamps (lake margins), Valley and foothill grassland		0	2050	 Dean Wm. Taylor 1997
Centromadia parryi ssp. parryi	pappose tarplant	Asteraceae	annual herb	May-Nov	None	None	1B.2	Chaparral, Coastal prairie, Marshes and swamps (coastal salt), Meadows and seeps, Valley and foothill grassland (vernally mesic)	Alkaline (often)	0	1380	 © 2016 John Doyen

Centromadia parryi ssp. rudis	Parry's rough tarplant	Asteraceae	annual herb	May-Oct	None	None	4.2	Valley and foothill grassland, Vernal pools	Alkaline, Roadsides (sometimes), Seeps, Vernally Mesic	0	330	 © 2019 John Doyen
Cuscuta obtusiflora var. glandulosa	Peruvian dodder	Convolvulaceae	annual vine (parasitic)	Jul-Oct	None	None	2B.2	Marshes and swamps (freshwater)		50	920	No Photo Available
Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	Mar-May	None	None	2B.2	Valley and foothill grassland (mesic), Vernal pools		5	1460	 © 2013 Aaron Arthur
Fritillaria agrestis	stinkbells	Liliaceae	perennial bulbiferous herb	Mar-Jun	None	None	4.2	Chaparral, Cismontane woodland, Pinyon and juniper woodland, Valley and foothill grassland	Clay, Serpentinite (sometimes)	35	5100	 © 2016 Aaron Schusteff
Gratiola heterosepala	Boggs Lake hedge-hyssop	Plantaginaceae	annual herb	Apr-Aug	None	CE	1B.2	Marshes and swamps (lake margins), Vernal pools	Clay	35	7790	 ©2004 Carol W. Witham
Hesperevax caulescens	hogwallow starfish	Asteraceae	annual herb	Mar-Jun	None	None	4.2	Valley and foothill grassland (mesic clay), Vernal pools (shallow)	Alkaline (sometimes)	0	1655	 © 2017 John Doyen
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	None	None	1B.2	Marshes and swamps (freshwater)		0	395	 © 2020 Steven Perry
Juncus leiospermus var. ahartii	Ahart's dwarf rush	Juncaceae	annual herb	Mar-May	None	None	1B.2	Valley and foothill grassland (mesic)		100	750	 © 2004 Carol W. Witham
Lasthenia chrysantha	alkali-sink goldfields	Asteraceae	annual herb	Feb-Apr	None	None	1B.1	Vernal pools	Alkaline	0	655	 © 2009 California State University, Stanislaus

Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	None	None	1B.1	Vernal pools		5	2885	 ©2000 John Game
Lepidium latipes var. heckardii	Heckard's pepper-grass	Brassicaceae	annual herb	Mar-May	None	None	1B.2	Valley and foothill grassland (alkaline flats)		5	655	 2018 Jennifer Buck
Lilaeopsis masonii	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	None	CR	1B.1	Marshes and swamps (brackish, freshwater), Riparian scrub		0	35	No Photo Available
Navarretia eriocephala	hoary navarretia	Polemoniaceae	annual herb	May-Jun	None	None	4.3	Cismontane woodland, Valley and foothill grassland	Vernally Mesic	345	1310	 © 2018 Leigh Johnson
Orcuttia tenuis	slender Orcutt grass	Poaceae	annual herb	May-Sep(Oct)	FT	CE	1B.1	Vernal pools	Gravelly (often)	115	5775	 © 2013 Justy Leppert
Orcuttia viscida	Sacramento Orcutt grass	Poaceae	annual herb	Apr-Jul(Sep)	FE	CE	1B.1	Vernal pools		100	330	 © Rick York and CNPS
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	None	None	1B.2	Marshes and swamps (shallow freshwater)		0	2135	 ©2013 Debra L. Cook
Symphyotrichum lentum	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	None	None	1B.2	Marshes and swamps (brackish, freshwater)		0	10	No Photo Available

Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	None	None	1B.2	Marshes and swamps, Valley and foothill grassland (mesic, alkaline), Vernal pools	0	985	 © 2005 Dean Wm Taylor

Showing 1 to 22 of 22 entries

Suggested Citation:
California Native Plant Society, Rare Plant Program. 2023. Rare Plant Inventory (online edition, v9.5). Website https://www.rareplants.cnps.org [accessed 31 July 2023].

Appendix D

Hydraulic Modeling Technical Memorandum

Final

CITY OF SACRAMENTO
PROPOSED WATER+ TREATMENT PLANTS RESILIENCY AND IMPROVEMENTS PROJECT

Hydraulic Modeling Technical Memorandum

Prepared for
City of Sacramento

September 2024

Photo credit: Carollo Engineers, Inc.

Final

CITY OF SACRAMENTO
PROPOSED WATER+ TREATMENT PLANTS RESILIENCY AND IMPROVEMENTS PROJECT

Hydraulic Modeling Technical Memorandum

Prepared for
City of Sacramento

September 2024

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Atlanta	**Palm Beach County**	**San Diego**
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WATER + TREATMENT PLANTS RESILIENCY AND IMPROVEMENTS PROJECT

Hydraulic Modeling Technical Memorandum

1.0 Background and Purpose

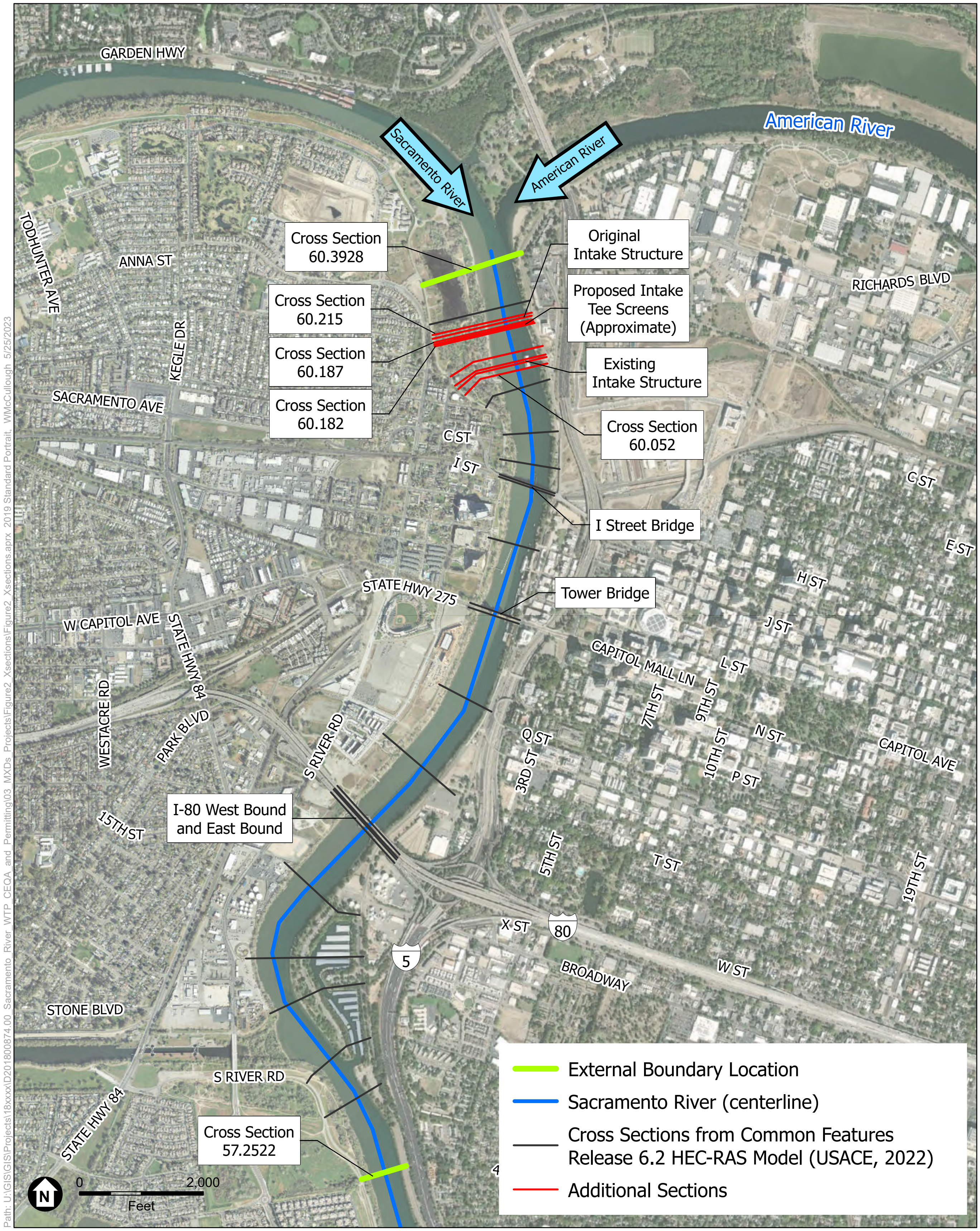
The City of Sacramento (City) is proposing the Water+ Treatment Plants Resiliency and Improvements Project (Project) to provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its effective life, and to meet projected water demand within the service area. As part of the Project, the City proposes to augment its raw water supply by constructing a new intake facility in the Sacramento River (**Figure 1-1**). Environmental Science Associates (ESA) is tasked with supporting Carollo Engineers, Inc. (Carollo) with Phase I services related to preparation of the Administrative Draft Environmental Impact Report for California Environmental Quality Act (CEQA) compliance.

This technical memorandum documents key findings of the hydraulic assessment of the new intake facility proposed under the Project. ESA developed a series of 1-D HEC-RAS models to evaluate potential changes to the hydraulic performance of state and federal flood control system near the Project site that could result from the construction of the intake facility. Results from the hydraulic analysis will support the CEQA analysis and inform Carollo's subsequent design development phases.

2.0 Project Description

As currently designed, the proposed Project comprises a pump station on the east overbank of the Sacramento River and a buried 84-inch-diameter intake pipe that conveys raw water to the wet well below the pump station (Carollo Engineers and Schnabel Engineering 2023). The terminus of the intake pipe would be a manifold system equipped with four tee screens. The manifold system would be secured to a concrete slab constructed on the riverbed. Portions of the concrete slab and the manifold system with tee screens would be placed above the channel bottom (**Figure 1-2**).

As shown in Figure 1-1, the proposed intake tee screens would be installed between the original and existing offshore intake structures. The original and existing intake structures each house pumps and include an access bridge supported by a middle pier.

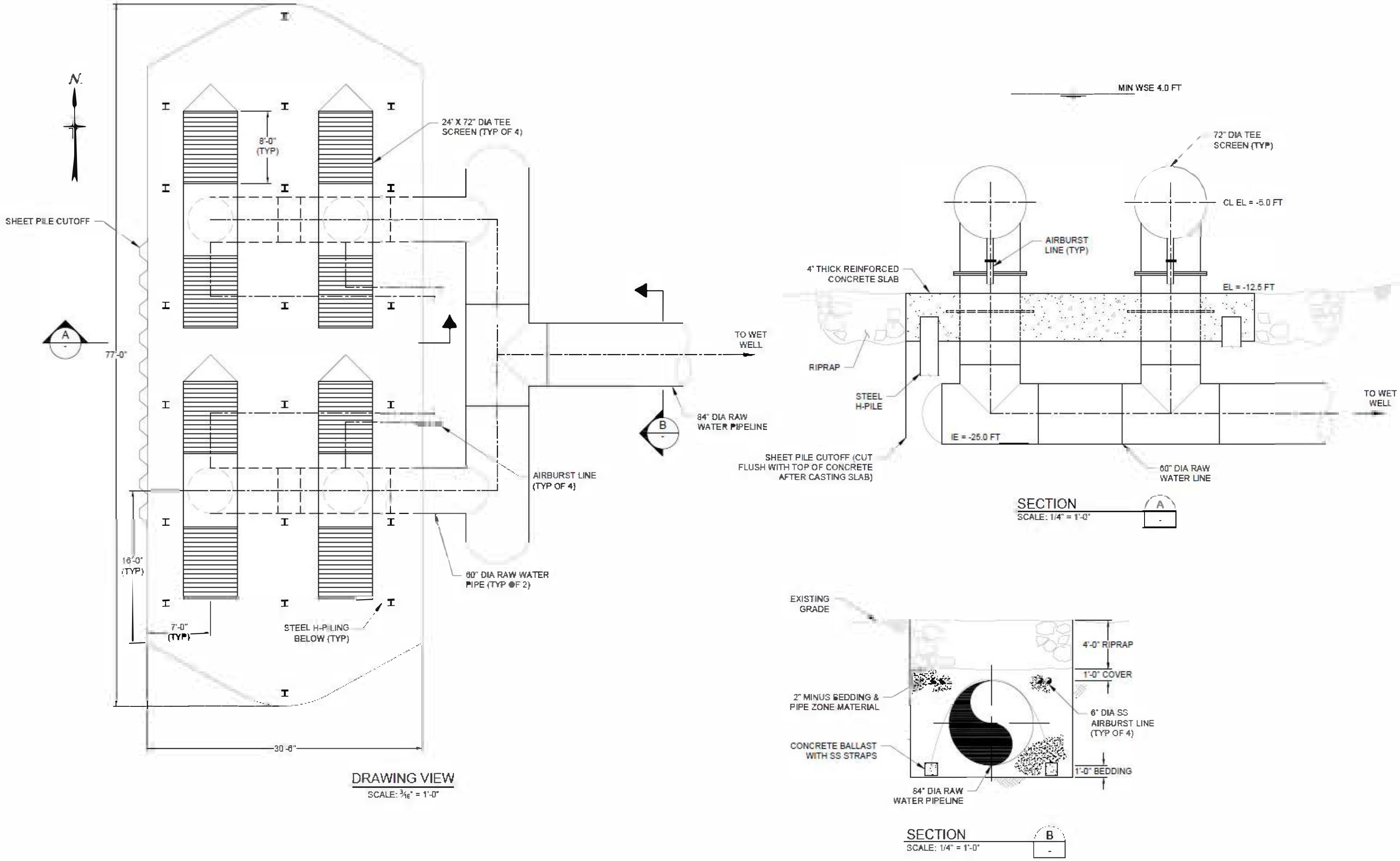


SOURCE: ESA, 2021

WATER+ TREATMENT RESILIENCY AND IMPROVEMENT PROJECT

Figure 1-1
Focus Reach

ESA



SOURCE: Carollo Engineers and Schnabel Engineering, 2023

Water+ ~~Treat~~ment Plants Resiliency and Improvements Project

Figure 1-2
Tee Screen Plan and Section

3.0 Scenarios

To assess the Project's impacts on flood hydraulics for an approximately 3-mile-long reach of the Sacramento River just downstream of its confluence with the American River (herein referred to as the "focus reach," see Figure 1-1), baseline (without-Project) and proposed (with-Project) conditions were simulated and the results were compared. As summarized in **Table 1-1**, scenarios evaluated include baseline and proposed conditions under a range of flows representing both existing and future climate change hydrologic conditions, as well as the authorized 1957 design capacity of the Sacramento River Flood Control Project on this reach of the Sacramento River.

TABLE 1-1
SUMMARY OF MODELED SCENARIOS

Scenario ID	Description	Upstream Boundary Condition (Inflow, cfs)	Downstream Boundary Condition (Stage, ft, NAVD 88)
BC-Q10	Baseline with 10-year flow	Flow time series (max value=100,500) [a]	Stage time series (max value =28.7) [a]
BC-Q100	Baseline with 100-year flow	Flow time series (max value=110,400) [a]	Stage time series (max value=31.2) [a]
BC-Q200	Baseline with 200-year flow	Flow time series (max value= 112,900) [a]	Stage time series (max value=31.7) [a]
PC-Q10	Proposed with 10-year flow	Same as BC-Q10	Same as BC-Q10
PC-Q100	Proposed with 100-year flow	Same as BC-Q100	Same as BC-Q100
PC-Q200	Proposed with 200-year flow	Same as BC-Q200	Same as BC-Q200
BC-Q10-CC	Baseline with 10-year flow accounted for climate change	Constant 105,500 [b]	Constant 28.7 [c]
BC-Q100-CC	Baseline with 100-year flow accounted for climate change	Constant 115,570 [b]	Constant 31.2 [c]
BC-Q200-CC	Baseline with 200-year flow accounted for climate change	Constant 119,500 [b]	Constant 31.7 [c]
PC-Q10-CC	Proposed with 10-year flow accounted for climate change	Same as BC-Q10-CC	Same as BC-Q10-CC
PC-Q100-CC	Proposed with 100-year flow accounted for climate change	Same as BC-Q100-CC	Same as BC-Q100-CC
PC-Q200-CC	Proposed with 200-year flow accounted for climate change	Same as BC-Q200-CC	Same as BC-Q200-CC
BC-1957-Design	Baseline with 1957 design conditions	Constant 110,000 [d]	Constant 33.6 [d]
PC-1957-Design	Proposed with 1957 design conditions	Same as BC-1957-Design	Same as BC1957-Design

NOTES:

[a] Common Features Release 6.2 model (USACE, 2022a) time series output for 10-, 100-, and 200-year runs. See Figures 5-1 and 5-2.

[b] Future "median" climate change scenario (DWR, 2022).

[c] Maximum value extracted from Common Features Release 6.2 model (USACE, 2022a) time series output for 10-, 100-, and 200-year runs.

[d] Levee and channel profile figures (USACE, 1957)

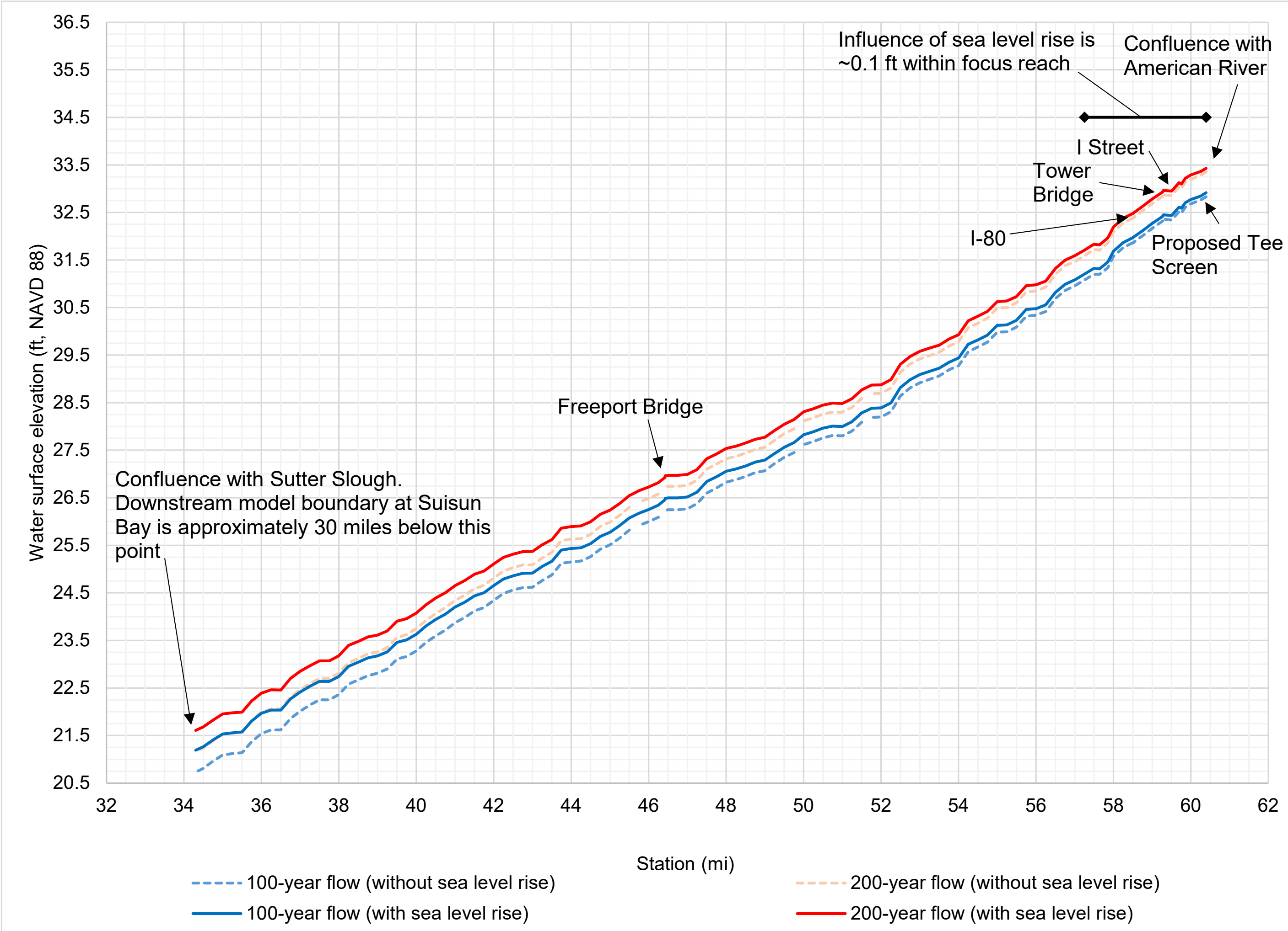
4.0 Reference Models

USACE Common Features Release 6.2

ESA's 1-D HEC-RAS hydraulic models were derived from the Common Features Release 6.2 HEC-RAS model supplied by the USACE (USACE, 2022a). The Common Features Release 6.2 model covers the Lower Sacramento River Basin, from the latitude of Nicolas (Feather River) and Tisdale Weir (Sutter Bypass) downstream to Collinsville at the mouth of the Sacramento River (Suisun Bay), and all tributaries in between. It includes the Central Valley levee and bypass system, Sacramento Deep Water Ship Channel, and Delta sloughs and islands adjacent to the main Sacramento River and Yolo Bypass. The model represents future conditions with American River Common Feature (ARCF) projects, including Sacramento Weir and Bypass expansion, Lower Elkhorn Basin Levee Setback on the Yolo Bypass, and West Sacramento Southport Levee setback in place (USACE, 2022b). The Common Features Release 6.2 model inherits geometry features from previous models that were calibrated to the 2006 flood event early in ARCF Preconstruction Engineering and Design (PED) phase. The model also reflects modifications made during the 2021 Natomas PED efforts, which included local adjustments made to the Sacramento-Feather River 2D Refinement Regions based on calibration to the 2017 event. The model does not include the original and existing intake structures within the Sacramento River. The flow and stage time series input and output data were included in the model in a data storage system file format.

The unsteady flow file used in the Common Features Release 6.2 model is defined by a combination of storm centering and flood event probability. Flood events for each storm centering are specified by scale factor of a synthetic representation of historic storms, as specified in a memorandum prepared by USACE (USACE, 2019). For the ARCF project areas, the "Fair Oaks and Sacramento at Latitude" storm centering, based on the historic storm pattern in 1986, is indicated to be the stage driver (USACE, 2022b).

The Common Features Release 6.2 model applies a constant downstream stage of 8.4 feet NAVD 88, based on year 2070 sea level rise projection of the San Francisco Bay (USACE, 2022b). To investigate the impact of sea level rise throughout our 3-mile-long focus reach, the Common Features Release 6.2 model was re-executed with the downstream stage set to current mean sea level of 3.7 feet NAVD 88. No changes were made to the unsteady flow input file, which was based on the "Fair Oaks and Sacramento at Latitude" storm centering. **Figure 4-1** compares the 100- and 200-year water surface elevations through the Sacramento River between its confluences with Sutter Slough and American River with and without the impact of sea level rise considered. The figure indicates that impacts from sea level rise are predicted to be insignificant (approximately 0.1 feet of increase) through our focus reach for the 100- and 200- year events. This is consistent with the findings from the Sacramento-San Joaquin Delta climate change vulnerability assessment (Delta Stewardship Council, 2021) that suggested the lack of sensitivity to sea level rise at the latitude of Sacramento area, and thus changes in watershed hydrology are the primary driver for the hydraulics in the vicinity of the focus reach. The 10-year event water surface profile run with current mean sea level as the downstream boundary is not available due to model instability issues.



SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

Figure 4-1
Baseline Water Surface Elevations with Current Mean Sea Level and with Future Sea Level at Suisun Bay

NOTES: Scenarios with current mean sea level and future sea levels apply 3.7 ft NAVD 88 and 8.4 ft NAVD 88 (i.e., projected year 2070 sea level), respectively, at model downstream boundary or Suisun Bay.

DWR Integrated 1- and 2-Dimensional Bypass Model

The California Department of Water Resources (DWR) Integrated 1- and 2-Dimensional Bypass (csr2Dbypass) model (CH2M, 2017) is a comprehensive river hydraulics model that includes Sacramento, Feather, and American Rivers' tributaries, and hydraulic structures. The model is developed from the Central Valley Floodplain Evaluation and Delineation light detection and ranging (LiDAR) and bathymetry data. The model was reviewed briefly to understand how the existing intake structures were characterized in the model geometry. The csr2Dbypass model represented the structures with a combination of blocked obstruction and bridge, and this approach was adopted for our ESA's HEC-RAS 1-D model (Section 5.0).

5.0 Hydraulic Analysis

HEC-RAS 1-D models were developed by truncating the Common Features Release 6.2 model to include only the 3-mile-long focus reach of the Sacramento River downstream of its confluence with American River (Sections 57.2522 through 60.3928 in Figure-1-1). All models reference the NAVD 88 vertical datum in units of feet. The horizontal datum is NAVD 1983 California State Plane Zone II in US Survey feet.

Baseline Conditions

HEC-RAS 1-D models were prepared to establish the baseline conditions through the focus reach under a range of flows.

Geometry

The model geometry file for the truncated Common Features Release 6.2 model was modified to better reflect the current channel conditions. First, the in-channel geometry for each cross section was updated using a recent bathymetry survey data (Meridian Surveying Engineering, Inc., 2022). Second, additional cross sections (Sections 60.052 through 60.215 in Figure 1-1) were included in the model to add sufficient resolution in the model geometry to insert the existing and proposed intake facilities. The in-channel geometry for the additional cross sections was based on the Meridian Survey data and overbank areas were cut from the LiDAR data from DWR (DWR 2019;2020). Figure 1-1 shows layout of the original and additional cross sections included in our baseline conditions model.

The Common Features Release 6.2 model does not include the original and existing intake structures; therefore, these features were added to the model. Consistent with the csr2Dbypass model (CH2M, 2017) setup, the original and existing intake facilities were each represented in the model with a combination of blocked obstruction and bridge with a center pier. The structure dimensions and elevations were obtained from as-built plans (City of Sacramento, 1921; CH2M Hill, 2006). The intake structure and pier widths for both original and existing facilities were indicated to vary with elevation; therefore, the widest portions below the facility superstructures were used to represent the structure widths. Consistent with the approach taken in the Common Features Release 6.2 model, the bridge low chord elevation was reduced by 2 feet to reflect a 2-foot floating blockage induced by the bridge deck, and the piers included floating debris that is twice the width of the pier to account for debris that snags the pier (USACE, 2022b). **Table 5-1** summarizes the geometry configurations used to represent the original and exiting intake facilities in the model.

The model includes the I Street Bridge, Tower Bridge, and Highway 80, which are imported directly from the Common Features Release 6.2 model.

TABLE 5-1
DIMENSIONS AND ELEVATIONS USED TO REPRESENT THE ORIGINAL AND EXISTING INTAKE FACILITIES IN THE MODEL

Structure	Intake Support Width (ft) [a]	Access Bridge Low Chord Elevation. (NAVD 88, ft) [b, c]	Access Bridge Deck Elevation (NAVD 88, ft) [c]	Access Bridge Pier Width (ft) [a]	Access Bridge Deck Width (ft)
Original Intake Structure	20.1	42.2	42.8	4.8	3.5
Existing Intake Structure	51.0	39.2	47.7	9.5	29.0

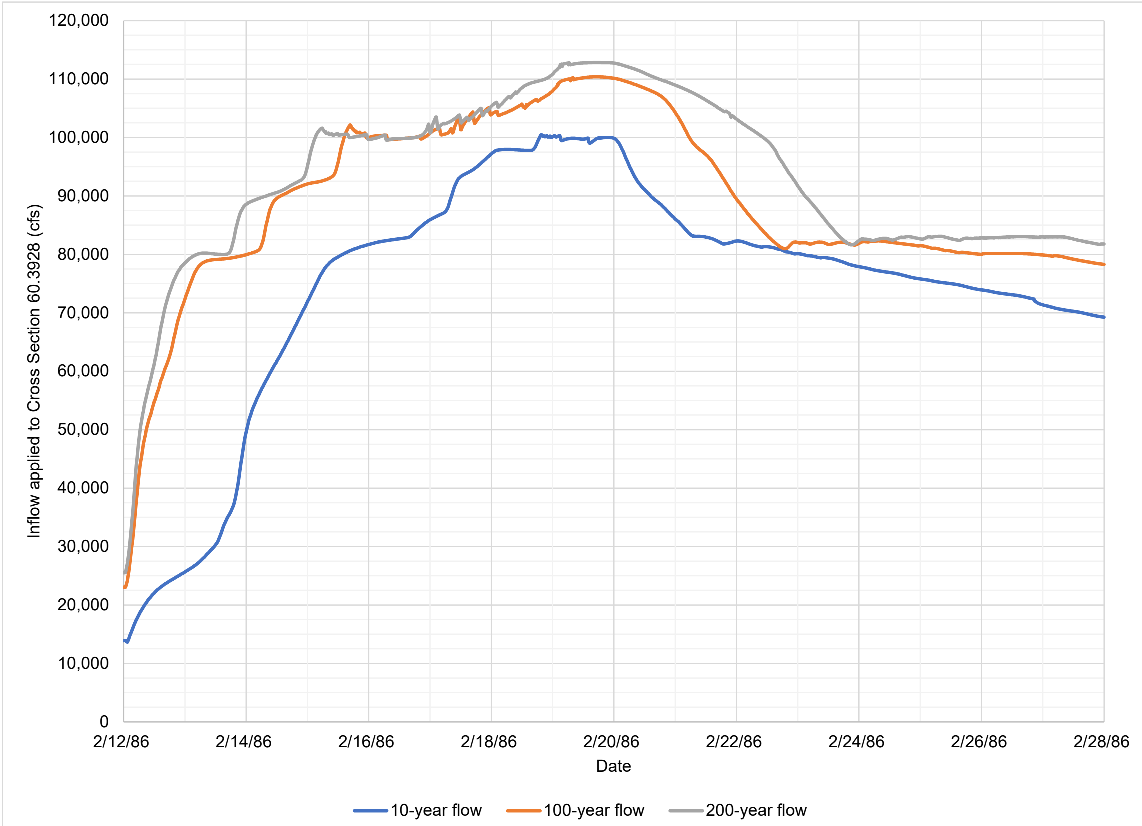
NOTES:
[a] Width perpendicular to flow, widest section below superstructure.
[b] Models apply elevations that are 2 ft below these values to account for floating debris (USACE, 2022b).
[c] As-built plans reference the City of Sacramento datum. Conversion between NAVD 88 and the City of Sacramento datum is: NAVD 88 = City of Sacramento datum + 2.18 ft.

Roughness Coefficients

Manning's roughness coefficients (n-values) were adopted from the Common Features Release 6.2 model and applied to the additional cross-sections used to define the intake structures. An n-value of 0.033 was used on the main channel. An n-value of 0.045 was applied to most of the overbank areas, except for the vegetated floodplain across from the intake facilities, where an n-value of 0.050 was applied.

Boundary Conditions

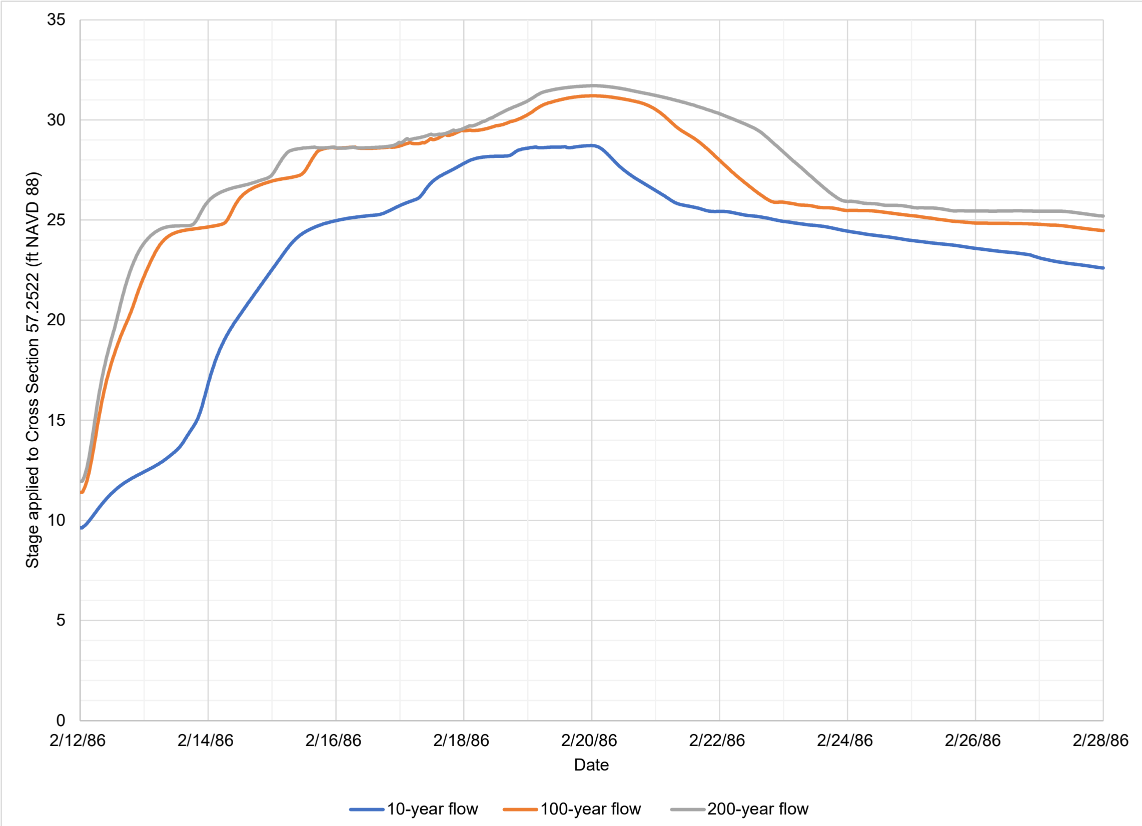
Figure 5-1 and **Figure 5-2** present the inflow hydrographs applied to the upstream boundary (cross section 60.3928 in Figure 1-1) and stage time series applied at the downstream boundary (cross section 57.2522 in Figure 1-1), respectively. These boundary condition input files were applied to evaluate the baseline and proposed conditions. As noted in Section 4.0, the Common Features Release 6.2 model accounts for the impact of sea level rise because it represents future conditions with the ARCF projects constructed. To simplify the input file setup, the outputs from the Common Features Release 6.2 model were applied as boundary conditions to ESA's HEC-RAS 1-D model. While this approach may overestimate water surface elevations, results of the sensitivity analysis in Section 4.0 indicate that the effects of sea level rise on flood hydraulics are negligible through the focus reach and should not significantly influence our analysis at this location.



SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

Figure 5-1
Flow Time Series Applied to Upstream Boundary (cross section 60.3928)



SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

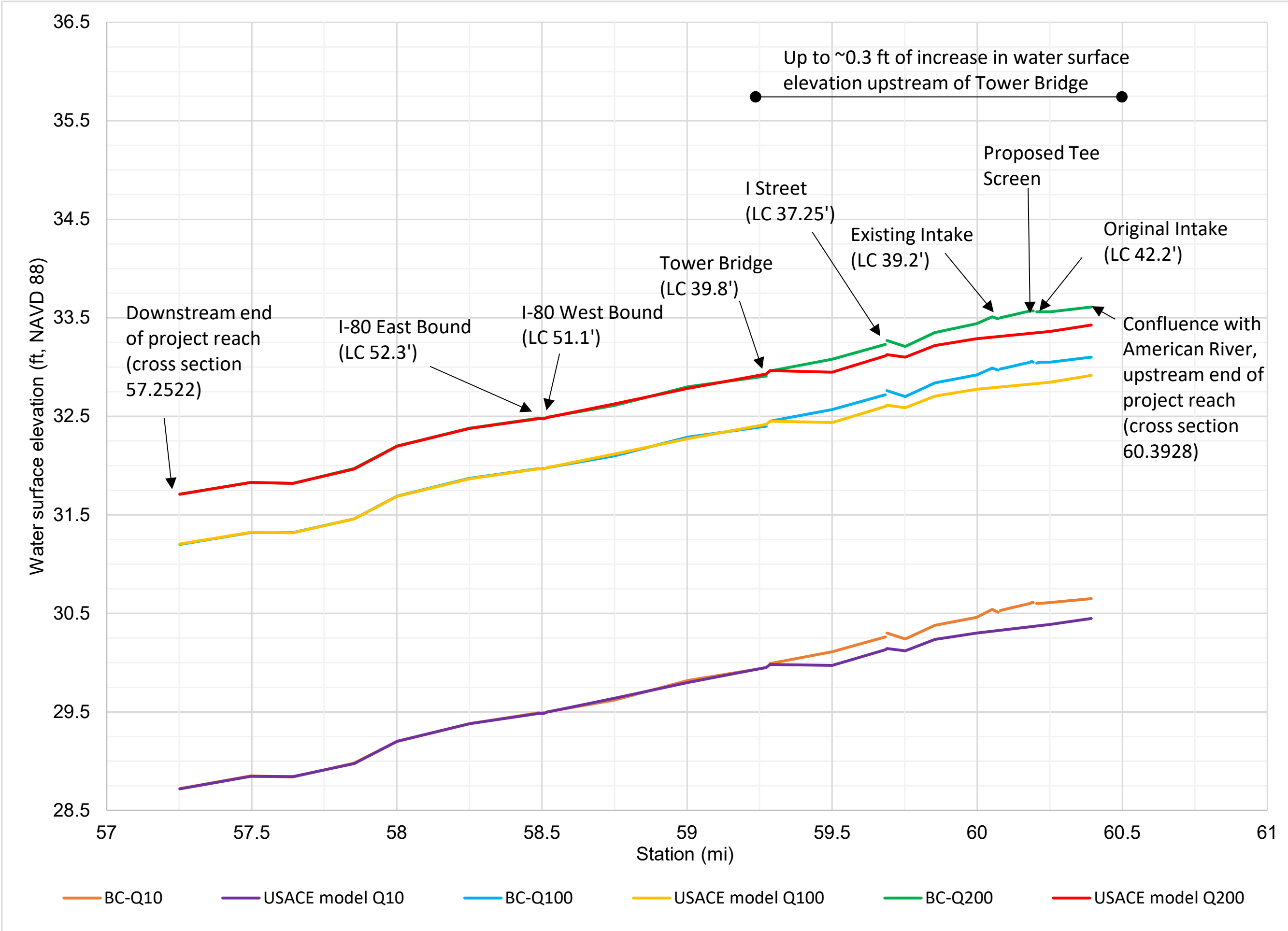
Figure 5-2
Stage Time Series Applied to Downstream Boundary (cross section 57.2522)

Results

Figure 5-3 compares predicted water surfaces profiles through the focus reach for the 10-, 100-, and 200-year events simulated by our baseline conditions model and the original Common Features Release 6.2 model. The profiles are based on the maximum values predicted by the unsteady flow simulations. As seen in the figure, the updated channel bathymetry and addition of the original and existing intake facilities to the model increased the maximum water surface elevations upstream of the Tower Bridge by up to approximately 0.3 feet for all flow rates evaluated. Even with the slight increase in stage, the maximum 200-year water surface profile is below the bridge low chord elevations and left and right levees or overbank profiles. Note that the left and right levee/overbank profiles, which range between approximately elevation 36 feet and elevation 46 feet NAVD 88, are not plotted on Figure 5-3 to maintain legibility of the figure.

Proposed Conditions

The proposed conditions model was developed by modifying the above baseline conditions model to include the proposed tee screen intake facility (Figure 1-2). No changes were made to the roughness coefficients and boundary condition inputs. The model does not account for a slight decrease in the Sacramento River flow resulting from the proposed pump station operation and diversion.



SOURCE: ESA

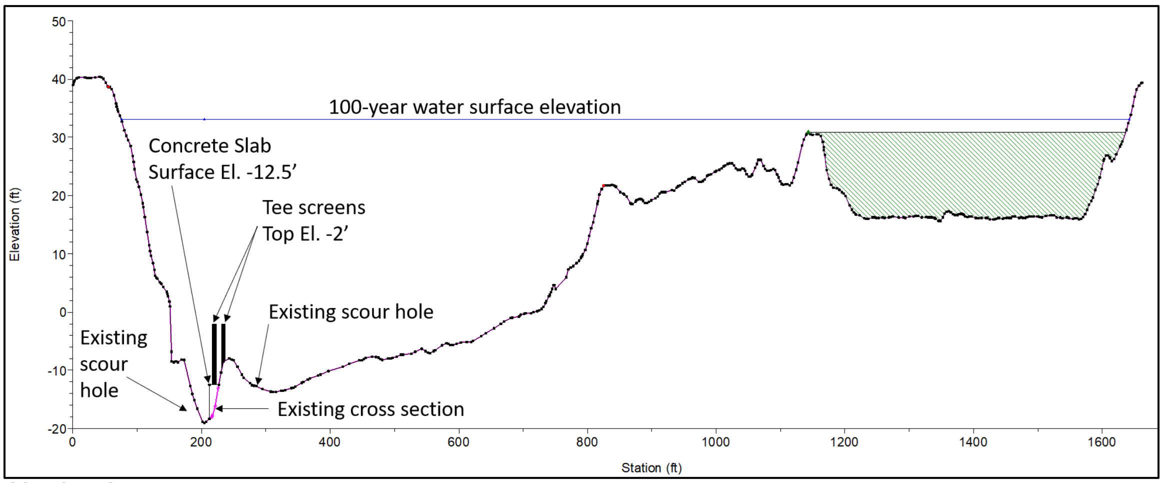
Water+ Treatment Plants Resiliency and Improvements Project

Figure 5-3
Comparisons of ESA's Baseline Conditions Model and USACE's Common Features Release 6.2 Model Water Surface Elevation

NOTES: The figure depicts maximum water surface profiles for 10-, 100-, and 200-year flood events. LC denotes bridge low chord elevations. Left and right levee/overbank profiles, which are not plotted here, range between approximately elevation 36 and elevation 46 ft NAVD 88 through the focus reach.

Geometry

As depicted in **Figure 5-4**, the proposed tee screens were represented in the model with two 6-foot-wide blocked obstructions that extended vertically to elevation -2 feet NAVD 88 (Carollo Engineers and Schnabel Engineering, 2023). The channel cross section geometry was also adjusted to include the concrete slab with its surface elevation at -12.5 feet NAVD 88 (Carollo Engineers and Schnabel Engineering, 2023). These modifications were made at two cross sections (cross sections 60.187 and 60.182), which are located just downstream of the original intake facility (Figure 1-1). As seen in Figure 5-4, the proposed features on the riverbed occupy only a small portion of the total channel cross section area.



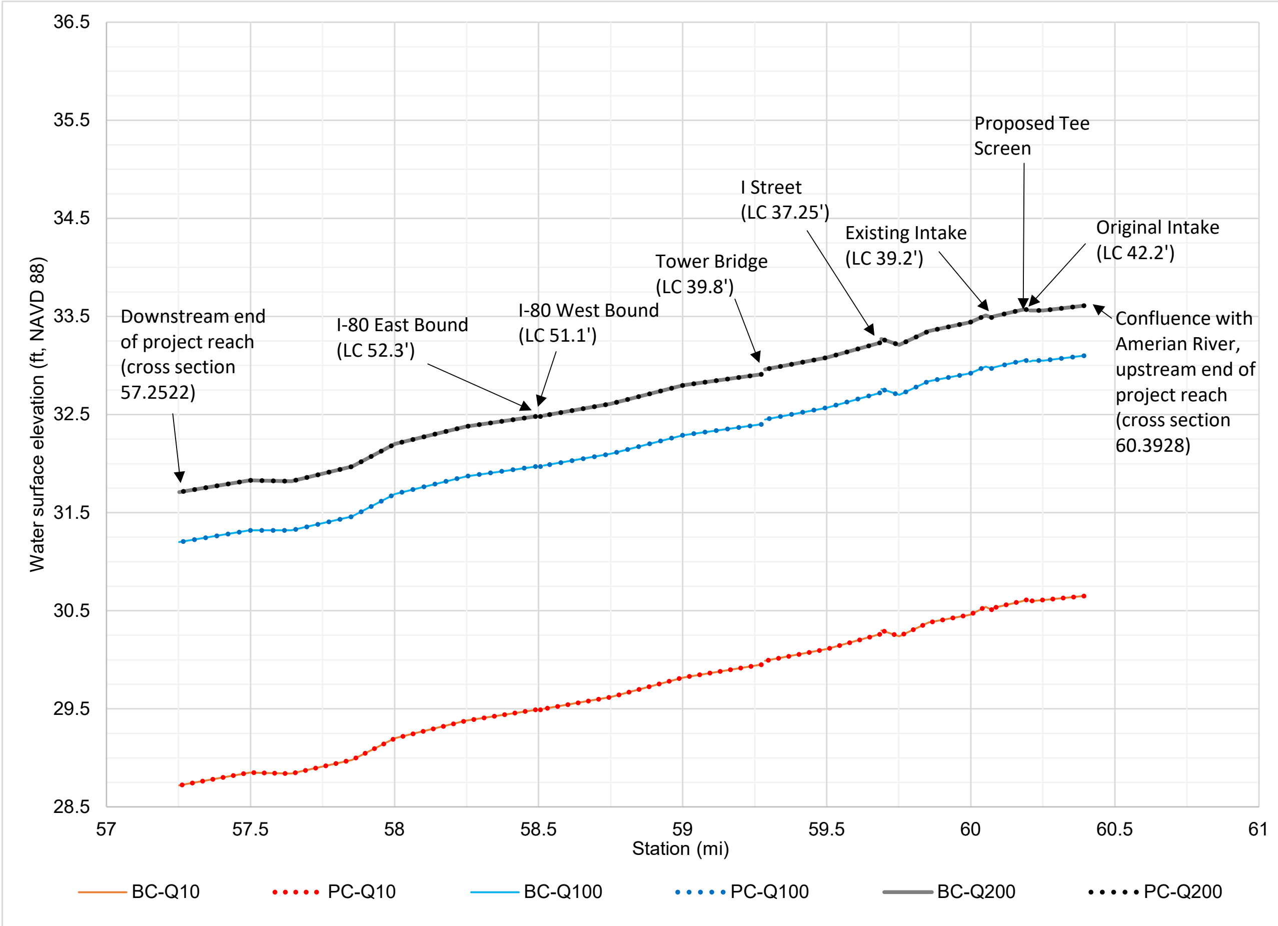
SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

Figure 5-4
Representation of the Proposed Intake Facility in the Proposed Conditions Model

Results

Figure 5-5 and **Figure 5-6** compare the simulated baseline and proposed water surface elevations and velocities, respectively, for the 10-, 100-, and 200-year flood events through the focus reach. The profiles are based on the maximum values predicted by the unsteady-state flow simulations. Figure 5-5 indicates that the proposed intake facility would have no impact on the water surface elevations through the focus reach relative to the baseline conditions. Figure 5-6 shows a slight but insignificant increase (less than 0.1 feet/s) in the channel velocities relative to the baseline conditions through the focus reach for all flowrates evaluated. These results are expected because, as illustrated in Figure 5-4, only a small portion of the conveyance area would be obstructed by the proposed intake appurtenances.

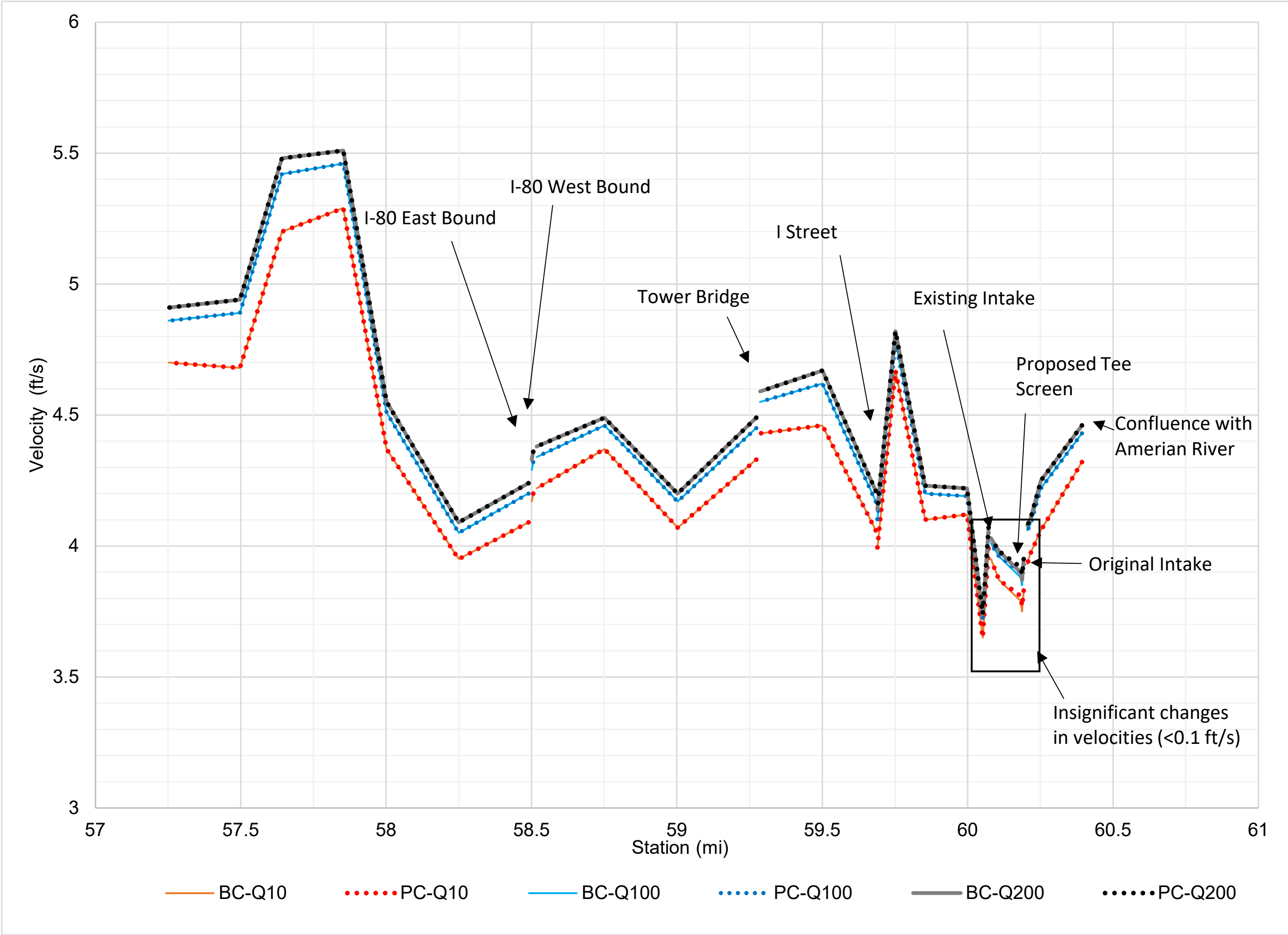


SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

Figure 5-5
Comparisons of Baseline and Proposed Water Surface Elevations

NOTES: The figure depicts maximum water surface profiles for 10-, 100-, and 200-year flood events. LC denotes bridge low chord elevations. Left and right levee/overbank profiles, which are not plotted here, range between approximately elevation 36 and 46 ft NAVD 88 through the focus reach.



SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

Figure 5-6
Comparisons of Baseline and Proposed Velocities

NOTES: The figure depicts maximum velocity profiles for 10-, 100-, and 200-year flood events. LC denotes bridge low chord elevations. Left and right levee/overbank profiles, which are not plotted here, range between approximately elevation 36 and 46 ft NAVD 88 through the focus reach.

Climate Change Scenarios

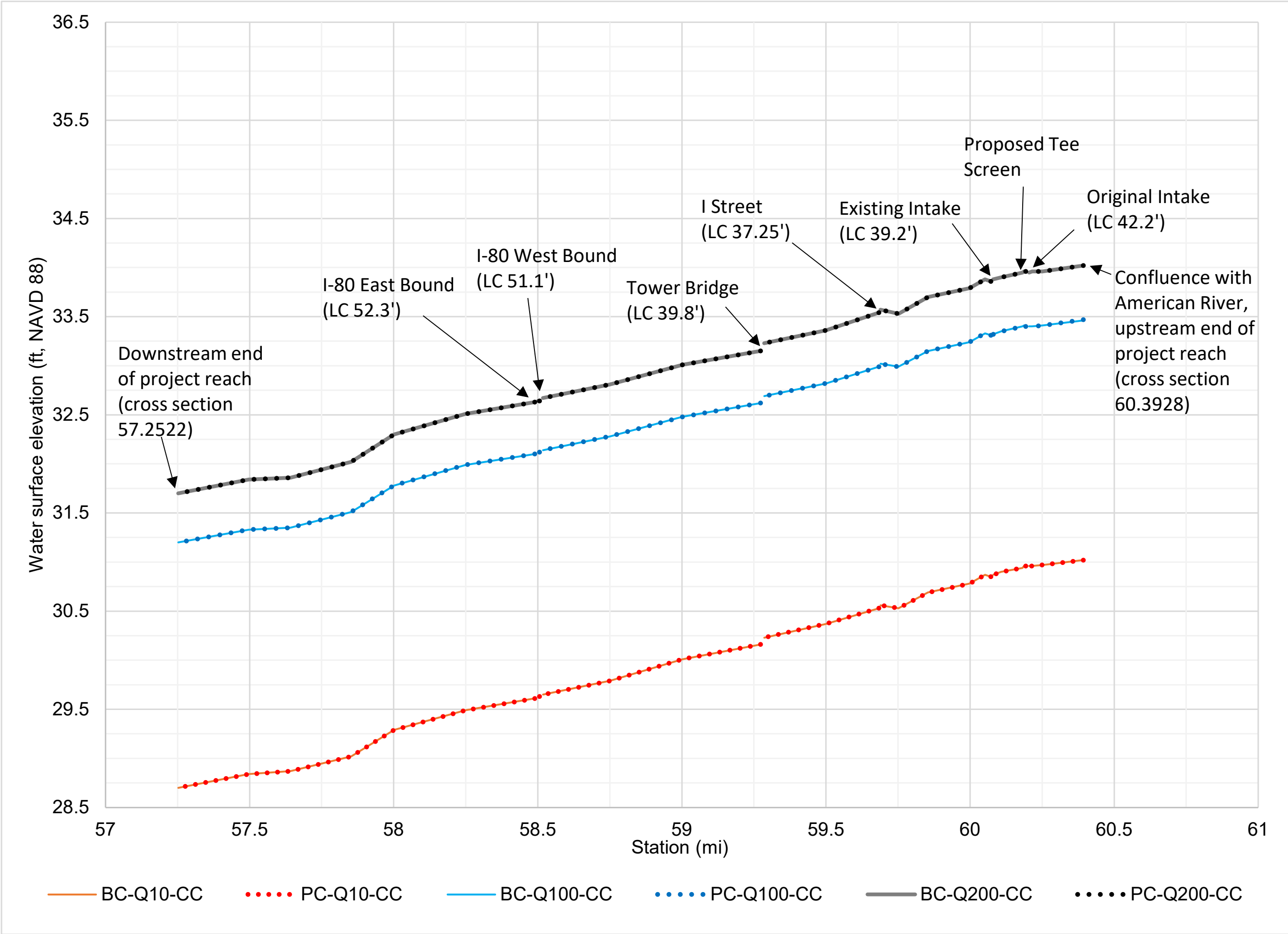
The baseline and proposed conditions hydraulics accounting for the effect of climate change were evaluated for flood events with 10-, 100-, and 200-year recurrence intervals. The hydraulic models were developed by modifying the boundary conditions input files for the baseline and proposed conditions models as described below. The model geometry and roughness coefficient data are identical to those from the baseline and proposed conditions models.

Boundary Conditions

The USACE currently addresses impacts of climate change based on sea level rise only and does not take into account the changes in inflow from the Sacramento River and its tributaries. Thus, the unsteady-state inflow hydrographs associated with the Common Features Release 6.2 model do not address climate change impacts on inland hydrology. However, DWR addresses this in the Central Valley Flood Protection Plan (CVFPP) and developed estimates of peak flows for a range of return frequencies under different climate change scenarios. To assess hydraulic conditions accounting for climate change, ESA applied steady-state peak flows predicted under the median future climate scenario at index point “SAC38B” form the DWR’s 2022 CVFPP Update (DWR, 2022) and used the geometry and downstream stage-flow relationship predicted by the Common Features Release 6.2 model (Table 1-1).

Results

Figure 5-7 and **Figure 5-8** compare the simulated baseline and proposed water surface elevations and velocities, respectively, for the 10-, 100-, and 200-year flood events with effects of climate change on hydrology considered. As expected, the figures show that the proposed intake facility would not significantly change the water surface elevations and velocities relative to the baseline conditions through the focus reach. Figure 5-7 also shows that the maximum 200-year water surface profiles with climate change are below bridge low chord elevations. Although the left and right levees and overbank profiles are not plotted, the 200-year water surface profiles are also predicted to be contained within the leveed channel.

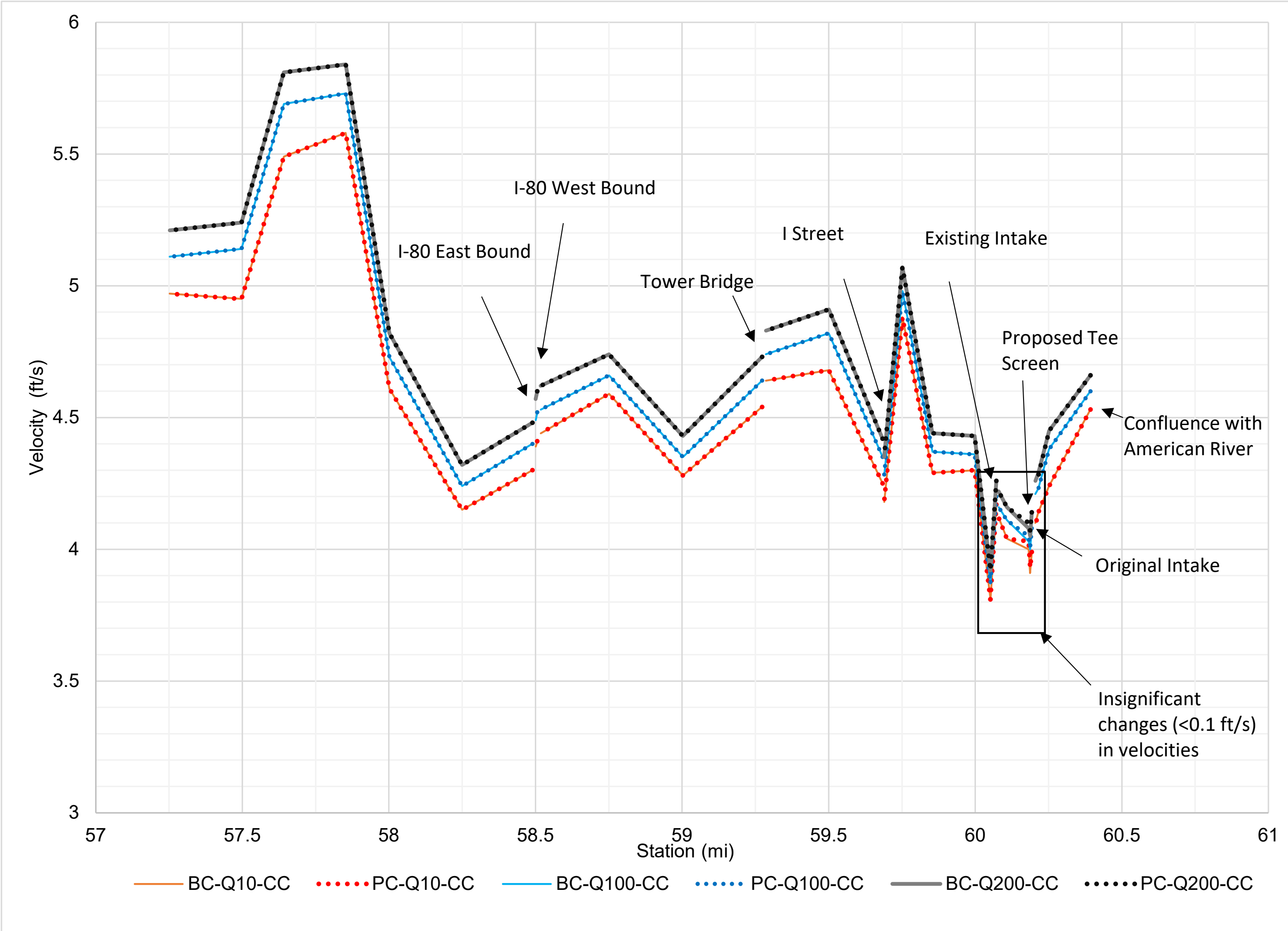


SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

Figure 5-7
Comparisons of Baseline and Proposed Water Surface Elevations with Climate Change

NOTES: The figure depicts water surface profiles for 10-, 100-, and 200-year flood events. LC denotes bridge low chord elevations. Left and right levee/overbank profiles, which are not plotted here, range between approximately elevation 36 and 46 ft NAVD 88 through the focus reach.



SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

Figure 5-8
Comparisons of Baseline and Proposed Velocities with Climate Change

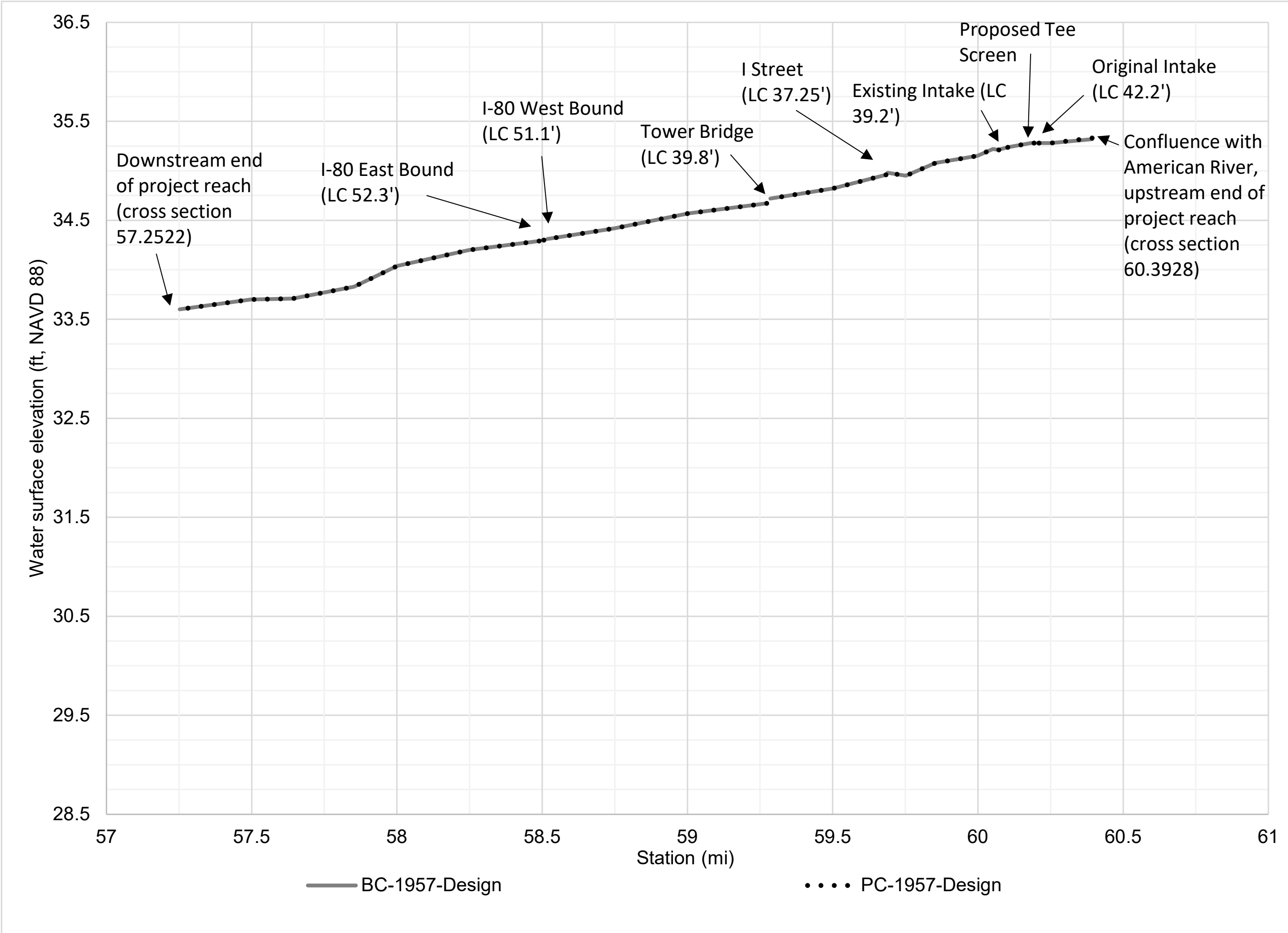
NOTES: The figure depicts velocity profiles for 10-, 100-, and 200-year flood events. LC denotes bridge low chord elevations. Left and right levee/overbank profiles, which are not plotted here, range between approximately elevation 36 and 46 ft NAVD 88 through the focus reach.

1957 Authorized Design Flow Condition: Baseline Conditions and Proposed Conditions

The baseline and proposed conditions hydraulics were evaluated using the 1957 authorized design flow. The models were developed by modifying the boundary conditions input files for the baseline and proposed conditions models. The steady-state flow rate and matching downstream boundary water surface elevation are obtained from Levee and Channel Profiles (USACE, 1957) (Table 1-1). The model geometry and roughness data are identical to those from the baseline and proposed conditions models.

Results

Figure 5-9 and **Figure 5-10** compare the simulated baseline and proposed water surface elevations and velocities, respectively, for the 1957 design conditions. As expected, the figures show that the proposed intake facility would not significantly change the water surface elevations and velocities relative to the baseline conditions through the focus reach. As depicted in Figure 5-9, the predicted water surfaces are below the bridge low chord elevations. Although the left and right levees and overbank profiles are not plotted, the 1957 design water surface profiles are also predicted to be contained within the leveed channel.

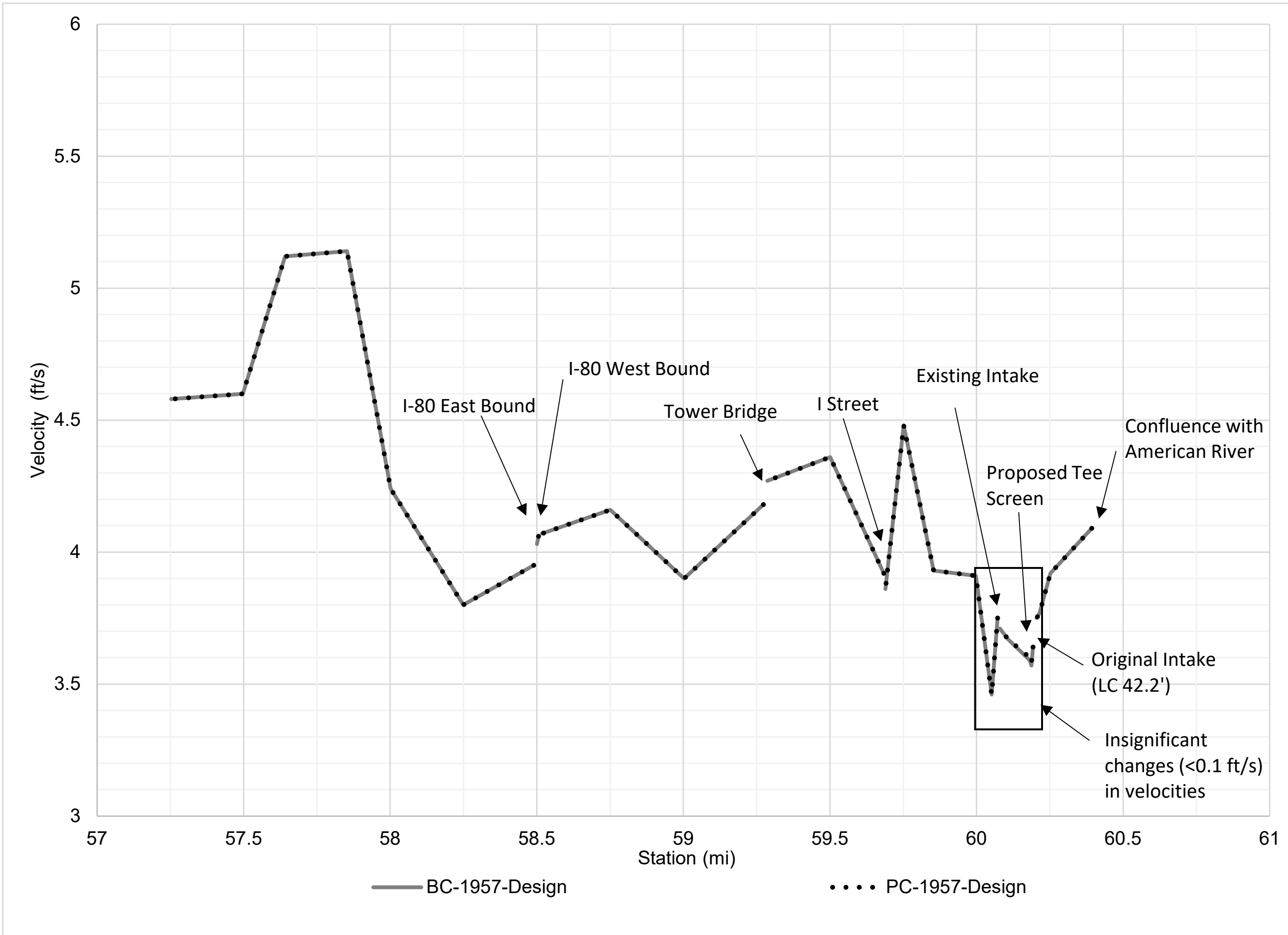


SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

Figure 5-9
Comparisons of Baseline and Proposed Water Surface Elevations for the 1957 Design Conditions

NOTES: LC denotes bridge low chord elevations. Left and right levee/overbank profiles, which are not plotted here, range between approximately elevation 36 and 46 ft NAVD 88 through the focus reach.



SOURCE: ESA

Water+ Treatment Plants Resiliency and Improvements Project

Figure 5-10
Comparisons of Baseline and Proposed Velocities for the 1957 Design Conditions

NOTES: LC denotes bridge low chord elevations. Left and right levee/overbank profiles, which are not plotted here, range between approximately elevation 36 and 46 ft NAVD 88 through the focus reach.

6.0 Summary

This memorandum documents modeling assumptions and data sources used to perform an assessment of the hydraulic effects of the Project. The HEC-RAS 1-D models were prepared by reducing the Common Features Release 6.2 model (USACE, 2022a) to focus the analysis on the area surrounding the proposed Project site and modifying the model geometry file to include the updated bathymetry and the existing and proposed intake structures. The resulting hydraulic models cover an approximately 3-mile-long segment of the Sacramento River just downstream of its confluence with the American River (i.e., focus reach). The baseline and proposed conditions hydraulic performances were evaluated over a range of inflow and downstream stage scenarios, including the 10-, 100-, and 200-year flood events with and without climate change impact, and the 1957 authorized design conditions (Table 1-1). The proposed conditions model does not account for a slight decrease in the Sacramento River flow resulting from the proposed pump station operation to produce a more conservative modeling result with the channel.

The model results showed that for all scenarios considered, the proposed new intake facility would not significantly change the water surface elevations and velocities relative to the baseline conditions through the focus reach. This is expected, because only a small portion of the flow conveyance area would be blocked due to the compact design of the intake appurtenances. The current analysis is considered sufficient for assessing the Project’s impacts on the channel flood hydraulics through the focus reach and demonstrates the Project will not be injurious to the public or affect the state and federal flood control system’s ability to meet its authorized purpose.

7.0 References

California Department of Water Resources (DWR), 2019. Sacramento River LiDAR.

———, 2020. San Francisco Bay and Sacramento-San Joaquin Delta DEM for Modeling, Version 4.2. Surveyed in 2010.

———, 2022. CVFPP 2022 Update Appendix D Risk Analysis Summary by Index Point. May 2022.

Carollo Engineers and Schnabel Engineering, 2023. Conceptual Drawings of the Sacramento River WTP Expansion Project. Prepared for the City of Sacramento.

CH2M, 2017. Integrated HEC-RAS One-Dimensional/Two-Dimensional Bypass Model (csr2Dbypass model). Prepared on behalf of the California Department of Water Resources June 2017.

CH2M Hill, 2006. Sacramento River Water treatment Plan Replacement Intake Project Record Drawings. Prepared for City of Sacramento Department of Utilities. February 2006.

City of Sacramento Filtration Division, 1921. Project Plan. March 1921.

Delta Stewardship Council, 2021. Delta Adapts: Creating a Climate Resilient Future Sacramento-San Joaquin Delta Climate Change Vulnerability Assessment. June 2021.

Meridian Surveying Engineering, Inc., 2022. Sacramento River Intake DA531019.000 Bathymetric Survey at the Request of Schanel Engineering West, Inc. April 2022.

U.S. Army Corps of Engineers (USACE), 1957. Sacramento River Flood Control Project – Levee and Channel Profiles. USACE: Sacramento, CA.

———, 2019. Memorandum for Record: CVHS Hydrograph Package for HEC-RAS Model Inputs. USACE Sacramento District, Hydrology Section. February 2019.

———, 2022a. Common Features Release 6.2 HEC-RAS 1-D model.

———, 2022b. Memorandum for File: American River Common Features 2016. 1-Dimensional HEC-RAS Model for the Lower Sacramento River Cumulative Impacts Assessment. July 2022.

Appendix E
Hydrologic (CalSim) Modeling Appendix

Final

CITY OF SACRAMENTO WATER+ TREATMENT PLANTS RESILIENCY AND IMPROVEMENTS PROJECT

Hydrologic Study – Evaluation of Project Effects on Water System Operations

Prepared for
City of Sacramento

May 2025

Final

CITY OF SACRAMENTO WATER+ TREATMENT PLANTS RESILIENCY AND IMPROVEMENTS PROJECT

Hydrologic Study – Evaluation of Project Effects on Water System Operations

Prepared for
City of Sacramento

May 2025

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CHAPTER 1
Introduction

1.1 Background

The City of Sacramento (City) owns and operates water treatment and distribution facilities that provide drinking water to nearly half a million customers in a 100-square-mile service area. These facilities include two surface water treatment plants, approximately 1,800 miles of distribution pipelines, and 30 permitted groundwater wells. The City's two surface water treatment plants, the E.A. Fairbairn Water Treatment Plant (FWTP) and the Sacramento River Water Treatment Plant (SRWTP), currently have a combined maximum surface water supply and treatment capacity of 260 million gallons per day (MGD) (City of Sacramento, 2021).

The FWTP treats surface water diverted from the American River and the SRWTP treats surface water diverted from the Sacramento River drawn through the existing Sacramento River water intake. Originally constructed in 1961, the FWTP underwent significant improvements in 2014 with the installation of a new dewatering facility. Originally constructed in 1923, the SRWTP underwent significant improvements in 2004 with expanded treatment systems and a replacement water intake within the Sacramento River, and again in 2014 with the installation of a new high lift pump station and a new dewatering facility.

Consistent with the City's 2040 General Plan (City of Sacramento, 2024), the City is proposing the Water+ Treatment Plants Resiliency and Improvements Project (proposed project) to provide treatment resiliency for changing water quality in both the American and Sacramento Rivers, to address reliability of facilities with infrastructure currently approaching the end of its effective life, and to provide diversion and treatment capacity in order to meet projected water demand within the service area.

According to the City's 2020 Urban Water Management Plan (UWMP), the City's projected retail water demand is 155,219 acre-feet (af) and wholesale water demand is 97,060 af, or a total projected water demand of approximately 252,279 af (225 MGD) by 2050 (City of Sacramento, 2021). This future projected water demand could be accommodated under the City's existing surface water entitlements, established in state-issued water rights permits, agreements made by the City with the United States Department of the Interior Bureau of Reclamation (Reclamation) in 1957, agreements made by the City with the Sacramento Municipal Utilities District (SMUD) in 1957, and through a voluntary agreement made through the regional Water Forum in 2000 (City of Sacramento, 2021). The majority of the City's surface water rights are senior to those held by Reclamation for operation of the Central Valley Project (CVP).

To reliably meet current and future water demands, the City has evaluated several projects, in addition to the proposed project, to increase long-term water supply and treatment capacities. The general objective of the proposed project is to provide a reliable, resilient, and safe water supply while meeting the City's projected potable water demand. In summary, the proposed project is designed to achieve the project objectives through two phases of work relating to the City's water treatment plants, raw water supply, and potable water distribution system: an "initial phase" to occur between 2026 and 2037, followed by a "project buildout" to occur between 2040 and 2050 (see Section 2.2, *Project Description*).

1.2 Purpose of this Model Appendix

The purpose of the model appendix is to document analytical modeling conducted to assess potential effects of the proposed project on the environment, and specifically presents the approach, tools, analysis methodology, and modeling results of potential hydrologic effects of increased Sacramento River diversions on water operations in the Study Area (see Section 2.1, *Study Area*), such as those of the State Water Project (SWP) and CVP. The hydrologic modeling results support the analysis of potential impacts associated with implementation of the proposed project (e.g., changes in flow patterns, water temperatures, reservoir storage volumes, and regional water system operations) included in the City of Sacramento Water+ Treatment Plants Resiliency and Improvements Project Draft Environmental Impact Report (EIR) being prepared by the City in compliance with the California Environmental Quality Act (CEQA) (SCH #2022040138).

1.3 Organization of this Model Appendix

This model appendix is organized as follows:

- **Chapter 1. Introduction** describes the purpose and organization of this model appendix.
- **Chapter 2. Project Description** briefly describes the proposed project and introduces the models selected for evaluating potential effects of the increased diversion to existing water system operations and the environment.
- **Chapter 3. Overview of Selected Models** presents background on the CalSim 3 (Hydrology) and HEC-5Q (water temperature) models used in this study including information on the history of the models, general application of the models without the proposed project, and general model assumptions and limitations.
- **Chapter 4. Modeling Approach** describes how the proposed project was represented in the selected models, provides greater detail of how the models were applied in this study to support review of the proposed project in this Draft EIR, and describes model outputs and the water year classification criteria.
- **Chapter 5. Model Results and Discussion** presents the CalSim 3 and HEC-5Q modeling results and limited interpretation of these results.
- **Chapter 6. Conclusion** summarizes the results and discussion.
- **Chapter 7. References** provides a list of references.

CHAPTER 2
Project Description

2.1 Study Area

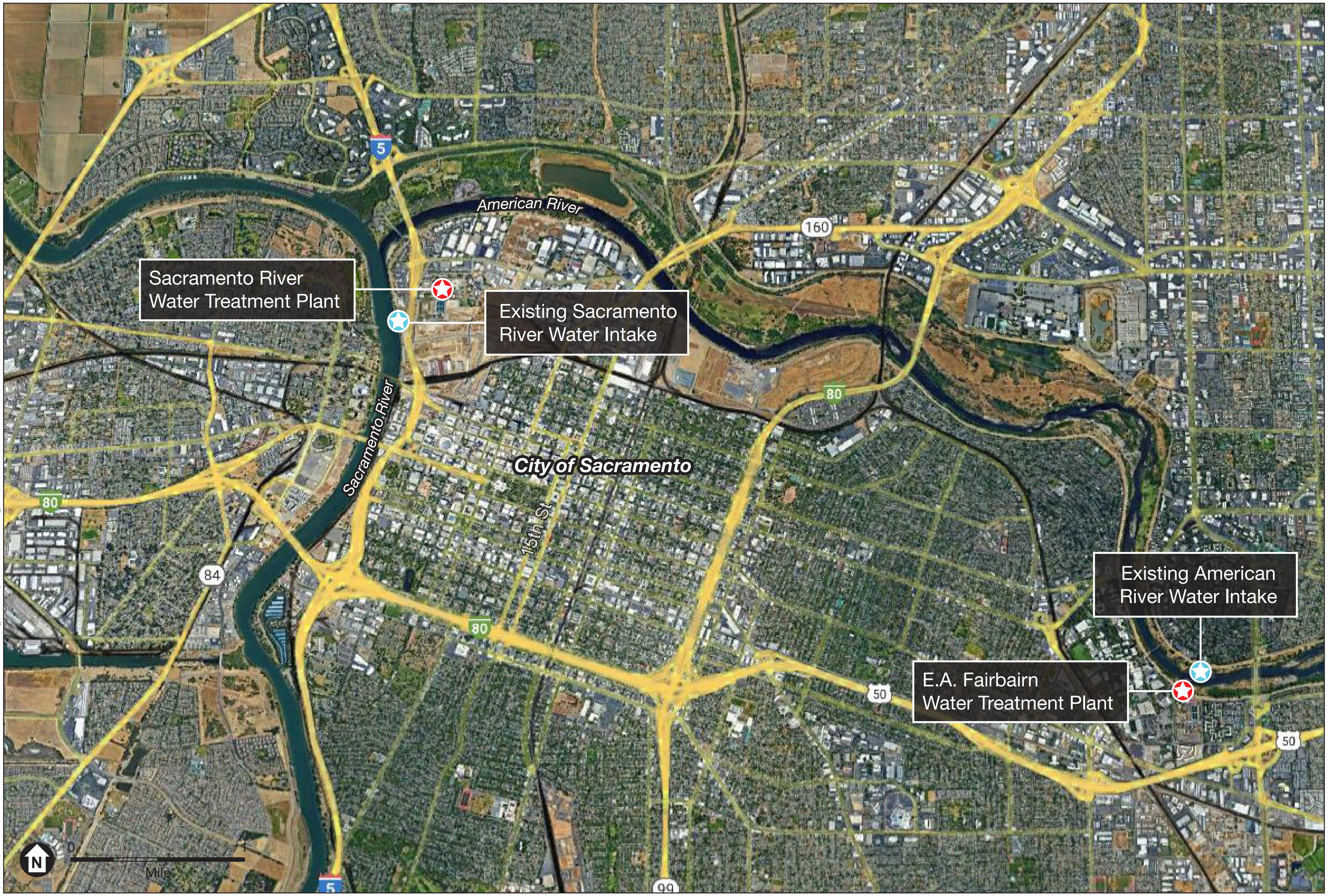
The City's water treatment plants and raw water supply facilities are located within the city of Sacramento (see **Figure 1**, Regional Location Map). As described in Chapter 2, *Project Description*, of this Draft EIR, the proposed project involves construction and operation of various components associated with operation of the FWTP (see **Figure 2**, E.A. Fairbairn Water Treatment Plant Project Area) and the SRWTP (see **Figure 3**, Sacramento River Water Treatment Plant Project Area). The FWTP and SRWTP project areas (Project Area) denote the active areas of construction and operation of proposed improvements at both treatment plants, upgrades to existing utilities at both treatment plants, Sacramento River water intakes, and potable water transmission pipelines in the vicinity of the SRWTP.

For this modeling appendix, a broader Study Area was defined to assess potential effects of the proposed project on the environment that could occur beyond the Project Areas. The Study Area includes: (1) the Project Area (described above); (2) areas in the vicinity of the Project Area that could be affected by treatment plant operations, including: Folsom Reservoir, the Lower American River to its confluence with the Sacramento River, and the Sacramento River south to the Sacramento–San Joaquin Delta (Delta); and (3) CVP and SWP water systems and service areas.

2.2 Project Description

The proposed project involves treatment reliability and resiliency improvements at both the FWTP and SRWTP. At SRWTP the proposed project includes construction and operation of a second water intake, a pump station, and a new pipeline for conveying raw water from the supply source (Sacramento River) to SRWTP facilities. It also includes improvements to the existing SRWTP water intake and associated facilities, including a new pipeline to transport sediment deposited within the intakes to SRWTP. As described in Section 1.1, *Background*, the proposed project is designed to achieve the project objectives through two phases of work relating to the City's water treatment plants, raw water supply, and potable water distribution system: an "initial phase" to occur between 2025 and 2037, followed by a "project buildout" to occur between 2040 and 2050.

The initial phase of the proposed project would improve treatment reliability at both water treatment plants by replacing facilities that have reached the end of their effective lives. The initial phase would also provide resiliency within each treatment system through the addition of ozone treatment, to help address changing water quality in the Sacramento and American Rivers, and the conversion from chlorine gas to sodium hypochlorite, a safer and more reliably available chemical for disinfection.



SOURCE: Carollo, 2022

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 1
Regional Location Map

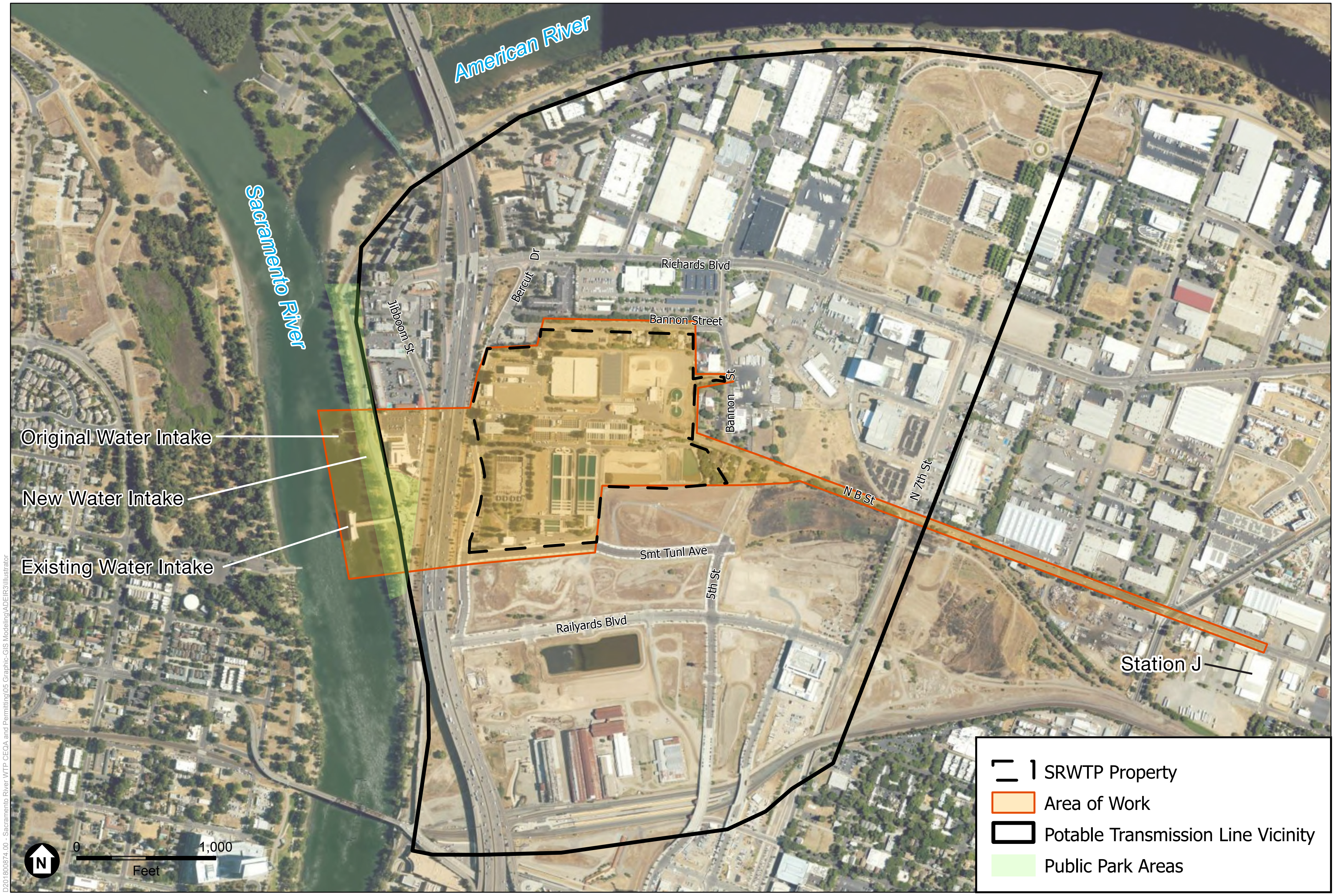
ESA

SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 2
E.A. Fairbairn Water Treatment Plant Project Area

ESA



SOURCE: NAIP 2022, ESA, 2024

City of Sacramento's Water+ Treatment Plants Resiliency and Improvements Project

Figure 3
Sacramento River Water Treatment Plant Project Area

ESA

The project buildout phase of the proposed project would be staged to meet the increasing water demands of the City's service area through 2050 by further increasing the capacity of the SRWTP to treat water diverted from the Sacramento River.

Currently, the FWTP is authorized to divert up to 200 MGD under its water rights. Various treatment permit requirements and the condition of existing infrastructure at present render the facility capable of operating at a treatment capacity of 100 MGD for short periods of time, but currently has a reliable capacity of 80 MGD due to the existing condition of certain plant treatment facilities. Certain regulatory conditions require the City to limit FWTP diversions to as low as 64.4 MGD (as indicated by the Hodge criteria). The proposed resiliency improvements at FWTP during the initial phase would provide a reliable surface water treatment capacity of 100 MGD, with the capability of treating 120 MGD for short periods of time. There are no project buildout activities planned for the FWTP as part of the proposed project.

The SRWTP currently has a diversion and treatment capacity of 160 MGD. In parallel with the initial phase of treatment reliability and resiliency improvements, the SRWTP capacity would be increased from 160 MGD to 235 MGD (an increase of 75 MGD). The project buildout phase would be staged to meet the increasing water demands of the City's service area through 2050, for an ultimate SRWTP treatment capacity of 310 MGD (a total increase of 150 MGD).

2.3 Model Selection

Two modeling tools were used to evaluate potential changes to surface water resources. The California Simulation Model 3.0 (CalSim 3) model was used to assess effects on surface water resources within the Study Area, including the lower American River, the Sacramento River and Delta, and the SWP and CVP systems. Water temperatures for the lower American River from Folsom Dam to the confluence with the Sacramento River were simulated using the United States Army Corps of Engineers (USACE) HEC-5Q modeling code. These modeling tools and the analytical framework used in this project EIR are introduced below. Greater detail on the background, application, assumptions, and limitations of these modeling tools is provided in Chapter 3, *Overview of Selected Models*, and greater detail on how the models were applied in this study to evaluate potential changes to surface water resources resulting from implementation of the proposed project is provided in Chapter 4, *Modeling Approach*.

The CalSim 3 model was jointly developed by the California Department of Water Resources (DWR) and Reclamation as a planning model to simulate operations of the SWP and CVP over a range of hydrologic conditions. The CalSim 3 model includes facilities and operations of all major water projects within the Central Valley. The model represents the best available planning model for the SWP and CVP system operations and is an improved and expanded version of CalSim II, which has been the standard planning model for system operations since the early 2000s.

Inputs to CalSim 3 include unimpaired inflows and rainfall runoff, agricultural, urban, and wetland water demands, return flows, and groundwater recharge from precipitation and irrigation. Sacramento Valley and tributary rim basin hydrology are developed using a process designed to adjust the historical sequence of monthly stream flows over a 94-year period (1921 to 2015) to represent a sequence of flows at existing and future levels of development.

CalSim 3 produces outputs for river and channel flows and diversions, reservoir storage, Delta flows and exports, Delta inflow and outflow, water deliveries to SWP and CVP and non SWP and CVP users, and controls on SWP and CVP system operations. These can be used to assess effects resulting from the proposed project under various project buildout phase and hydrologic and demand conditions (e.g., existing [2020] and future [2040] climate-change hydrology conditions).

HEC-5Q is a modeling tool that simulates reservoir and river water temperatures based on input storage, flow, and meteorological data (HEC, 1998; RMA, 1998). The HEC-5Q modeling tool is often used for long-term planning analyses and has been applied to numerous rivers across the United States. The American River HEC-5Q model simulates daily reservoir and river temperatures throughout the CalSim 3 94-year period of record for the lower American River from Folsom Dam to the confluence with the Sacramento River. It is the standard planning-level model used for assessing the temperature effects of CalSim simulated operations on the lower American River.

CHAPTER 3

Overview of Selected Models

3.1 CalSim 3 Hydrologic Modeling

The evaluation of long-term system-wide effects on SWP and CVP operations resulting from potential facility and/or policy changes is typically done using the CalSim suite of models (CalLite, CalSim II and CalSim 3), referred to generally as CalSim in this document. CalSim is a water operation planning model, jointly developed by DWR and Reclamation, that simulates the long-term operational capability of the SWP and CVP over a period of record that includes a wide range of hydrologic variability. CalSim was originally developed over two decades ago and has been updated through a managed process.

More than one version of the model is available for potential application. The model version used as a starting point for the modeling in this study is the same developed by DWR for the Delta Conveyance Project Draft EIR, referred to herein as the 2023 DCR CalSim 3 model version (DWR, 2022b). The 2023 DCR CalSim 3 model includes refinements to performance and representation of the SWP and CVP systems from DWR's 2021 Delivery Capability Report (2021 DCR) release of CalSim 3. The 2023 DCR CalSim 3 model version also includes adjustments to climatic and hydrologic conditions to better reflect modern climate patterns and provide a more accurate baseline for future climate change scenarios (DWR, 2022b). The 2023 DCR CalSim 3 input datasets along with the selected CalSim 3 model represent the best available data at the time when the modeling analysis was conducted for this Draft EIR.

In July 2024, Reclamation released a Draft Environmental Impact Statement (EIS) for the long-term operation (LTO) of California's two major water systems, the SWP and CVP. This draft was prompted by a 2021 executive order, which mandated a review of the 2019 biological opinions. Along with the Draft EIS a revied LTO CalSim 2 model was released. This CalSim 2 version reflects proposed updates to the regulatory framework for SWP and CVP operations and adjusted historical hydrology. Additional revisions to the LTO CalSim 3 model are possible in response to comments on the Draft EIS.

Overall results of the proposed project and its changes in the physical environment are not expected to be substantially different when modelled in the 2023 DCR CalSim 3 model version as compared to LTO CalSim 2 model. Further, potential effects of the proposed project are assessed using simulations from a common model, the 2023 DCR CalSim 3 model version, as the incremental difference between outputs of modeling scenarios that include representation of the proposed project from baseline conditions that do not include the proposed project (see Chapter 4). Therefore, the relative changes to surface water resources associated with the proposed project are likely to be similar regardless of which of these model versions is used.

The following sections provide information on the history of the CalSim model, general application of the CalSim 3 model without the proposed project, and general CalSim 3 model assumptions and limitations. Chapter 4, *Modeling Approach*, describes how the proposed project was represented in the CalSim 3 model and provides greater detail of how CalSim 3 was applied in this study to support review of the proposed project in this Draft EIR.

3.1.1 CalSim 3 Background

In 2000, DWR created a general-purpose simulation environment for analyzing management options for reservoirs and river systems. This environment, known as the Water Resources Integrated Modeling System (WRIMS), uses a mixed integer linear programming solver to determine the timing and volumes of reservoir releases and water deliveries. The application of WRIMS to the SWP and CVP system is known as CalSim. Geographically, CalSim represents the portion of California's Central Valley that drains to the Delta, and SWP exports to the San Francisco Bay area, central coast, and south coast.

CalSim typically simulates SWP and CVP system operations for a multi-year period using a monthly time step. The model assumes that facilities, land use, water supply contracts, and regulatory requirements are constant over this period, representing a fixed level of development (e.g., 2020, 2040). The historical streamflow record, adjusted for the influence of land-use change and upstream flow regulation, is used to represent the possible range of water supply conditions for the Central Valley. Rim watershed inflows, stream accretions and depletions, water diversion requirements (demands), and return flows are the primary components of the input hydrology. The CalSim model is described in detail by DWR and Reclamation (2002) and by Draper et al. (2004).

The primary purpose of CalSim is to evaluate SWP and CVP operations at current or future levels of development, with and without various assumed future facilities, various regulatory requirements, and with different facility management options. One of the principal outputs of the model is the estimate of SWP and CVP exports at SWP and CVP facilities in the south Delta and corresponding delivery reliability of the two projects. However, CalSim has also become a widely accepted modeling tool for water resources planning in the Central Valley.

The 2023 DCR CalSim 3 generally represents the most current version of the CalSim model and is the best available planning-level analytical tool for SWP and CVP system operations (DWR, 2022a) and is an improved and expanded version of CalSim II, which has been the standard planning model for system operations since the early 2000s. Improvements and enhancements in CalSim 3 relative to CalSim II include:

- Improved representation of mountain and foothill watersheds (rim watersheds), which surround the Central Valley floor, explicit representation of storage regulation and diversions within these watersheds, and improved estimates of unimpaired flows based on historical gauge data.
- Adoption of a finer spatial resolution depicting the major stream network, major surface water diversions, and large water agencies or groups of smaller water agencies located in the Central Valley.

- Refinement of water demands including updated urban demands, agricultural land use, crop water demands, and irrigation efficiencies.
- Improved simulation of groundwater heads, flows, and storage, including stream-groundwater interaction, by linking CalSim 3 to the California Central Valley Simulation Model (C2VSim), a distributed, finite element groundwater model and improved distinction between surface water use and groundwater use.
- Expansion of the model domain to include the entire Delta watershed using a physically based network schematic.
- Extension of the period of simulation from water year 2004 through water year 2015.

Both DWR and Reclamation have extensively reviewed CalSim 3 performance relative to CalSim II and observed data. Detailed description of CalSim 3 and model validation is available from DWR (DWR, 2017, 2022a).

Level of Development

CalSim 3 uses a “level of development” approach to simulate operation of water management facilities and flows in rivers, streams, and channels. In this approach, facilities, land use, contracts, and regulations are held constant over the 94-year period of simulation. Monthly values of unimpaired runoff represent the range of water supply conditions that characterize either existing conditions (year 2020) or future conditions (year 2040) influenced by climate change. Model results are best interpreted in terms of probabilities or exceedance representing the range of outcomes that could occur for the chosen level of development.

Timestep and Period of Simulation

CalSim 3 simulates monthly water management operations for a 94-year period. It includes facilities and operations of all major water projects within the Central Valley. The inflow hydrology is based on the historical weather sequence October 1921 through September 2015. Though using a monthly timestep, the model includes several adjustments to better represent management operations at a daily timescale. These include (1) daily representation of Sacramento River flows for the purpose of simulating flow over the Fremont and Sacramento weirs, (2) adjustment of instream flow requirements on the Sacramento River at the Navigation Control Point to account for daily flow variation within the month, (3) daily representation of the Sacramento River flow at Wilkins Slough for triggering various Delta regulatory actions, and (4) for the proposed North Delta Diversion, daily patterning of flows at Hood when applying bypass flow and low-level pumping requirements and simulating diversions.

Inputs to CalSim 3 include unimpaired inflows and rainfall runoff, agricultural, urban, and wetland water demands, return flows, and groundwater recharge from precipitation and irrigation. Sacramento Valley and tributary rim basin hydrology are developed using a process designed to adjust the historical sequence of monthly stream flows over a 94-year period (1921 to 2015) to represent a sequence of flows at existing and future levels of development.

Spatial Resolution

Water Budget Areas

CalSim 3 divides the Sacramento and San Joaquin valleys into geographic regions termed water budget areas (WBA). WBAs provide a structure to simplify the organization, explanation, and presentation of CalSim 3 data, code, and results. WBAs also define the spatial resolution of meteorological input data for calculating agricultural demands (i.e., precipitation and evapotranspiration [ET]).

Demand Units

WBAs, described above, are disaggregated into one or more demand units for agricultural, municipal, or wetland water use purposes. A demand unit represents a collection of water users who have the same physical, legal, and contractual access to water, and have similar land uses, water delivery systems, and water use efficiencies.

The size and number of demand units in CalSim 3 is set partly by the availability of data for model calibration but is also a compromise between a simpler model representation that requires less data input, and a very detailed, physically based, representation that requires greater levels of input and code. The number of demand units has been set to facilitate the use of local planning information and data for CalSim 3, and to facilitate future use of CalSim 3 for regional water resources planning by local agencies. CalSim 3 has a total of 258 demand units within the model domain.

Additional information on demand units relevant to the proposed project is presented in Chapter 4, *Modeling Approach*.

3.1.2 CalSim 3 Application and Use

Appropriate Use of Model Results

The CalSim 3 models developed and/or applied for this analysis are generalized and simplified representations of complex ‘real-world’ water resources systems. As discussed above, CalSim 3 is considered a “level of demand” type model and was developed for long-term, planning level analyses (e.g., comparing different water demand and use scenarios) and are not intended to replicate historical operations (DWR, 2017, 2022a). In other words, CalSim 3 is not considered a predictive model (i.e., calibrated and validated to predict real world conditions) and therefore the results cannot be considered as absolute within a quantifiable confidence interval. Even so, the CalSim 3 models are informative and are accepted tools for understanding the performance and potential effects (both positive and negative) of the operation of a proposed project and its interaction with the water resources system under consideration. This is primarily accomplished by using model results as a “comparative tool” to assess relative changes between two simulations, e.g., Existing Conditions simulation compared to a proposed project or project alternative simulation. Such comparative analyses can serve as an indicator of meeting specific conditions (e.g., compliance with a standard) and/or of trends or tendencies (e.g., generalized impacts), and allow for reasonable inference of how different project conditions might perform under different scenarios and effect environmental resources.

Because CalSim 3 relies on generalized rules, a coarse representation of project operations, and no specific operations in response to extreme events, results should not be expected to reflect what operators might do in real time operations on a specific day, month, or year within the simulation period. In reality, the operators would be informed by numerous real-time considerations not represented in CalSim 3, such as salinity monitoring.

Due to the assumptions involved in the input data sets and model logic, care must be taken to select the most appropriate time-step for the reporting of model results. Sub-monthly (e.g., weekly, or daily) reporting of raw model results is not consistent with how the models were developed, and results should be presented on a monthly or more aggregated basis.

Appropriate Reporting Timestep

All CalSim 3 model results are reported on a monthly or annual basis, which is consistent with the model timestep.

Appropriate Reporting Locations

Because of assumptions involved in the preparation of input data and development of model logic, care must be taken to select the most appropriate locations for reporting CalSim 3 results. CalSim 3 is based on a simplified spatial representation of the Central Valley's water resources with lumped representation of inflows and outflows to and from the stream network. Rainfall-runoff and stream- groundwater interaction are aggregated to specific nodes along a river reach. Diversions and return flows are similarly aggregated. Reporting of model results inconsistent with the spatial representation or resolution of the model is inappropriate. In general, reporting of model results should correspond to reservoir releases, compliance locations for regulatory flow requirements, or flows at stream gages, where the model developers have strived for consistency with real-world flows.

Appropriate Statistical Comparisons and Relative Uncertainty

Use of absolute differences computed at a point in time between model results from a project scenario or alternative and a baseline to evaluate potential effects of the proposed project is an inappropriate use of model results (e.g., calculating differences between the results from a baseline and an alternative for a particular month and year within the period of simulation). Similarly, statistics based on the absolute differences at a point in time (e.g., maximum of monthly differences) are also an inappropriate use of model results. By computing the absolute differences in this way, an analysis disregards the changes in antecedent conditions between individual scenarios and distorts the evaluation of impacts of a specific action or project.

Alternately, reporting seasonal patterns from long-term averages and water year type averages and statistics based on long-term and water year type averages are appropriate uses of model results. Similarly, computing differences between long-term or water year type averages of model results from two scenarios is also appropriate. Care should be taken to use the appropriate water year type for presenting water year type average statistics of model results (e.g., D-1641 Sacramento River 40-30-30 or San Joaquin River 60-20-20, and with or without climate modified conditions).

As explained by DWR (2022a), even with comparative analysis, model uncertainty and its influence on the model results cannot be completely avoided. In addition to showing the potential effects of the project being analyzed, differences between two scenarios can sometimes include the unintended effects of model uncertainty. While no exact quantification of model uncertainty is available, DWR believes that CalSim 3 results are subject to uncertainty that is within at least 5 percent and likely lower (DWR, 2021; DWR, 2022b). In other words, when comparing model simulation results, it is possible that changes in modeled flows or storages that are less than 5 percent between two or more scenarios may be strongly influenced by model uncertainty. Therefore, the appropriate inference from an observed difference in modeling results that is less than 5 percent is likely “no change”, unless there is additional evidence from detailed examination to suggest otherwise (e.g., the percent change is persistent and/or associated with a relatively large magnitude of water volume or flow). Throughout the use of CalSim 3 and its predecessors, other rule-of-thumb criteria have generally been used for considering the potential significance of an observed difference in modeling results from a comparative analysis (DWR, 2022a). For example, observed changes in monthly flow and/or storage of less than 10 thousand acre-feet (TAF) are generally considered no change (DWR, 2022b).

When comparing simulated model results, if the relative difference in a given parameter (i.e., reservoir water elevation and storage, river flow, power generation, water delivery, or river temperature) is 5 percent or less and does not exceed the lesser of either 10 TAF or 1 percent of a water storage features total storage capacity, the simulated hydrology changes can generally be considered negligible compared to Baseline conditions. This approach is consistent with several certified CEQA EIRs or other environmental reviews including but not limited to the EIR for State Water Project Long-Term Operations (DWR, 2019), the Final EIR for Coordinated Long-Term Operation of the Central Valley Project and State Water Project (Reclamation, 2015), the Draft Supplemental Environmental Assessment/EIR for the Folsom Dam Modification Project Water Control Manual Update (USACE, 2017), the Draft EIR for the Delta Conveyance Project (DWR, 2022b), and the Final EIS for the Long-Term Operation of the Central Valley Project and State Water Project (Reclamation, 2024a). It should be understood that these criteria are given here as general measures for establishing when modeled changes in hydrology between two or more scenarios are likely negligible or not. The appropriate parameter and specific criteria to be used will vary depending on the exact resource area and impact being analyzed, as discussed in this Draft EIR.

Model Output Metrics

The most appropriate presentation of monthly and annual model results is in the form of probability distributions and comparisons of probability distributions (e.g., cumulative probabilities). If necessary, comparisons of model results against threshold or standard values should be limited to comparisons based on cumulative probability distributions.

Appropriate formats to present model results include:

- Long-term and water-year-type summary tables and charts showing monthly and/or annual statistics derived from the model results.

- Cumulative exceedance probability monthly and/or annual model results shown only by rank/ order or only by probability statistic.
- Comparative statistics based on these two types of presentations are generally acceptable.

3.1.3 CalSim 3 Model Assumptions and Limitations

CalSim 3 is a monthly model developed for planning level analyses. For existing conditions, the model is run using historical observed or reconstructed unimpaired runoff, but with 2020 level water demands, facilities, regulations, and operations criteria. Output from the 94-year simulation does not provide information about historical conditions, but does provide information about storage, flow, and water deliveries that could occur under the historical weather sequence. Similarly, the Future Conditions Baseline (2040) model provides information about storage, flow, and water deliveries that would occur under a repeat of the historical weather sequence transformed for (a) climate change and (b) operations of water management facilities to account for sea level rise, changes in land use and population, and associated water demands and water use.

Climate Change under Existing Conditions

The inflow hydrology for the existing conditions model is based on assumptions of stationarity. However, while there has been no obvious trend in total water year runoff into the Sacramento and San Joaquin Rivers, there have been changes in the timing of that runoff. The fraction of snowmelt runoff between April and July relative to total year-round water runoff has declined over the past century (DWR, 2016). Additionally, as the climate continues to warm, it is expected to increase variability in precipitation. For instance, while there is uncertainty around the magnitude and direction of projected precipitation patterns, most global climate models (GCMs) forecast that regional average fall and spring precipitation will decrease, winter and summer precipitation will increase, and a greater proportion of precipitation will occur as rainfall rather than snow in the American River basin (Stantec and Reclamation, 2022).

Calibration and Validation

Because CalSim 3 is partly a physically based model and partly a management model, the model cannot be fully calibrated and cannot be used in a predictive manner.

Relaxation of Regulatory Requirements

CalSim 3 makes storage release decisions and routes water through the stream network, based on a set of pre-defined rules that represent existing or future assumed regulations and operations criteria. These pre-defined rules do not include temporary relaxation of non-discretionary regulatory requirements such as what occurred in 2014 and 2015 as a result of Temporary Urgent Change Petitions submitted to the State Water Board (e.g., Reclamation and DWR, 2014).

Monthly Timestep

Simulated operational decisions in CalSim 3 are made on a monthly timestep. While there are certain components of the model that are downscaled to a daily timestep, such as north Delta diversion bypass flows, the results of those daily conditions are always averaged to a monthly timestep. For example, a certain number of days with and without the action is calculated and the monthly result is calculated using a day-weighted average based on the total number of days in that month. Operational decisions based on those components are again made on a monthly basis. Use of CalSim 3 results to provide information at a sub-monthly timescale should include disaggregation methods that are appropriate for the given application, report, or subsequent model and recognize that the CalSim 3 operational decisions are always on a monthly timestep.

Extreme Conditions

Despite detailed model inputs and assumptions, CalSim 3 results differ from real-time operations under stressed water supply conditions caused by drought. The model cannot represent the unique real-time policy decisions that SWP and CVP operators or other water management entities/agencies make in consultation with regulatory agencies under extreme circumstances and that deviate from standard operating policies. Model results that indicate severely low reservoir storage, or inability to meet flow requirements or senior water rights, should be considered an indicator of stressed water supply conditions under a model scenario and should not necessarily be understood to reflect literally what would occur under that model scenario. In real-time operations these simulated conditions (e.g., low storage) would typically be avoided by policy decisions being made in prior months and through operational changes outside the capabilities of the CalSim 3 model. In actual operations, as has always been the case in the past, SWP and CVP operators and other water managers would work in real time to satisfy legal and contractual obligations given the extreme conditions. The frequency of extreme conditions is expected to increase in the future under the combined effects of climate change and sea level rise.

Regulatory Uncertainty

Continuing evolution of the regulatory environment makes the long-term planning of SWP and CVP operations challenging. CalSim 3 assumes the full implementation of the operational actions of the 1999 (revised in 2000) State Water Board Decision-1641 (State Water Board, 2000), the 2019 National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (USFWS) Biological Opinion (BiOps) on the Reinitiation of Consultation on the Long Term Operation (ROC on LTO) of the CVP and SWP (NMFS, 2019), and 2020 California Department of Fish and Wildlife (CDFW) Incidental Take Permit (ITP) for Long-Term Operation of the SWP in the Sacramento-San Joaquin Delta (2081-2019-066-00) (CDFW, 2020). These are likely to evolve under future re-consultations and in the face of climate change. For example, on December 12, 2024, Reclamation signed a Record of Decision to implement Alternative 2 – Multi-Agency Consensus Proposal (Preferred Alterative) into SWP and CVP operations as described in the Final EIS for the Long-Term Operation of the CVP and SWP (Reclamation, 2024a) and authorized by the 2024 USFWS and 2024 NMFS Biological Opinions and 2024 CFW ITP.[1]

Delta Salinity Compliance

CalSim 3 simulates Delta flows for a set of regulatory and operational criteria, including salinity standards, using a monthly timestep. CalSim 3 relies on an artificial neural network (ANN) model, for monthly averaged flow verses salinity relationships in the Delta.

1 https://www.usbr.gov/mp/bdo/lto/index.html

At times, CalSim 3 model runs may indicate exceedances of D-1641 salinity standards. These exceedances result from limitations in the modeling process. In actual operations, DWR and Reclamation staff constantly monitor Delta water quality conditions and adjust operations of the SWP and CVP in real time, as necessary, to meet water quality objectives. These decisions are based on real-time conditions and many factors that the best available management models cannot represent or simulate. Under extreme conditions, DWR and Reclamation negotiations with the State Water Board would occur in order to balance the needs of protected resources, beneficial uses, and water rights. Negotiated decisions under extreme conditions cannot be modeled.

Model limitations relating to Delta salinity include using a monthly timestep to model partial month salinity standards and operations under extreme conditions whereby project reservoirs may drop below dead storage.[2]

Partial Month Salinity Standards

In CalSim 3, the reservoirs and facilities of the SWP and CVP are operated to comply with regulatory flow and water quality requirements. Meeting regulatory requirements, including Delta water quality objectives, is the highest operational priority in the model.

Because CalSim 3 is a monthly timestep model and a number of daily D-1641 salinity standards are active during only portions of a month (e.g., April 1–June 20 and June 20–August 15), D-1641 standards are represented as a monthly weighted average in the model. The model attempts to meet these objectives on a monthly average basis, even though the objectives themselves are often transitioning within a month from one value to the other and may start or end in the middle of a month. When the monthly weighted average standards calculated for CalSim 3 are less stringent than the daily D-1641 electrical conductivity (EC) standards, CalSim 3 adjusts SWP and CVP operations to release less flow to meet monthly weighted average EC standards instead of the flow needed to meet higher daily D-1641 EC standards. This results in a few days within such months where the modeled salinity exceeds the compliance standard. Importantly, however, in reality the SWP and CVP operations are adjusted on a day-to-day basis to meet the Delta standards.

Low Reservoir Storage

Under extremely dry conditions, existing obligations and non-discretionary requirements on the SWP, CVP, and other local projects may result in periods when reservoirs levels fall below the top of the inactive zone, or dead storage; reservoir storage at or below the elevation of the lowest outlet is considered to be at dead storage. Under such extreme conditions, simulated flows may fall short of minimum flow criteria, salinities may exceed standards, diversions may fall short of allocated amounts, storage may drop below target values, and operating agreements may not be met in CalSim 3 simulations.

2 Dead storage refers to the portion of the reservoir that lies below the minimum operational water level. It represents the volume of water that cannot be effectively utilized for water supply, power generation, or other beneficial uses.

3.2 HEC-5Q Temperature Modeling

As discussed in Section 2.3, HEC-5Q is a modeling tool that simulates reservoir and river water temperatures based on input storage, flow, and meteorological data. The HEC-5Q modeling tool consists of two model components: HEC-5 and HEC-5Q. HEC-5 is the daily flow simulation component of the model, where daily storages and flows are simulated at specific nodes (HEC, 1998). HEC-5Q is the temperature simulation component of the model, where 6-hour input meteorological data (equilibrium temperatures, exchange rates, shortwave radiation, and wind speed) are applied to the simulated storages and flows from the HEC-5 model to simulate water temperatures as specified locations (RMA, 1998). The HEC-5Q component is a cross-sectional based model and has a higher spatial resolution in comparison to the HEC-5 component.

The HEC-5Q model version used as a starting point for the modeling in this study is the same model developed by DWR for the Delta Conveyance Project Draft EIR (DWR, 2022b). For this Draft EIR, HEC-5Q was applied to the American River as this is the location where changes to river temperatures associated with implementation of the proposed project would most likely have the potential to affect environmental resources. Monthly CalSim 3 outputs, with a period of record from October 1921 to September 2015, were downscaled to daily timeseries and then used to prescribe HEC-5's storage and flow data for use in/by the HEC-5Q model. The 6-hour meteorological data used in the models were derived from observed data from the Gerber and Nicolaus California Irrigation Management Information System (CIMIS) stations.

The following subsections provide background on the American River HEC-5Q model and general information on application, assumptions, and limitations of the American River HEC-5Q model. Chapter 4, *Modeling Approach*, describes how the proposed project was represented in the American River HEC-5Q model and provides greater detail of how the American River HEC-5Q model was applied in this study to support review of the proposed project in this Draft EIR.

3.2.1 American River HEC-5Q Model

The American River HEC-5Q model simulates water temperatures for the lower American River (below Folsom Dam to the confluence of Sacramento River). The model uses inputs from CalSim 3 that have been temporally downscaled to daily timeseries and 6-hour meteorological data. The American River model was last fully calibrated in 2013, using a calibration period of 2003 to 2011 (RMA and WCI, 2013). A validation procedure was performed in 2015 to incorporate additional logic in the model for the Folsom Water Supply Treatment Control Device (WSTCD), which is described in Appendix 6B, Section C of the 2015 LTO EIS (Reclamation, 2015). For the 2015 validation equilibrium temperature scaling factors in the HEC-5Q inputs were adjusted to match the simulated temperatures with 2013 calibration results. The 2015 validation process used hydrology and meteorological boundary condition data from the 2013 calibration.

Model inputs to the American River HEC-5Q model include initial storage levels, reservoir and tributary inflows, reservoir outflows, diversions, and reservoir evaporation derived from CalSim 3 outputs. The daily downscaled CalSim 3 timeseries all assume a constant (uniform) daily flow over each month of the 94-year CalSim 3 simulation period. 6-hour meteorological inputs to the model were derived from observed Nicolaus CIMIS data.

The American River HEC-5Q model generates daily reservoir and river temperatures throughout the CalSim 3 94-year period of record. It can also provide the temperature profiles for Folsom Reservoir.

In addition to the WSTCD, Folsom Dam has multiple temperature control devices (TCDs) that allow releases to come from different elevations of the reservoir pool to generate power, meet specified tailwater temperature target, and meet water supply diversions. In determining the configuration of the TCDs in the American River HEC-5Q model annual schedules of monthly tailwater temperature targets for Folsom Dam are specified based on a combination of end-of-May Folsom Lake storage and June to September inflow volume to Folsom Lake, an indicator of the available coldwater pool, for each year of the CalSim 3 simulation period. Specifically, a representative subset of the Automated Temperature Selection Procedure (ATSP) temperature target schedules specified in the 2009 NMFS BiOp were used in the selection procedure for use in the HEC-5Q model. Based on the tailwater target temperature schedule timeseries, the model determines which configuration of the shutters and low-level outlet will produce a release temperature that best meets the monthly temperature target. The low-level outlet with a maximum release capacity of 700 cfs, is allowed to operate from September 15 to November 30. The Water Supply TCD included in the American River HEC-5Q model is operated to withdraw stored water within the temperature range of 63°F to 65°F, and an elevation range of 320 feet to 460 feet. Notably, the schedules only vary for the May through November period. Appendix 6B, Section C of the 2015 ROC on LTO EIS (Reclamation, 2015) provides a complete description of the Folsom Dam TCD operating logic in the American River HEC-5Q model.

3.2.2 HEC-5Q Model Assumptions and Limitations

There are several limitations to the HEC-5Q models and the simulated water temperatures, both in their capability to simulate observed water temperatures and as applied in this Draft EIR. The original calibration of the HEC-5Q model was focused on simulating daily average observed temperatures, primarily in the warmer periods, and while the model adequately represents the thermal responses to the hydrologic and meteorological changes model performance is less accurate during cooler periods, the model employs several algorithms to represent an approximation of current operations, and average monthly predictions are typically only accurate to within 2°F of observation (State Water Board et al., 2023).

The model results and interpretation thereof can also be limited when there is discrepancy between the temporal resolution (time-step) of the input data and model outputs. For example, even though the HEC-5Q models simulate water temperatures on a sub-monthly timescale, given that they are driven by the monthly CalSim 3 results as inputs, the use of modeled temperatures should generally be limited to monthly average values, even though short-term fluctuations that may be real and important to biological resources. In reality, SWP and CVP operators and other water managers consistently monitor and adjust operations at facilities (e.g., real-time adjustment to releases) to maintain compliance with existing standards such as flow and temperature requirements or recommendations pursuant to applicable agreements and regulatory requirements. If sub-monthly results are to be used, it is important to understand that the HEC-5Q models adhere to the CalSim 3 monthly volumes of reservoir storages, releases, and diversions.

When interpreting results in the context of regulatory requirements it is necessary to consider that HEC-5Q models do not alter operations (other than temperature control device gate settings) to meet a temperature objective downstream in the river, and there is no feedback to CalSim 3 to alter simulated operations (i.e., storage, release volumes, or diversion) when targets are not met. Thus, while the CalSim 3 model operates according to a set of pre-defined rules that represent existing or future assumed regulations and operations criteria[3] such that reservoirs and facilities of the SWP and CVP are operated to comply with regulatory flow and water quality requirements, operations are not explicitly modified in response to HEC-5Q outputs to change operations to meet temperature requirements as they would in response to real-time monitoring and planning.

As discussed above, the HEC-5Q model employs several algorithms to approximate current SWP and CVP operations. For Folsom Dam, the model uses a simplified procedure to specify the annual temperature target schedules based on end-of-May storage and June-September inflow, and the targets are not altered dynamically each year. If the cold-water pool estimate is even slightly above or below the threshold used for a tier, the model automatically selects a different temperature schedule that can greatly affect the temperature results.

Lastly, given that the inputs to the HEC-5Q models are from the CalSim 3 model, all the limitations of the CalSim 3 model should be considered when using the temperature results.

3.2.3 Appropriate Use of HEC-5Q Model Results

The American River HEC-5Q model is not a predictive model of actual operations and resulting temperatures (in the way they are applied in this study), and therefore the results cannot be considered as absolute with and within a quantifiable confidence interval unless the hypothetical storages and assumed uniform release rates were to occur.

Because the American River HEC-5Q model is driven by the long-term hypothetical operations simulated in CalSim 3 on a monthly timestep, typically the temperature results are also presented on a monthly timestep. Monthly flow and temperature results are unlikely to address the daily variability in the river temperatures but reflect changes in the monthly means. The daily variability, around a changed mean, could be added to the monthly temperature results by scaling the historical daily temperature patterns to reflect the monthly means. However, this approach of incorporating daily variability does not account for the uncertainty associated with the daily flow conditions which are not included in the boundary flows used by the temperature models. Thus, while the model generates daily results, they need to be interpreted with the understanding that the monthly changes are the most appropriate use of the modeling results.

When reporting, comparing, and interpreting results the same considerations as described in Section 3.1.2 for CalSim 3 apply.

[3] See Appendix 5A, Section B, Modeling Technical Appendix – Hydrology and Systems Operations Modeling, of the Delta Conveyance Project Draft EIR for complete description of CalSim 3 existing or future assumed regulations and operations criteria. Available at https://www.deltaconveyanceproject.com/planning-processes/california-environmental-quality-act/draft-eir/draft-eir-document.

CHAPTER 4
Modeling Approach

4.1 CalSim 3 Hydrologic Modeling

As discussed in Chapter 3, the CalSim 3 model version used as a starting point for the modeling in this study is the same version developed by DWR for the Delta Conveyance Project Draft EIR (DWR, 2022b). A series of CalSim 3 modeling scenarios were developed to evaluate surface water resource conditions (specifically, reservoir storage levels and instream flows) first without operation of the proposed project, and then with operation of the proposed project under varying assumptions about the underlying hydrology and the level of demand for surface water diversion on the surface waters affected by the proposed project. Model scenarios were organized into sets with consistent hydrological and meteorological conditions and baseline water demands, each consisting of a baseline scenario and a set of three proposed project scenarios. The baseline scenario represents conditions that would prevail without the implementation of the proposed project, while the proposed project scenarios simulate the changes and outcomes directly attributable to the proposed project. The three proposed project scenarios incorporate three levels of City of Sacramento demand increases based on demand projections associated with implementation of the proposed project phases. This structured approach helps to clearly differentiate the impacts introduced by the proposed project from the baseline conditions, providing a robust framework for environmental assessment and decision-making.

For this study two sets of model scenarios were developed representing existing (2020) and future conditions (2040). The input hydrology and meteorology information for the existing conditions and future conditions CalSim 3 models was the same as that developed by DWR for the Delta Conveyance Project Draft EIR (DWR, 2022b). The hydrology for the existing conditions analysis represents historic hydrological and meteorological conditions from October 1921 to September 2015. For the future conditions analysis, a future hydrology was generated for the same period of record that incorporates changes in meteorological conditions and sea level rise anticipated from environmental climate changes. Like hydrology and meteorology, baseline water demand inputs to the CalSim 3 models were set to reflect two levels of development, existing and future, using the same inputs as those developed by DWR for the Delta Conveyance Project Draft EIR (DWR, 2022b). For the three proposed project scenarios additional City of Sacramento water demand above what was included in the baseline conditions scenarios was specified to be met through combined diversions at the FWTP and SRWTP intakes that may in-turn affect hydrologic conditions on the lower American River, Sacramento River, the Delta, and the SWP and CVP.

A total of eight scenarios were modeled including four existing condition scenarios with different water demands, and four future conditions scenarios with different water demands. The period modeled for all scenarios is based on hydrology from Water Years 1922 to 2015 (October 1921 to

September 2015). Aligning with CEQA requirements only the existing conditions scenarios are used in this Draft EIR to evaluate the significance of potential impacts of the proposed project. The future conditions scenarios were developed to provide deeper insights into the proposed project's potential impacts, were formulated for informational purposes, and are not intended for formal CEQA impact assessment. These modeling scenarios are shown in **Table 1** and are further described below.

TABLE 1
SUMMARY OF CALSIM 3 MODEL SCENARIOS

Modeling Scenario ID	Title	Input Hydrology	Combined Demand at UD-26N-NU3 and UD-26S-NU1 Calsim 3 Demand Nodes (TAF/Y)[1]
EXISTING (2020) CONDITIONS (Group 1) – Used for CEQA Impact Determinations			
1.0	Existing Conditions, Baseline	Historical[2]	122
1.1	Existing Conditions, +75MGD	Historical	206
1.2	Existing Conditions, +150MGD	Historical	290
1.3	Existing Conditions, Projected Demand	Historical	252
FUTURE (2040) CONDITIONS (Group 2) – Informational			
2.0	Future Conditions, Baseline	Future (3)	122
2.1	Future Conditions, +75MGD	Future	206
2.2	Future Conditions, +150MGD	Future	290
2.3	Future Conditions, Projected Demand	Future	252

NOTES: TAF/Y = thousand acre-feet per year

1. Demand at UD-26N-NU3 is held at a constant 43 TAF/Y for all scenarios.
2. Hydrology inputs (and simulation period) comprise water years 1922-2015 (DWR, 2022a).
3. Climate change assumptions for these models are 2040 Central Tendency hydrology with 1.8 ft sea level rise (DWR, 2022b).

4.1.1 CalSim 3 Existing Baseline Conditions Model Scenario

Assumptions for the Existing Conditions Baseline model include existing facilities, water management operations including SWP and CVP operational assumptions and modeling criteria, ongoing programs, regulatory requirements, water demands, stream diversions and water rights, water transfers, water wheeling, and groundwater elevations as of 2020 and/or as simulated in the CalSim 3 studies of the Draft SWP Delivery Capability Report 2021 (DWR, 2022c) and the Delta Conveyance Project Draft EIR (DWR, 2022b).

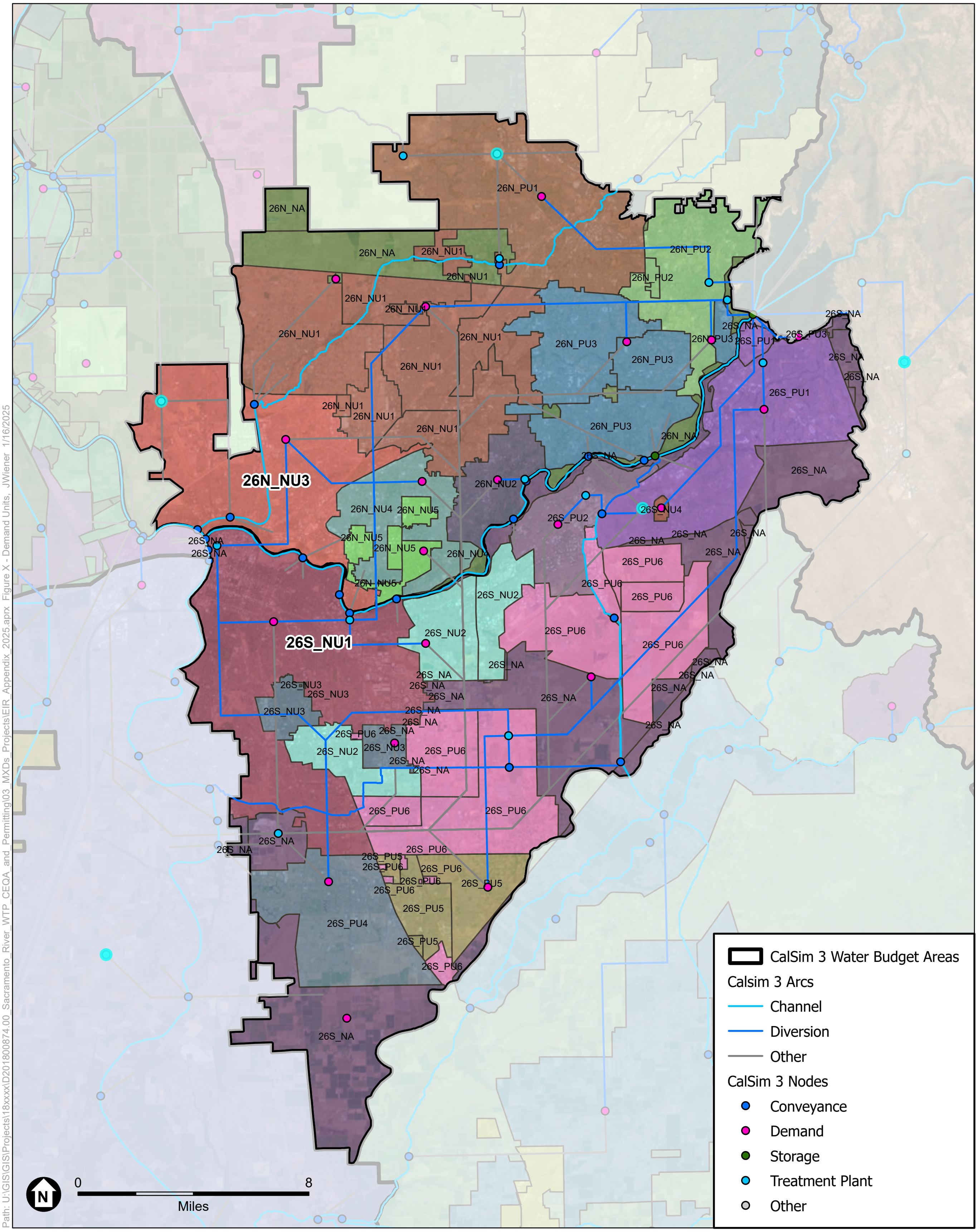
The hydrology for the Existing Conditions Baseline model analysis is based on existing (historical) hydrological and meteorological conditions. The period modeled for this Draft EIR analysis uses hydrology from water years 1922 to 2015 (October 1921 to September 2015), the same time period that is available for the CalSim 3 model. The water year types documented during this period represent a wide range of hydrologic conditions, and this hydrologic variability is expected to occur during the operation of the proposed project. Hydrologic inputs are those developed for the 2021 Delivery Capability Report prepared by the DWR (2022c). Groundwater elevations at the start of the period of simulation are derived from output from the California Central Valley Groundwater-Surface Water Fine Grid Simulation Model (C2VSimFG).

Water demands for the Existing Conditions Baseline model were set as the 2020 level of development, as represented in CalSim 3 studies for the 2021 Delivery Capability Report (DWR, 2022c). These demands are the same as those used for the Delta Conveyance Project Draft EIR (DWR, 2022b). For major water purveyors, such as the City, urban water demands are based on 2015 Urban Water Management Plans and historical annual production data for the years 2016 through 2019 contained in DWR's Public Water Supply 7 Statistics Database (PWSS). For small, unincorporated communities, water demands are based on per capita water use rates and population estimates. Annual water demands are disaggregated to monthly demands based on historical monthly production data in the PWSS database. Urban water demands input to CalSim 3 consist of a 12-month repeating timeseries with no inter-annual variation.

The Existing Conditions Baseline model includes continuation of current operations of the SWP and CVP by DWR and Reclamation, respectively. Assumptions for regulatory requirements in existing conditions related to operations of the SWP and CVP are from the 2019 NMFS and USFWS BiOps (under the ROC on LTO) and the 2020 CDFW ITP. The regulatory assumptions also include continued operations under the Coordinated Operations Agreement; State Water Resources Control Board (State Water Board) Decision 1641 (D-1641); and the State Water Board Water Quality Control Plan adopted in 2006.

CalSim 3 incorporates the City of Sacramento water demands with demand units UD-26N-NU3 (service area north of the American River) and UD-26S-NU1 (service area south of the American River). The City of Sacramento also provides retail services within the City limits, and wholesale and wheeling services outside the city limits. These demands are incorporated into the City's local water demands at demand units UD-26N-NU3 and UD-26S-NU1. Demands at these demand units are met through combined diversions at the FWTP and SRWTP and with supplementary groundwater pumping. The CalSim 3 model logic allows for demands unable to be met at FWTP due to operational constraints and/or regulatory requirements on the American River to be met by diversions at the SRWTP on the Sacramento River (see Section 4.1.4, *CalSim 3 Model Operation and Regulatory Requirements*). The combination of various surface water supplies and groundwater supplies improve the reliability for delivering drinking water.

Under Existing Baseline Conditions, the total combined annual city demand at units UD-26S-NU1 and UD-26N-NU3 is 122 TAF (Table 1). Notably, diversions from FWTP are also used to meet water demands at several other demand units: UD-26N-NU1, UD-26N-NU3, UD-26N-NU4, and UD-26S-NU2. Whereas diversions from SRWTP are only also used to meet demands at demand unit UD-26S-PU4 (**Figure 4**). Demands at demand unit UD-26S-PU4 are also supported by diversions from Vineyard Water Treatment Plant (WTPVNY). Due to the simpler water partitioning and downstream location of demand unit UD-26S-NU1, only demands at this unit were altered to reflect implementation of the proposed project and demands at UD-26N-NU3 were left unchanged (see Section 4.1.3, *CalSim 3 Proposed Project Model Scenarios*). The repeating monthly hydrograph of the City's Existing Conditions Baseline demand at UD-26S-NU1 is presented in **Figure 5**.



Path: U:\GIS\GIS\Projects\18xxxx\D201800874.00_Sacramento_River_WTP_CEQA_and_Permitting\03_MXDs_Projects\EIR_Appendix_2025.aprx Figure X - Demand Units JWiener 1/16/2025

SOURCE: DWR 2022

City of Sacramento's Water + Treatment Plants Resiliency and Improvements Project

Figure 4
CalSim 3 Demand Units

ESA

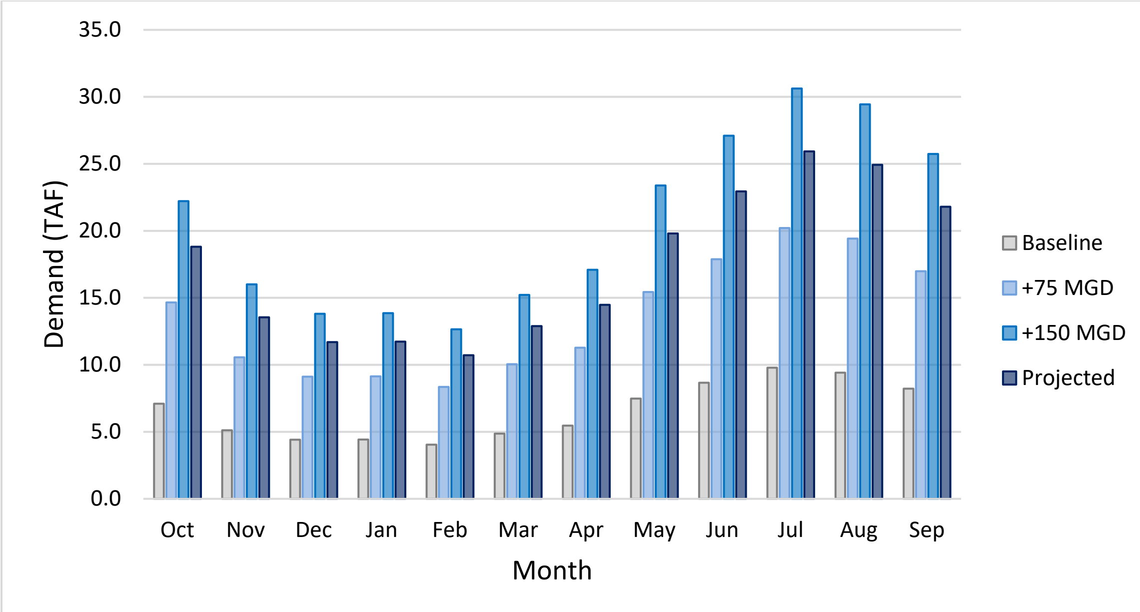


Figure 5
Existing and Future Conditions Model Scenarios City of Sacramento Monthly Urban Demand Patterns at Demand Unit UD-26S-NU1

In CalSim 3, diversions at FWTP are constrained by contract limits and various Water Forum constraints (DWR, 2022a). The CalSim 3 FWTP maximum diversion rate of 310 cubic feet per second (cfs) (200.4 MGD) is based on Water Forum constraints, which are consistent with reports of the plants' peak hydraulic flow rate (City of Sacramento, 2021) but exceed the 80 MGD of reliable treatment capacity currently provided by FWTP. When run, the Calsim 3 model version (i.e., existing conditions model developed by DWR for the Delta Conveyance Project Draft EIR) simulates FWTP diversions that are as large as 124 MGD (192 cfs) and that regularly exceed the current reliable operating capacity of 80 MGD (approximately 34 percent of timeseries of monthly outputs). As discussed in Section 2.2, *Project Description*, the proposed project includes resiliency improvements at FWTP would provide a reliable surface water treatment capacity of 100 MGD, with the capability of treating 120 MGD for short periods of time. Durations that the FWTP intake would operate to deliver 120 MGD are unknowable and are expected to occur during wetter water year types (e.g., above normal and wet water years) based on demands and water availability considerations. Given that under most conditions the intake would be expected to operate to deliver 100 MGD or less, the Calsim 3 modeling code was modified to constrain FWTP diversions to no more than 100 MGD (154.7 cfs). This change was implemented in all model scenarios. This simplifying assumption had the additional benefit of improving model stability and eliminated the need to develop complex logic regarding when the intake may operate to deliver above the 100 MGD rate. Further, while the FWTP intake may in reality operate at the 120 MGD diversion rate the effect on surface water resources of such operations would be relatively minimal. For instance, the 20 MGD difference in rates equates to a difference of 30.9 cfs, which amounts to less than 1 percent of typical flow rates in the lower American Rier.[4] If the

4 The average flow in American River at Fair Oaks, CA for the period of record 1904-2024 is 3,679 cfs (USGS Gage #s: 11446500).

FWTP were operated continuously at the higher rate (i.e., 120 MGD vs 100 MGD) for one month, the minimum CalSim 3 time-step, the volumetric difference in diversion would be only 1.9 TAF, which is only 1.5 percent of the annual city demand at units UD-26S-NU1 and UD-26N-NU3.

Ultimately, the Existing Conditions Baseline model represents the conditions at the time the Notice of Preparation (NOP) was issued, encompassing the water demands and historical hydrologic conditions in the study area. This scenario serves as a snapshot of the present situation, which is critical for understanding the current water use and hydrology before any new interventions are applied.

4.1.2 CalSim 3 Future Baseline Conditions Model Scenario

The CalSim 3 future conditions baseline model reflects projected year 2040 conditions in the absence of the proposed project. In general, the future conditions baseline model includes facilities and programs that are represented in the existing baseline conditions model along with updates to water supplies and water demands that differ from existing baseline conditions to incorporate projected changes in land use and urban growth, climate change, and sea level rise (DWR, 2022b).

As discussed in Section 4.1 above, future hydrologic and meteorological conditions that incorporate projected environmental climate changes used in this study were generated by the DWR for the Delta Conveyance Project Draft EIR (DWR, 2022b). The approach used to generate these inputs is summarized here with more complete details available in DWR (2022b). Broadly, CalSim 3 hydrology inputs for future conditions that differ from existing conditions include climate data, unimpaired inflow to the rivers and streams of the Central Valley rim watersheds (e.g., CalSim 3 boundary conditions), valley floor hydrology, and reservoir evaporation.

The 2040 climate data was developed with 20 global climate projections using the Coupled Model Intercomparison Project 5 (CMIP5), selected by the DWR Climate Change Technical Advisory Group (CCTAG). The future conditions scenarios use the 2040 median climate scenario (Central Tendency) developed by DWR for the Delta Conveyance Project Draft EIR (DWR, 2022b). This dataset along with its updated CalSim 3 model are the current best available data. To generate the climate change hydrology, historical observed meteorological daily data were perturbed with the differences observed in the ensemble of the selected global climate projections.

For the future CalSim 3 boundary conditions, historical and perturbed meteorological data were input into a gridded watershed model (Variable Infiltration Capacity [VIC]) to estimate climate variables (runoff, surface water evaporation, and potential ET). The differences between historical and projected meteorology and climate conditions were applied to the historical CalSim 3 boundary conditions to represent 2040 conditions. Future valley floor hydrology was generated by modifying hydrology inputs to CalSimHydro[5] to reflect the 2040 land use, urban growth, and climate scenario. Modified inputs include land use, precipitation, and potential crop evapotranspiration. Potential reference crop ET output from the VIC model simulation were used to perturb historical rates. Lastly, open water evaporation output from the VIC model simulation was used to perturb historical reservoir evaporation rates and generate future condition reservoir evaporation rates.

5 CalSimHydro is a pre-processor used to calculate CalSim 3 agricultural and managed wetland water demands.

Sea level rise assumptions were based on the California Ocean Protection Council's (OPC) guidance updated in 2018, the *State of California Sea-Level Rise Guidance* (the Guidance). The Guidance includes science-based methodology for state and local governments to analyze and assess the risks associated with sea level rise and to incorporate sea level rise into their planning, permitting, and investment decisions. The Guidance incorporates probabilistic sea-level rise projections, which associate a likelihood of occurrence (or probability) with sea level rise heights and rates and are directly tied to a range of emissions scenarios. The Guidance also includes an extreme scenario called the H++ scenario (resulting from loss of the West Antarctic ice sheet). The probability of this scenario is currently unknown, but its consideration is important, particularly for high stakes, long-term decisions. Under the extreme H++ scenario rapid ice sheet loss on Antarctica could drive rates of sea-level rise in California above 50 mm/year (2 inches/year) by the end of the century, leading to potential sea-level rise exceeding 10 feet. This rate of sea level rise would be about 30 to 40 times faster than the sea-level rise experienced over the last century.

The future baseline condition water demand is based on a 2040 level of development, as represented in CalSim 3 studies for the Delta Conveyance Project Draft EIR (DWR, 2022b). For major water purveyors, urban water demands for future (2040) conditions are based on the projected 2040 water demand listed in water purveyors' 2015 Urban Water Management Plans, including the City of Sacramento's 2015 Urban Water Management Plan. For small unincorporated communities within the CalSim 3 model domain, water demands are based on per capita water use rates and population projections.

In the DWR (2022b) future baseline condition model, the City's demand at units UD-26S-NU1 and UD-26N-NU3 assumes some level of greater demand over existing conditions. Given potential hydraulic constraints of the City's existing supply and distribution system facilities (City of Sacramento, 2021), presumably the City's portion of the assumed greater demand will be able to be delivered by the proposed project. Therefore, to properly represent the demand under 2040 conditions for the purpose of comparing the proposed water treatment plant improvements, the assumed greater demand was reset to the City's demands from the Existing Conditions Baseline model for demand units UD-26S-NU1 and UD-26N-NU3 to create a future baseline condition model run suitable for comparison to future model scenarios that include the proposed project (i.e., using the Existing Conditions Baseline model UD-26S-NU1 and UD-26N-NU3 inputs preserves increased demands by other non-City water users while simultaneously removing the increased City demand). Like Existing Baseline Conditions, the total combined annual city demand at units UD-26S-NU1 and UD-26N-NU3 for Future Baseline Conditions was 122 TAF (Table 1 and Figure 5).

Lastly, CalSim 3 defines wastewater return flows for each urban demand unit that include a portion of indoor water use, outdoor water use, discharge of treated wastewater, and stormwater runoff that returns to either the surface water or groundwater system. Generally, for urban demand units wastewater return flows are input to be constant throughout the year and are quantified as a proportion of urban demands (DWR, 2022a). Return flows for UD-26S-NU1 and UD-26N-NU3 are defined by wastewater units WW-26S-NU1 and WW-26N-NU3. The annual wastewater return flows for these demand units are calculated in CalSim 3 to equal 61.4 percent of annual demands (DWR, 2022b). The annual wastewater return flows are then partitioned equally across all months to create a repeating time series of inputs. Like the demands at UD-26S-NU1 and UD-26N-NU3, for the future baseline condition model wastewater return flows at WW-26S-NU1 and WW-26N-NU3 were reset to equal those from the Existing Conditions Baseline model.

4.1.3 CalSim 3 Proposed Project Model Scenarios

As discussed in Section 2.2, *Project Description*, the proposed project would be completed in two phases whereby the SRWTP raw water supply and treatment capacity would initially be increased from 160 MGD to 235 MGD (an increase of 75 MGD [+75 MGD scenario]) and at full buildout would be increased from 235 MGD to 310 MGD (a total increase of 150 MGD [+150 MGD scenario]). The additional 150 MGD of water diversion capacity provided by the proposed new water intake would be accommodated under the City's existing surface water entitlements, as detailed in Section 1.1, *Background*. The City's surface water rights are senior to those held by Reclamation and DWR for operation of the CVP and SWP, respectively. Despite the relative seniority of the City's surface water rights, increased diversions by the City may have effects on SWP and CVP system operations to include changes in upstream reservoir operations, changes in river flows, and changes in water supply available to some SWP and CVP contractors.

A set of modeling scenarios was developed to represent and assess potential effects of the proposed project on the environment for both the +75 MGD scenario and +150 MGD scenario under existing and future conditions (Table 1). It is not realistic in CalSim 3 to represent the proposed diversion capacity increases at SRWTP by simply having the plant operate continuously at the increased rate. Instead, the proposed diversion capacity increases need to be quantified as an increase in water demand throughout the year. Therefore, the proposed project was represented in the CalSim 3 existing and future proposed project model runs by increasing demands at the UD-26S-NU1 demand unit above those used in the existing and future baseline conditions model runs (see subsections below for details)[6]. As discussed in the section above, CalSim 3 includes wastewater return flows for UD-26S-NU1 and UD-26N-NU3 (i.e., WW-26S-NU1 and WW-26N-NU3) that are linearly scaled to equal 61.4 percent of annual demands (DWR, 2022b). To conserve mass in the model simulations and account for changes in return flows associated with different City demands, inputs at WW-26S-NU1 and WW-26N-NU3 were adjusted for each proposed project model simulation based on UD-26S-NU1 and UD-26N-NU3 inputs using the same 61.4 percent scalar as the baseline conditions simulations.[7] No other changes were made to the existing and future baseline conditions model runs for the existing and future proposed project model runs.

The +75 MGD and +150 MGD model scenarios include increased water demands over baseline conditions based on the additional volumes of water able to be diverted if the SRWTP were operated continuously at the higher diversion rates provided by the proposed capacity improvements. While these theoretical demand increases are useful benchmarks for assessing potential effects of the

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6 Water demand increases associated with the proposed increases in diversion capacity were calculated as the additional annual volume of water able to be diverted from the proposed diversion improvements (i.e., an increase of 75 MGD corresponds to 84.0 TAF/Y and an increase of 150 MGD corresponds to 168.1 TAF/Y).

7 Consistent with baseline conditions model simulations and DWR (2022b), inputs at WW-26S-NU1 and WW-26N-NU3 were defined as a monthly repeating timeseries equal to 1/12th the annual demand at UD-26S-NU1 and UD-26N-NU3, respectively.

proposed project on the environment, an additional set of model scenarios were developed based on projected City water demands from the City's 2020 UWMP (Projected Demand scenarios). The annual City demand specified in the Projected Demand scenarios was set as 252,279 acre-feet per year (AF/Y), which includes a projected 2050 retail water use of 155,219 AF/Y and 2050 projected wholesale demand of 97,060 TAF/Y (City of Sacramento, 2021; Tables 4-4 and 4-8, respectively).

The proposed project model scenarios are discussed in more detail in the subsections below.

75 MGD Project Scenario

For the +75 MGD model scenarios, increased SRWTP diversion capacity was added as a set of proportional monthly increases to existing City demand. Specifically, the 84.0 TAF/Y of additional diversion capacity that would result from continued operation of SRWTP with an increase of 75 MGD was represented in both the existing and future CalSim 3 model runs by increasing monthly demands at UD-26S-NU1 proportional to existing demands (**Table 2**).[8] The repeating monthly hydrograph representing the City's demand for the existing and future +75 MGD model scenarios at UD-26S-NU1 are presented in Figure 5.

TABLE 2
MODEL SCENARIO MONTHLY DEMANDS AT UD-26S-NU1 AND UD-26N-NU3

Month	Existing and Future Baseline Demand at UD-26S-NU1 (TAF)	Monthly Proportion of Total Demand (%)	Existing and Future +75 MGD Model Scenario Demand at UD-26S-NU1 (TAF)	Existing and Future +150 MGD Model Scenario Demand at UD-26S-NU1 (TAF)	Existing and Future Projected Demand Model Scenario Demand at UD-26S-NU1 (TAF)	All Scenarios Demand at UD-26N-NU3 (TAF)
Oct	7.1	9.0%	14.7	22.2	18.8	3.9
Nov	5.1	6.5%	10.6	16.0	13.6	2.8
Dec	4.4	5.6%	9.1	13.8	11.7	2.4
Jan	4.4	5.6%	9.1	13.9	11.7	2.4
Feb	4.0	5.1%	8.3	12.7	10.7	2.2
Mar	4.9	6.2%	10.0	15.2	12.9	2.6
Apr	5.5	6.9%	11.3	17.1	14.5	3.0
May	7.5	9.5%	15.4	23.4	19.8	4.1
Jun	8.7	11.0%	17.9	27.1	22.9	4.7
Jul	9.8	12.4%	20.2	30.6	25.9	5.3
Aug	9.4	11.9%	19.4	29.4	24.9	5.1
Sep	8.2	10.4%	17.0	25.7	21.8	4.5
Annual Total	**79.0**	**100.0%**	**163.1**	**247.1**	**209.3**	**43.0**

NOTES: TAF = thousand acre-feet

150 MGD Project Scenario

For the +150 MGD model scenarios, the increase in SRWTP diversion capacity was also represented as a set of proportional monthly increases to existing City demand. Specifically, the

8 The total annual increase in demand of 84.0 TAF/Y was partitioned and added to each existing monthly demand in equal proportion to the percentage that each existing monthly demand was relative to the existing total annual demand.

168.1 TAF/Y of additional diversion capacity that would result from continued operation of SRWTP with an increase of 150 MGD was represented in both the existing and future CalSim 3 model runs by increasing monthly demands at UD-26S-NU1 proportional to existing demands (Table 2).[9] The repeating monthly hydrograph representing the City's demand for the existing and future +150 MGD model scenarios at UD-26S-NU1 are presented in Figure 5.

Projected Demand Scenario

The monthly demand template for the Projected Demand model scenario was generated similar to the +75 and +150 MGD model scenarios by proportional increasing to existing monthly City demands. Specifically, the 130.3 TAF/Y of additional demand between the 122 TAF/Y existing baseline conditions demand at UD-26S-NU1 and UD-26N-NU3 and the Projected Demand scenarios demand of 252.3 TAF/Y was represented in both the existing and future CalSim 3 model runs by increasing monthly demands at UD-26S-NU1 proportional to existing demands (Table 2). The repeating monthly hydrograph representing the City's demand for the existing and future Projected Demand model scenarios at UD-26S-NU1 are presented in Figure 5.

4.1.4 CalSim 3 Model Operation and Regulatory Requirements

In the CalSim 3 model runs, increased City water demands specified at demand unit UD-26S-NU1 are generally met by water sourced from upstream reservoir storage, reduced deliveries to junior water rights holders, reduced flow downstream in the Sacramento River, or due to an interbasin transfer and reduced flow downstream in the Trinity River.

In determining water management operations, CalSim 3 makes storage release decisions and routes water through the stream network based on a set of pre-defined rules that represent existing or future assumed regulations and operations criteria.[10] This means the model "behaves" such that reservoirs and facilities of the SWP and CVP are operated to comply with regulatory flow and water quality requirements. For instance, minimum flow targets in the Lower American River below Nimbus Dam are based on the Lower American River Modified Flow Management Standard, per the 2017 Water Forum Agreement (WFA), and minimum flows further downstream on the American River at the H Street bridge are based on State Water Board Decision 893 (D-893). Pursuant to the Water Forum Agreement, the City agreed to add conditions to its American River water right permits, which became effective after the 2004 expansion of the FWTP, limiting diversions at the FWTP intake when American River flows at the treatment plant intake fall below the Hodge Flow Conditions. Diversions are allotted up to 200 MGD when not under Hodge Flow Conditions. The Hodge Flow Conditions are implemented in CalSim 3 such that whenever the American River flow rate is less than the Hodge Flow Criteria, CalSim 3 diversions at the FWTP intake cannot be more than the maximum diversions shown in **Table 3**. The condition in the City of Sacramento's Water Forum purveyors-specific agreement that limits the

9 The total annual increase in demand of 168.1 TAF/Y was partitioned and added to each existing monthly demand in equal proportion to the percentage that each existing monthly demand was relative to existing total annual demand.

10 See Appendix 5A, Section B, Modeling Technical Appendix – Hydrology and Systems Operations Modeling, of the Delta Conveyance Project Draft EIR for complete description of CalSim 3 existing or future assumed regulations and operations criteria. Available at https://www.deltaconveyanceproject.com/planning-processes/california-environmental-quality-act/draft-eir/draft-eir-document.

quantity of water diverted from the American River at the FWTP intake under extremely dry years (i.e., conference years[11]) to 155 cfs and 50,000 AF/Y is also implemented in the CalSim 3 model. The CalSim 3 model logic allows for demands unable to be met at FWTP due to operational constraints and/or regulatory requirements on the American River to be met by diversions at the SRWTP under some of the City's permits on the Sacramento River (DWR, 2022a).

TABLE 3
HODGE FLOW CRITERIA FOR MAXIMUM DIVERSION AT FAIRBAIRN WATER TREATMENT PLANT INTAKE

Maximum Diversion	River Flow and Time of Year						
	< 2,000 cfs	< 3,000 cfs		< 1,750 cfs			< 2,000 cfs
	01/01 – 02/28	03/01 – 05/31	06/01 – 06/30	07/01 – 08/31	09/01 – 09/30	10/01 – 10/14	10/15 – 12/31
Rate (MGD)	77.6	77.6	100.2	100.2	77.6	64.6	64.6
Rate (cfs)	120	120	155	155	120	100	100

NOTES: cfs = cubic feet per second; MGD = million gallons per day

When river flows exceed hodge criteria the model will make diversion based on meeting demands.

SOURCE: Water Forum Agreement, Section 5 and Appendix C, January 2000. Water Right Order amending Permit 11358-11361, amended State Water Board, 2000.

CalSim 3 assumptions for additional, downstream regulatory requirements related to operations of the SWP and CVP are from the 2019 BiOps (under the ROC on LTO; NMFS, 2019), and 2020 CDFW ITP (CDFW, 2020). The regulatory assumptions also include continued operations under the CVP-SWP Coordinated Operations Agreement; State Water Board D-1641 (State Water Board, 2000); and the State Water Board Water Quality Control Plan adopted in 2006 (State Water Board, 2006). Overall, meeting regulatory requirements, including Delta water quality objectives, is the highest operational priority in the CalSim 3 model. The sources and locations for the relevant Lower American River and Delta instream flow and reservoir storage criteria are summarized in **Table 4**.

TABLE 4
SUMMARY OF CALSIM 3 INSTREAM FLOW AND WATER QUALITY CRITERIA

Water Body	Point of "Compliance"	Minimum instream flows
Lower American River	Below Nimbus Dam	Modified Flow Management Standard with a planning minimum end of Dec storage target of 275 TAF
Lower American River	At H Street Bridge	State Water Board D-893
Delta	Delta Outflow	State Water Board D-1641
Delta	X2 Position	State Water Board D-1641

NOTES: TAF = thousand acre-feet

4.1.5 CalSim 3 Model Outputs

CalSim 3 dynamically computes water year types based on simulated runoff to date and forecasts of future inflows. Water year types may vary from the initial forecast made in February through

[11] Conference years are those years which require diverters and others to meet and confer on how best to meet demands and protect the American River.

to May when the final forecast of water year type is made. Water year types also may vary between Existing Conditions and future 2040 conditions. For the presentation of results, water year type refers to the Sacramento Valley 40-30-30 hydrologic classification (wet, above normal, below normal, dry, critically dry) as defined in D-1641 (State Water Board, 2000).

Generally, model results are summarized by calculating and comparing long-term and/or water-year-type simulation period averages, annual averages, or monthly averages over the entire simulation period of water years 1922-2015.[12] Comparison between simulations are generally quantified as the difference between long-term averaged values from a modeling scenario minus those from the relevant existing conditions baseline, such that negative values represent a decrease in modeled parameters (e.g., reduced river flows, reduced reservoir storage, etc.) compared to the baseline conditions. Both the magnitude of these differences as well as the percentage these differences represent relative to baseline conditions are presented. For each set of comparisons, results are generally presented as long-term simulation period averages, annual averages, or monthly averages over the entire simulation period of water years 1922-2015.

In general, annual values for flows and deliveries are computed from October 1 through September 30. However, SWP deliveries to its long-term water contractors are presented by SWP contract year, unless otherwise noted (January–December), and CVP deliveries to its contractors are presented by CVP contract year (March–February), unless otherwise noted.

Relevant CalSim 3 model output locations and parameters for assessing potential changes attributable to the proposed project are summarized in **Table 5**. **Figure 6** presents the locations of these output nodes at the regional and local scales. Details of reservoirs for which CalSim 3 model outputs are reported are shown in **Table 6**.

[12] Simulation period averages are calculated using the full set of simulation results (e.g., for the average simulation period percent difference between two scenarios, first the percent difference between scenarios in each time step is calculated and the simulation period average is the average of that set of values). For a given output location this yields one value per metric (i.e., percent difference and magnitude difference). Simulation period averages by water year type are calculated the same but using a subset of the results according to water year classification. For a given output location this yields five values per metric. Monthly averages are calculated the same as simulation period averages and simulation period averages by water year type same but using a subset of the results according to month and month-water year classification combinations as appropriate. For a given output location this yields 12 monthly averages values per metric and 60 monthly averages by water year type value per metric (i.e., 12 months times fiver water year types).

TABLE 5
CALSIM 3 MODEL NODES AND PARAMETERS

Location	CalSim 3 Node	Parameter	Units	Indicator	Analysis metric(s)[1]
Folsom Reservoir	S_FOLSM	Reservoir Storage	TAF	End of Month	Long term monthly averages and End of September and December Storage
Shasta Lake	S_SHSTA	Reservoir Storage	TAF	End of Month	Long term monthly averages and End of September and December Storage
Clair Engle Reservoir (Trinity Lake)	S_TRNTY	Reservoir Storage	TAF	End of Month	Long term monthly averages and End of September and December Storage
Lake Oroville	S_OROVL	Reservoir Storage	TAF	End of Month	Long term monthly averages and End of September and December Storage
American River below Nimbus Dam (above Fairbairn WTP)	C_AMR009	Flow	cfs	Monthly Average	Long term monthly averages
American River below Fairbairn WTP	C_AMR006	Flow	cfs	Monthly Average	Long term monthly averages
Sacramento River below Keswick and Clear Creek Tunnel	C_KSWCK	Flow	cfs	Monthly Average	Long term monthly averages
Sacramento River above American River	C_SAC064	Flow	cfs	Monthly Average	Long term monthly averages
Sacramento River between American River and SRWTP	C_SAC063	Flow	cfs	Monthly Average	Long term monthly averages
Sacramento River below SRWTP (Sacramento River Pump Station)	C_SAC062	Flow	cfs	Monthly Average	Long term monthly averages
Trinity River below Clear Creek Tunnel	C_TRN111	Flow	cfs	Monthly Average	Long term monthly averages
Feather River flows at Mouth	C_FTR003	Flow	cfs	Monthly Average	Long term monthly averages
Delta outflow	NDOI	Flow	cfs	Monthly Average	Long term monthly averages
Sacramento River WTP	D_SAC062_WTPSAC	Diversion	TAF	Monthly Total	Long term monthly averages and average annual totals
Fairbairn WTP	D_AMR007_WTPFBN	Diversion	TAF	Monthly Total	Long term monthly averages and average annual totals
Banks Pumping Plant (SWP Exports)	C_CAA003_SWP + C_CAA003_WTS	Delta Export	TAF	Monthly Total	Average annual totals
Jones Pumping Plant (CVP Exports)	C_CAA003_CVP + C_DMC000	Delta Export	TAF	Monthly Total	Average annual totals
X2 Position	X2_PRV	Salinity	N/A	Monthly Average	Long term monthly averages

NOTES: cfs = cubic feet per second; TAF = thousand acre-feet

1. Results also compared to relevant regulatory requirement and objectives.

TABLE 6
DETAILS OF MAJOR RESERVOIRS THAT MAY BE AFFECTED BY THE PROPOSED PROJECT

Reservoir Name	Sub-Basin	Owner/Operator	Storage Volume (acre-feet)	1 Percent of Storage Volume (TAF)
Folsom Reservoir	American	Reclamation	967,000	9.7
Shasta Lake	Sacramento	Reclamation	4,552,000	45.5
Clair Engle Reservoir (Trinity Lake)	Trinity	Reclamation	2,447,650	24.5
Lake Oroville	Feather	DWR	3,424,753	34.2

NOTES: DWR = California Department of Water Resources; Reclamation = Bureau of Reclamation; TAF = thousand acre-feet

SOURCE: Reclamation, 2024b. DWR, 2025.

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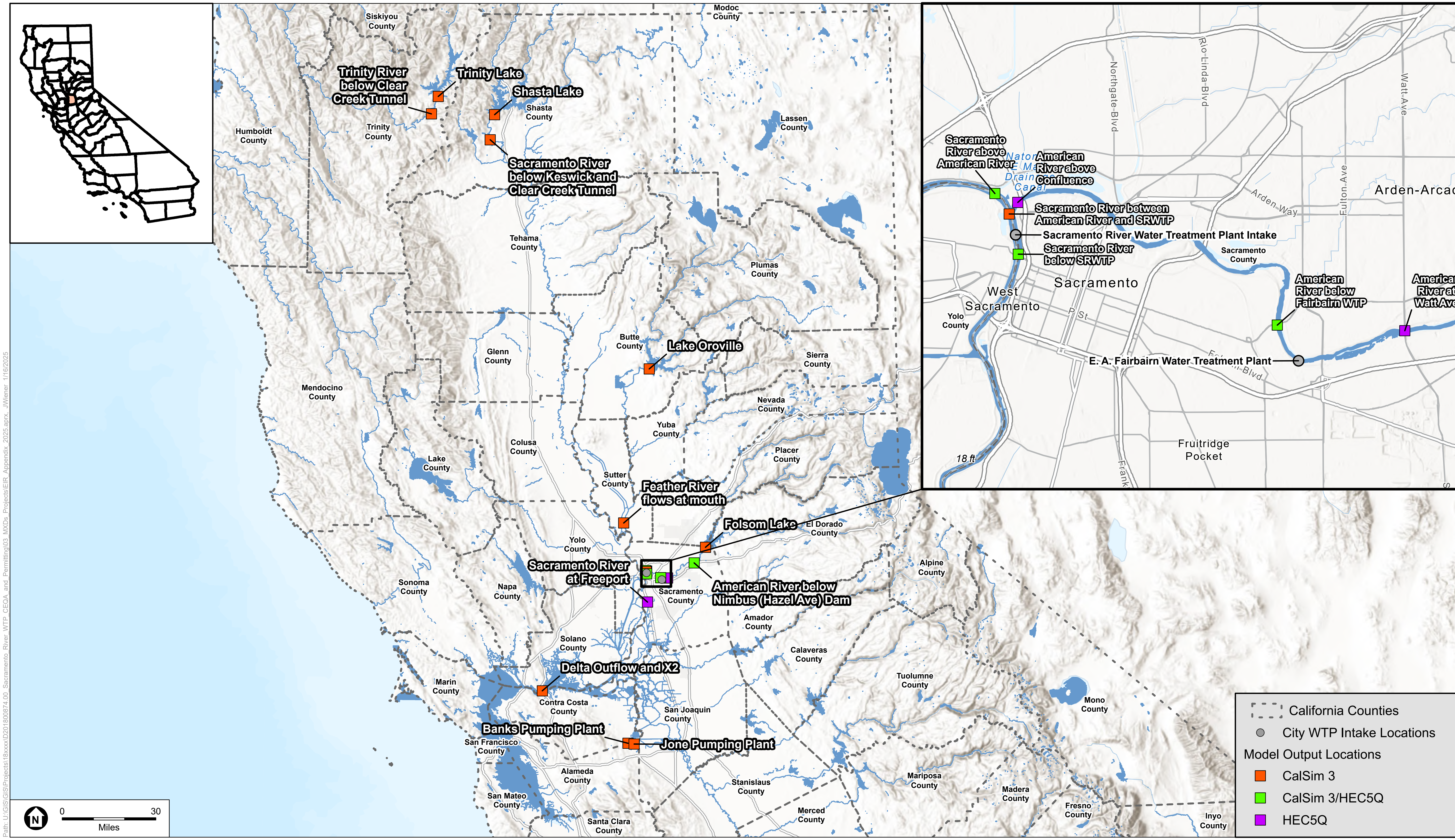

SOURCE: ESRI, 2016; DWR, 2022; ESA, 2025

City of Sacramento's Water + Treatment Plants Resiliency and Improvements Project

Figure 6
CalSim 3 and HEC-5Q Output Locations

ESA

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4.2 HEC-5Q Temperature Modeling

4.2.1 American River HEC-5Q Model

As discussed in Chapter 3, the American River HEC-5Q model version used as a starting point for the modeling in this study is the same developed by DWR for the Delta Conveyance Project Draft EIR (DWR, 2022b). No modifications were made to the model code or to the meteorological inputs, meaning the only difference was to the initial storage levels, reservoir and tributary inflows, reservoir outflows, diversions, and reservoir evaporation derived from CalSim 3 outputs.

4.2.2 HEC-5Q Model Scenarios and Outputs

The scenarios modeled with the American River HEC-5Q model were the same as those modeled with the CalSim 3 model. A total of eight scenarios were modeled including four existing condition scenarios with different water demands, and four future conditions scenarios with different water demands (Table 1).

Relevant HEC-5Q model output locations for assessing potential water temperature changes attributable to the proposed project are summarized in **Table 7**. Generally, model results are summarized by calculating long-term and/or water-year-type annual or monthly averages over the entire simulation period of water years 1922-2015. Comparisons between simulations are generally quantified as the difference between long-term averaged values from a modeling scenario minus those from the relevant existing conditions baseline, such that negative (positive) values represent a decrease (increase) in water temperature compared to the baseline conditions (e.g., a negative residual means a decrease in temperature relative to the existing conditions baseline and visa-versa). Both the magnitude of these differences as well as the percentage these differences represent relative to Baseline conditions are presented.

TABLE 7
AMERICAN RIVER HEC-5Q MODEL NODES AND PARAMETERS

Location	Parameter	Units	Indicator	Analysis metric(s)
American River below Nimbus Dam (above Fairbairn WTP)	Temperature	°F	Monthly Average	Long term monthly averages
American River at Watt Avenue	Temperature	°F	Monthly Average	Long term monthly averages
American River below Fairbairn WTP	Temperature	°F	Monthly Average	Long term monthly averages
American River above Sacramento River	Temperature	°F	Monthly Average	Long term monthly averages
Sacramento River above American River	Temperature	°F	Monthly Average	Long term monthly averages
Sacramento River below SRWTP (Sacramento River Pump Station)	Temperature	°F	Monthly Average	Long term monthly averages
Sacramento River at Freeport	Temperature	°F	Monthly Average	Long term monthly averages

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CHAPTER 5
Model Results and Discussion

5.1 CalSim 3 Results and Discussion

5.1.1 Surface Water Changes

This subsection describes and presents results of the simulated environmental changes associated with proposed project diversion-related changes to surface water resources. Such changes could affect resources dependent upon existing hydrologic conditions. Thus, descriptions of estimated potential changes to surface water resources presented in this section provide a basis for understanding potential effects on other resources.

As discussed in Section 4.1.5, *CalSim 3 Model Outputs*, all results are presented relative to baseline conditions. For each set of model scenario comparisons, results are generally presented as long-term annual or monthly averages over the entire simulation period of water years 1922-2015 and grouped by Water Year Type.

Additional results for each model output location are presented in **Exhibit A**, **Exhibit B**, and **Exhibit C**. Respectively these exhibits include results in the form of: (1) tables presenting long-term monthly average baseline model parameters and the percent change and magnitude change in average monthly model parameters from the baseline condition for each proposed project model scenario for each month for the entire model simulation and again for each water year type; (2) exceedance probability plots of simulated model parameters stratified by water year types (e.g., wet, above normal, below normal, dry, and critically dry) for each model scenario; and (3) "detailed" exceedance probability plots showing exceedance probabilities of simulated model parameters for each model scenario, exceedance probabilities of the percent change between baseline and each proposed project model scenario, and exceedance probabilities of the magnitude change between baseline and each proposed project model scenario for the entire model simulation.

Surface Water Results Summary – Existing Conditions

Comparison of Existing Conditions Project Scenarios with Existing Condition Baseline

This section provides a broad summary of relevant CalSim 3 existing conditions model results and discussion of the simulated river and reservoir changes associated with implementation of the proposed project. Importantly, unless otherwise stated, model results always meet or are within the range of relevant uncertainty of regulatory or otherwise agreed upon flow, storage, temperature, and water quality requirements (DWR, 2017; 2021).

River Flows

Changes in simulated, long-term (simulation period) average flows between existing baseline and existing proposed project model scenarios are summarized in **Table 8**. This table depicts summary statistics (arithmetic mean) of percent and magnitude changes between baseline and proposed project model scenarios calculated from long-term averaged model output values.[13] Metrics are presented for all water year types and again for just Dry and Critically Dry water year types when water supplies are often most limited**.** These metrics provide a high-level summary of simulated expected changes to surface hydrology parameters between baseline and proposed project model scenarios for a broad range of conditions.

TABLE 8
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE STREAMFLOW UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (cfs)[a]	Long-term Average Dry/ Critical Years (cfs)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Flow at Trinity River below Clear Creek Tunnel				
1.0 - Existing Baseline	1,049	704	-	-
1.1 - +75 MGD	1,046	698	-0.4% (-2.6)	-0.8% (-5.8)
1.2 - +150 MGD	1,045	698	-0.5% (-3.4)	-0.8% (-5.8)
1.3 - Projected Demand	1,046	698	-0.4% (-2.9)	-0.8% (-5.8)
Total Flow at Feather River below Thermalito Afterbay				
1.0 - Existing Baseline	4,130	2,064	-	-
1.1 - +75 MGD	4,132	2,071	0.2% (2.0)	0.5% (6.6)
1.2 - +150 MGD	4,134	2,078	0.3% (3.6)	1.0% (14.2)
1.3 - Projected Demand	4,133	2,076	0.3% (3.1)	0.9% (12.3)
Total Flow at Feather River at Mouth				
1.0 - Existing Baseline	7,297	3,297	-	-
1.1 - +75 MGD	7,298	3,304	0.2% (1.4)	0.4% (6.5)
1.2 - +150 MGD	7,299	3,311	0.3% (2.7)	0.7% (14.2)
1.3 - Projected Demand	7,299	3,309	0.2% (2.4)	0.6% (12.3)
Total Flow at Sacramento River below Keswick and Clear Creek Tunnel				
1.0 - Existing Baseline	8,495	6,252	-	-
1.1 - +75 MGD	8,498	6,277	0.1% (2.9)	0.5% (25.4)
1.2 - +150 MGD	8,499	6,288	0.1% (3.8)	0.6% (35.9)
1.3 - Projected Demand	8,499	6,286	0.1% (3.5)	0.6% (33.7)

13 CalSim 3 simulated water management operations at a monthly time-step. Thus, results should be interpreted in the context as being long-term averaged monthly values.

TABLE 8
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE STREAMFLOW UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (cfs)[a]	Long-term Average Dry/ Critical Years (cfs)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Flow at Sacramento River above American River				
1.0 - Existing Baseline	17,917	10,690	-	-
1.1 - +75 MGD	17,927	10,724	0.1% (9.7)	0.5% (33.8)
1.2 - +150 MGD	17,928	10,737	0.2% (10.4)	0.7% (46.5)
1.3 - Projected Demand	17,927	10,733	0.2% (9.3)	0.6% (42.7)
Total Flow at Sacramento River between American River and SRWTP Intakes				
1.0 - Existing Baseline	21,157	12,246	-	-
1.1 - +75 MGD	21,138	12,263	0.0% (-19.0)	0.2% (17.1)
1.2 - +150 MGD	21,123	12,263	-0.1% (-33.9)	0.3% (16.7)
1.3 - Projected Demand	21,128	12,269	-0.1% (-28.5)	0.3% (23.3)
Total Flow at Sacramento River below SRWTP Intakes				
1.0 - Existing Baseline	21,078	12,163	-	-
1.1 - +75 MGD	20,983	12,081	-0.6% (-94.8)	-0.8% (-81.9)
1.2 - +150 MGD	20,886	11,970	-1.3% (-192.0)	-1.8% (-192.7)
1.3 - Projected Demand	20,928	12,026	-1.0% (-149.5)	-1.3% (-136.1)
Total Flow at American River below Nimbus Dam (above FWTP intake)				
1.0 - Existing Baseline	3,339	1,663	-	-
1.1 - +75 MGD	3,332	1,662	0.3% (-6.7)	1.0% (-0.6)
1.2 - +150 MGD	3,323	1,652	0.2% (-15.4)	0.8% (-10.2)
1.3 - Projected Demand	3,327	1,661	0.3% (-11.2)	1.1% (-1.4)
Total Flow at American River below FWTP intake				
1.0 - Existing Baseline	3,237	1,557	-	-
1.1 - +75 MGD	3,212	1,543	-0.5% (-25.2)	-0.1% (-14.0)
1.2 - +150 MGD	3,207	1,532	-0.4% (-29.9)	-0.2% (-25.0)
1.3 - Projected Demand	3,201	1,534	-0.6% (-36.2)	-0.2% (-23.8)
Total Flow at Delta outflow				
1.0 - Existing Baseline	21,158	8,428	-	-
1.1 - +75 MGD	21,143	8,439	0.0% (-15.6)	0.1% (10.9)
1.2 - +150 MGD	21,130	8,422	-0.1% (-28.3)	-0.1% (-6.2)
1.3 - Projected Demand	21,135	8,431	-0.1% (-23.3)	0.0% (3.3)

NOTES: cfs = cubic feet per second; MGD = million gallons per day

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

Overall, long-term averaged monthly river flows for the proposed project model scenarios were all found to have negligible differences compared to Existing Baseline conditions (e.g., simulated changes were within 5 percent; **Table 8**). Differences varied by location, water year type, water use scenario, and month making generalizations difficult. Different combinations of these variables also resulted in variability in the patterns of flow changes with larger changes in flow sometimes concentrated in certain month and water year combinations (see **Exhibit A**). The largest simulated percent and magnitude decreases in monthly flows for the proposed project scenarios occurred to the Trinity River below Clear Creek Tunnel, Sacramento River below SRWTP intake, and American River below FWTP intake (Table 8).

Flows in the Sacramento River below SRWTP intake are directly influenced by proposed project diversions. On average, simulated average monthly flows at Sacramento River below SRWTP intake diversions were between 0.6 and 1.3 percent less than Existing Baseline conditions for the three proposed project scenarios. Comparing monthly averages by water year type, the magnitudes of simulated changes in monthly average flows at the Sacramento River below SRWTP intake were all less than 1.7 percent of the long-term average observed flow at this location, suggesting these simulated changes were relatively small in the context of this location's hydrologic regime and that changes were within the typical range of both model and observational uncertainty, which can be as large as 5-10 percent of actual values (USGS, 1992; Sauer and Meyer, 1992).[14] Based on comparing the by-month average flows, flow decreases at the Sacramento River below SRWTP intake diversion model node were generally greatest from August through November. During the remaining months, average flows differed little from Existing Baseline conditions (see **Exhibit A**). Average decreases during the summer and late fall months at this location also tended to be greater during dry water year types. Nonetheless, no decreases in long-term average monthly flow under the proposed project scenarios exceeded 5 percent for any combination of month and water year type.

Flows in the Trinity River below Clear Creek Tunnel are more indirectly influenced by proposed project diversions in the sense that flows at this location were reduced to convey more water into the Sacramento River to meet the simulated increased City demands. On average, across the three proposed project scenarios, simulated long-term average monthly flows at Trinity River below Clear Creek Tunnel were between 0.4 and 0.5 percent less than those under Existing Baseline conditions. Comparing monthly averages by water year type, the magnitude of simulated changes in monthly average flows at the Trinity River below Clear Creek Tunnel between the proposed project scenarios and Existing Baseline conditions were all less than 5.8 percent of the long-term average observed flow at this location.[15] Based on comparing the by-month average flows, flow decreases at the Trinity River below Clear Creek Tunnel model node were highly sporadic but tended to be greatest from August through January (see Exhibit A). During the remaining months, average flows differed little from Existing Baseline conditions. The timing of flow decreases at the Trinity River below Clear Creek Tunnel and other model nodes described above (Sacramento River below SRWTP intake) correspond to the period when simulated City diversions are at their

[14] Observed data for this location is from the following USGS Gage #s: 11447650 – Sacramento River at Freeport, CA (Period of Record 1948-2015). All data was downloaded from https://waterdata.usgs.gov/nwis.

[15] Observed data for this location is from the following USGS Gage #s: 11525500 – Trinity River at Lewiston, CA (Period of Record 1911-2024). All data was downloaded from https://waterdata.usgs.gov/nwis.

highest (**Figure 5**). Average monthly flow decreases during the fall months also tended to be greater during dryer water year types. During certain month and water year type combinations, average flow decreases were in excess of 5 percent (e.g., August, September, and October of critically dry years for all proposed project scenarios and January of above normal years for the +150 MGD and Projected Demand Scenarios [**Exhibit A**]).

At the Feather River and Delta Outflow output locations, as well as the other output locations on the Sacramento River (i.e., Feather River below Thermalito Afterbay, Feather River at Mouth, and Sacramento River nodes upstream of SRWTP intake) simulated percent and magnitude changes in long-term averaged monthly river flows were either negligible or generally increased for the proposed project scenarios compared to Existing Baseline conditions (Table 8; see also **Exhibit A**). Increased streamflows reflect changes in CVP-SWP operations needed to convey water downstream to the SRWTP to meet simulated increased City diversions. Flow increases at the Feather River flows at Mouth model node were highly sporadic but were generally greatest in May through July and October through December (Exhibit A). During the remaining months, average flows differed little from Existing Baseline conditions. Flow increases on the Sacramento River nodes upstream of SRWTP intake were generally greatest in June through August. The timing of flow increases at these model nodes typically correspond to the period when simulated City diversions are at their highest (Figure 5).

Lastly, simulated percent and magnitude changes in monthly averaged flow on the American River between the proposed project scenarios and Existing Baseline conditions were highly variable depending on project scenario, month, water year type, and output location (Table 8; see also **Exhibit A**). For the American River below Nimbus Dam output location, percent changes in average monthly flows were, on average, found to either not change or slightly increase for the proposed project scenarios compared to Existing Baseline conditions, whereas magnitude changes in average monthly flows were found to either not change or slightly decrease. These differences simply reflect the temporal variability in simulated changes and how rescaling of magnitudes to percentages can dampen and alter the weighting of relative changes. Based on comparing the by-month average flows, flow decreases at this output location were greatest in September and October. Downstream at the American River below FWTP intake simulated average monthly flows were on average between 0.4 and 0.6 percent less than Existing Baseline conditions for the three proposed project scenarios. Comparing monthly averages by water year type, the magnitudes of simulated decreases in monthly average flow at the American River below FWTP intake did not exceed more than 6.4 percent of the long-term average observed flows at this location.[16] Based on comparing the by-month average flows, flow decreases at this output location were greatest in March, September, and October.

During certain month and water year type combinations, simulated average flow decreases on the American River at one or both output locations (i.e., below Nimbus Dam [upstream of FWTP] and below FWTP intake) were in excess of 5 percent (e.g., October of critically dry years and September of above normal years for all proposed project scenarios, August and October of dry years for the +150 MGD and Projected Demand scenarios, and January of dry years for the

16 Observed data for this location is from the following USGS Gage #s: 11446500– American River at Fair Oaks, CA (Period of Record 1904-2024). All data was downloaded from https://waterdata.usgs.gov/nwis.

Projected Demand scenario [**Exhibit A**]). With the exception of January of dry years, diversions at the FWTP intake under the proposed project scenarios for these months and water year types are, on average, the same or slightly less than those occurring under the Existing Baseline conditions, meaning these decreases are not directly related to changes in diversions at the FWTP intake but are more related to changes in broader SWP and CVP operations. For instance, during each of these months and water year types, storage at Folsom Reservoir was simulated to increase under the proposed project scenarios meaning the model is taking a discretionary action to keep water in storage rather than release it to the River (see subsequent subsection, *CVP/SWP-Related Storage Facilities*, for more discussion).

Exceedance probabilities of monthly simulated flow values for the Existing Baseline and proposed project scenario simulations for each water year type for each output location are presented in **Exhibit B**. These exceedance probabilities show the percentage of time simulated flows from each model scenario equal or exceed different discharges and illustrate the overall similarity in simulated flows between model scenarios. Where proposed project scenario flows plot below Existing Baseline flows, this indicates a reduction in the frequency that flows of the same magnitude will occur under proposed project conditions, and visa-versa when proposed project flows plot above Existing Baseline flows. In cases where plots diverge but then overlap again, this indicates that changes in discharge frequency are for a limited range of flows. Overall, proposed project condition flows plot directly over those from the Existing Baseline simulation. The greatest divergences tend to occur during Dry and Critically Dry water year types, but as described above these differences are minimal (e.g., less than 5%) and plots typically converge meaning differences occur for only a small range of flow magnitudes (e.g., differences do not represent persistent decreases between conditions).

Overall, changes in river flows under the proposed project scenarios correspond with logical changes in City water diversions (described in the subsection above) and changes in reservoir storage (presented in the next subsection). Increases in diversions, from Existing Baseline conditions, at the SRWTP intakes occur year-round but are more pronounced between May and October when the specified simulated City water demands are highest. This corresponds to periods with increased flows at the Feather River model output locations and Sacramento River model nodes upstream of SRWTP and slight decreases in flows in the American River, which may reflect CVP-SWP operations geared toward reducing American River flows to store available water for meeting later instream requirements or water demands while meeting City water demands through a combination of flow releases from Folsom, Shasta, Trinity, and Oroville reservoirs.

CVP/SWP-Related Storage Facilities

Similar to river flows, simulated changes in long-term average end of month reservoir storage volumes between the proposed project and Existing Baseline conditions varied by output location, month, and water year type; the results are summarized in **Table 9** with more complete results provided in **Exhibit A**.

TABLE 9
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE END OF MONTH RESERVOIR STORAGE UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (TAF)[a]	Long-term Average Dry/ Critical Years (TAF)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Storage at Folsom Reservoir				
1.0 – Existing Baseline	638	519	-	-
1.1 - +75 MGD	640	522	0.3% (1.7)	0.4% (2.8)
1.2 - +150 MGD	641	522	0.4% (2.2)	0.4% (3.0)
1.3 - Projected Demand	640	520	0.3% (1.7)	0.0% (1.1)
Total Storage at Lake Shasta				
1.0 - Existing Baseline	3,287	2,715	-	-
1.1 - +75 MGD	3,274	2,680	-0.7% (-13.2)	-1.9% (-34.7)
1.2 - +150 MGD	3,273	2,685	-0.8% (-14.3)	-1.7% (-29.7)
1.3 - Projected Demand	3,273	2,683	-0.8% (-14.8)	-1.8% (-32.0)
Total Storage at Clair Engle Reservoir				
1.0 - Existing Baseline	1,607	1,214	-	-
1.1 - +75 MGD	1,600	1,203	-0.8% (-7.1)	-1.4% (-10.8)
1.2 - +150 MGD	1,597	1,200	-1.1% (-10.3)	-1.6% (-13.7)
1.3 - Projected Demand	1,598	1,202	-0.9% (-9.0)	-1.4% (-11.8)
Total Storage at Lake Oroville				
1.0 - Existing Baseline	2,354	1,759	-	-
1.1 - +75 MGD	2,349	1,748	-0.4% (-5.1)	-0.8% (-10.3)
1.2 - +150 MGD	2,345	1,740	-0.7% (-9.6)	-1.4% (-18.9)
1.3 - Projected Demand	2,347	1,744	-0.5% (-7.3)	-1.1% (-14.9)

NOTES: MGD = million gallons per day; TAF = thousand acre-feet

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

At Folsom Reservoir, long-term average end of month reservoir storage values were, on average, found to increase slightly under the proposed project scenarios compared to Existing Baseline conditions. The average increases under the three proposed project scenarios ranged from 0.3 to 0.4 percent (1.7 to 2.2 TAF) (Table 9). Based on comparing the by-month average storage values, slight decreases in end of month Folsom storage, on the order of 0.1 to 0.2 percent, occurred between May and July, but the timing and magnitude of such decreases varied by project scenario (see **Exhibit A**). Across all three proposed project scenarios the greatest decrease in average monthly storage for any month and water year type combination was 2.1 percent (5.2 TAF). No simulated decrease in long-term average end-of-month storage at Folsom Reservoir was in excess of 5 percent and none of the long-term average decreases exceeded 1 percent of Folsom Reservoir's total storage capacity (9.7 TAF) (see **Exhibit A**).

At other CVP-SWP reservoirs (i.e., Shasta Lake, Trinity Lake [Claire Engle Reservoir], and Oroville Reservoir) simulated percent and magnitude changes in long-term average end of month reservoir storage generally decreased for the proposed project scenarios compared to Existing Baseline conditions (Table 9 and **Exhibit A**). These decreases reflect changes in CVP-SWP operations needed to convey water downstream to the SRWTP to meet simulated increased City demand. Decreases in storage were progressively greater from the +75 MGD project scenario to the +150 MGD project scenario. Decreases under the Projected Demand project scenario were slightly less than those for the +150 MGD project scenario. On average, storage decreases at Shasta Lake were greater than 10 TAF for all three proposed project scenarios. Average decreases were greater than 10 TAF at Trinity Lake for the +150 MGD project scenario. Average decreases at Lake Oroville were less than 10 TAF for all three proposed project scenarios. No long-term average decreases, considering all water year types and just Dry and Critically Dry water year types, exceeded 1 percent of any of these reservoirs total reservoir capacity for any of the three proposed project scenarios (Table 9). Relatively large storage decreases (e.g., in excess of 5 percent, 10 TAF, or 1 percent of total reservoir capacity) were simulated to occur during certain months and water year types, at all three locations (see **Exhibit A**). Due to carry-over conditions, whereby a decrease in one month is propagated forward and thus result in similar magnitude decreases in subsequent months, these decreases often persisted throughout the year. Based on comparing the by-month average storage values, the greatest decreases tended to occur between June and March and had a slight tendency to be elevated in dryer water year types compared to other water year types.

The primary drivers for changes in simulated reservoir storages presented in this report are: (1) releasing water to meet simulated increased City demand; (2) re-balancing of CVP North-of-Delta reservoirs in accordance with the dynamic requirements under the Coordinated Operations Agreement (COA) between the CVP and SWP; and (3) to maintain compliance with existing water quality standards (including minimum and recreational flow requirements and objectives) pursuant to applicable agreements and regulatory requirements. The COA defines the rights and responsibilities of the CVP and SWP regarding water needs of the Sacramento River system and Delta and includes obligations for in-basin uses, accounting, and real-time coordination of water obligations of the two projects. The COA contains considerable flexibility in the manner with which Delta conditions in the form of flow standards, water quality standards, and export restrictions are met. In other words, the reservoirs are releasing more water to meet downstream obligations (e.g., City Demands, Delta flows, water deliveries), which is why many of the simulated monthly flow changes for the Sacramento and Feather River are positive. D-1641 also authorizes the CVP and SWP to jointly use each other's points of diversion in the southern Delta, with conditional limitations and required response coordination plans. Both DWR and Reclamation must monitor the effects of their respective diversions and project operations to provide compliance with existing water quality objectives.

Lastly, Folsom Reservoir is operated by Reclamation to release water to meet Delta salinity and flow objectives established to improve fisheries conditions. Weather conditions combined with tidal action and local accretions from runoff and return flows can quickly affect Delta salinity conditions and require increases in spring Delta inflow to maintain salinity standards. In accordance with federal and State regulatory requirements, the CVP and SWP are frequently required to release water from upstream reservoirs to maintain Delta water quality. Folsom Lake is located closer to the Delta than Lake Oroville and Shasta Lake; therefore, water is often first released from Folsom Lake when releases are needed to meet water quality objectives. Water released from Lake Oroville and Shasta Lake generally reaches the Delta in approximately three and four days, respectively. As water from the other reservoirs arrives in the Delta, Folsom Reservoir releases can be reduced. In reality, real-time monitoring informs daily operations that can change quickly to meet salinity and flow requirements and objectives. Such operations are simplified and occur on a much coarser timescale in the Calsim 3 model. Operational foresight, such as available prior knowledge of City water demands, is also simplified in the Calsim 3 model in terms of forecasting and how SWP and CVP operations are adjusted month-to-month to meet demands and other objectives. As City water demands are relatively well known, they do not constitute a sudden change that would drive the type of changes in SWP and CVP operations described above.

Delta Water Quality

With regard to Delta water quality, of particular interest is the location of the transition between saline waters and fresh water, frequently referred to as the *low-salinity zone* (LSZ). The LSZ is typically located within Suisun Bay but can shift 2–6 miles depending on the factors influencing Delta hydrodynamics and may reach far eastward into the Delta during periods of low inflow. In the western Delta, changes in the LSZ location are commonly measured by the position of *X2*, which is defined as the distance upstream (in kilometers [km]) from the Golden Gate Bridge where tidally averaged salinity is equal to 2 parts per thousand, marking a transition to mostly fresh water. Aquatic organisms have different salinity tolerances and preferences; therefore, changes in the position of the LSZ and X2 are commonly used to characterize likely changes in species distribution and other ecological responses. The geographical position of the 2-parts-per-thousand isohaline is considered significant to the biologically important entrapment zone of the estuary and the resident fishery and provides an indicator of habitat protection outflow and salinity conditions in the Delta. Because X2 is an indicator of the extent of saltwater intrusion, it is also used to indicate changes to salinity concentrations within the Delta.

Changes in CalSim 3 simulated, long-term X2 position are summarized in **Table 10**. Simulated average differences in X2 position between proposed project conditions and Existing Baseline conditions were typically negligible. The maximum increase in long-term monthly average X2 position between all proposed project scenarios and Existing Baseline conditions was 0.2 km (see **Exhibit A**). Comparison of February through June X2 positions found that all X2 locations were west of Collinsville (i.e., less than 81 km) in accordance with D-1641 objectives. In addition to meeting D-1641 X2 objectives, simulated results for all model scenarios also met other D-1641 objectives, Net Delta Outflow Index (NDOI) outflow standards and export/import (E/I) ratio. Salinity criteria at Rock Slough, Emmaton, Jersey Point, and Collinsville were met consistently across all model scenarios (i.e., there were either no or only negligible differences between proposed project conditions and the existing conditions baseline) and on a monthly basis were found to be met on greater than 93 percent of simulation months, which is consistent with other CalSim 3 modeling (DWR, 2017, 2021).

TABLE 10
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM X2 LOCATION UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (km)[a]	Long-term Average Dry/ Critical Years (km)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
X2 Location				
1.0 – Existing Baseline	75.6	80.5	-	-
1.1 - +75 MGD	75.6	80.5	0.0% (0.01)	0.0% (-0.01)
1.2 -+150 MGD	75.6	80.5	0.0% (0.02)	0.0% (0.01)
1.3 - Projected Demand	75.6	80.5	0.0% (0.01)	0.0% (0.00)

NOTES: MGD = million gallons per day

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

Instream Flow and Reservoir Criteria

As discussed in Section 4.1.4, *CalSim 3 Model Operation and Regulatory Requirements*, meeting regulatory requirements, including Delta water quality objectives, are the highest operational priority in the CalSim 3 model and are given precedent over discretionary diversions to meet demands. As such, D-893 minimum flows at the H Street bridge and Hodge Flow Criteria are always met in all simulations. Further, minimum release requirements at Nimbus Dam based on flow objectives defined in the American River Modified Flow Management Standard, per the 2017 WFA, are met with nearly the same frequency in all these simulations (greater than 99 percent of simulation months).

Surface Water Results Summary – Future Conditions

Comparison of Future Conditions Baseline with Existing Condition Baseline

As discussed in Chapter 4, *Modeling Approach,* a future conditions baseline model was developed that includes projected (2040) changes in land use and urban growth (e.g., increased water demands), climate change, and sea level rise. Differences in these inputs result in Future Baseline conditions that differ from Existing Baseline conditions. To characterize the effect of these different inputs, comparison was made between the Existing Baseline conditions and Future Baseline conditions.

Changes between CalSim 3 simulated surface water parameters for Existing Baseline conditions and Future Baseline Conditions are summarized in **Table 11**. Changes, including the magnitude and direction of changes (e.g., increase vs. decrease) varied by parameter, output location, month, and water year type (**Figure 7** and **Figure 8**). For instance, changes to simulated river flows were variable, whereas reservoir storage values all tended to decrease under Future Baseline conditions.

TABLE 11
SUMMARY OF CALSIM 3 SIMULATED MONTHLY LONG-TERM SURFACE HYDROLOGY PARAMETERS UNDER EXISTING AND FUTURE BASELINE CONDITIONS FOR FULL SIMULATION PERIOD

Location and Compared Modeling Scenarios	Long-term Average All Years (Magnitude)[a]	Comparison of Long-term Average Changes between Baseline Conditions for All Years (Percent [magnitude])[a]
		Average Change
Total Storage at Folsom Reservoir (TAF)		
1.0.0 - Existing Baseline Conditions	638	-
2.0.0 - Future Baseline Conditions	606	-
2.0.0-1.0.0 (Future - Existing)	-	-5.2% (-32.8)
Total Storage at Lake Shasta (TAF)		
1.0.0 - Existing Baseline Conditions	3,287	-
2.0.0 - Future Baseline Conditions	3,218	-
2.0.0-1.0.0 (Future - Existing)	-	-1.3% (-69.6)
Total Storage at Clair Engle Reservoir (TAF)		
1.0.0 - Existing Baseline Conditions	1,607	-
2.0.0 - Future Baseline Conditions	1,556	-
2.0.0-1.0.0 (Future - Existing)	-	-1.7% (-51.1)
Total Storage at Lake Oroville (TAF)		
1.0.0 - Existing Baseline Conditions	2,354	-
2.0.0 - Future Baseline Conditions	2,177	-
2.0.0-1.0.0 (Future - Existing)	-	-7.7% (-177.5)
Total Flow at Trinity River below Clear Creek Tunnel (CFS)		
1.0.0 - Existing Baseline Conditions	1,049	-
2.0.0 - Future Baseline Conditions	1,136	-
2.0.0-1.0.0 (Future - Existing)	-	13.9% (87.6)
Total Flow at Feather River below Thermalito Afterbay (CFS)		
1.0.0 - Existing Baseline Conditions	4,130	-
2.0.0 - Future Baseline Conditions	4,409	-
2.0.0-1.0.0 (Future - Existing)	-	25.2% (279.1)
Total Flow at Feather River at Mouth (CFS)		
1.0.0 - Existing Baseline Conditions	7,297	-
2.0.0 - Future Baseline Conditions	7,739	-
2.0.0-1.0.0 (Future - Existing)	-	7.7% (442.4)
Total Flow at Sacramento River below Keswick and Clear Creek Tunnel (CFS)		
1.0.0 - Existing Baseline Conditions	8,495	-
2.0.0 - Future Baseline Conditions	8,710	-
2.0.0-1.0.0 (Future - Existing)	-	4.8% (215.0)

Location and Compared Modeling Scenarios	Long-term Average All Years (Magnitude)[a]	Comparison of Long-term Average Changes between Baseline Conditions for All Years (Percent [magnitude])[a]
		Average Change
Total Flow at Sacramento River above American River (CFS)		
1.0.0 - Existing Baseline Conditions	17,917	-
2.0.0 - Future Baseline Conditions	17,279	-
2.0.0-1.0.0 (Future - Existing)	-	-2.0% (-638.7)
Total Flow at Sacramento River between American River and SRWTP Intakes (CFS)		
1.0.0 - Existing Baseline Conditions	21,157	-
2.0.0 - Future Baseline Conditions	20,447	-
2.0.0-1.0.0 (Future - Existing)	-	-3.2% (-710.1)
Total Flow at Sacramento River below SRWTP Intakes (CFS)		
1.0.0 - Existing Baseline Conditions	21,078	-
2.0.0 - Future Baseline Conditions	20,328	-
2.0.0-1.0.0 (Future - Existing)	-	-3.5% (-750.2)
Total Flow at American River below Nimbus Dam (above FWTP Intake) (CFS)		
1.0.0 - Existing Baseline Conditions	3,339	-
2.0.0 - Future Baseline Conditions	3,280	-
2.0.0-1.0.0 (Future - Existing)	-	2.1% (-58.5)
Total Flow at American River below FWTP Intake (CFS)		
1.0.0 - Existing Baseline Conditions	3,237	-
2.0.0 - Future Baseline Conditions	3,169	-
2.0.0-1.0.0 (Future - Existing)	-	1.9% (-68.1)
Total Flow at Delta Outflow (CFS)		
1.0.0 - Existing Baseline Conditions	21,158	-
2.0.0 - Future Baseline Conditions	23,362	-
2.0.0-1.0.0 (Future - Existing)	-	10.4% (2204.2)
X2 Location (km)		
1.0.0 - Existing Baseline Conditions	76	-
2.0.0 - Future Baseline Conditions	78	-
2.0.0-1.0.0 (Future - Existing)	-	3.0% (2.0)

Notes: CFS = cubic feet per second; TAF = thousand acre-feet

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).

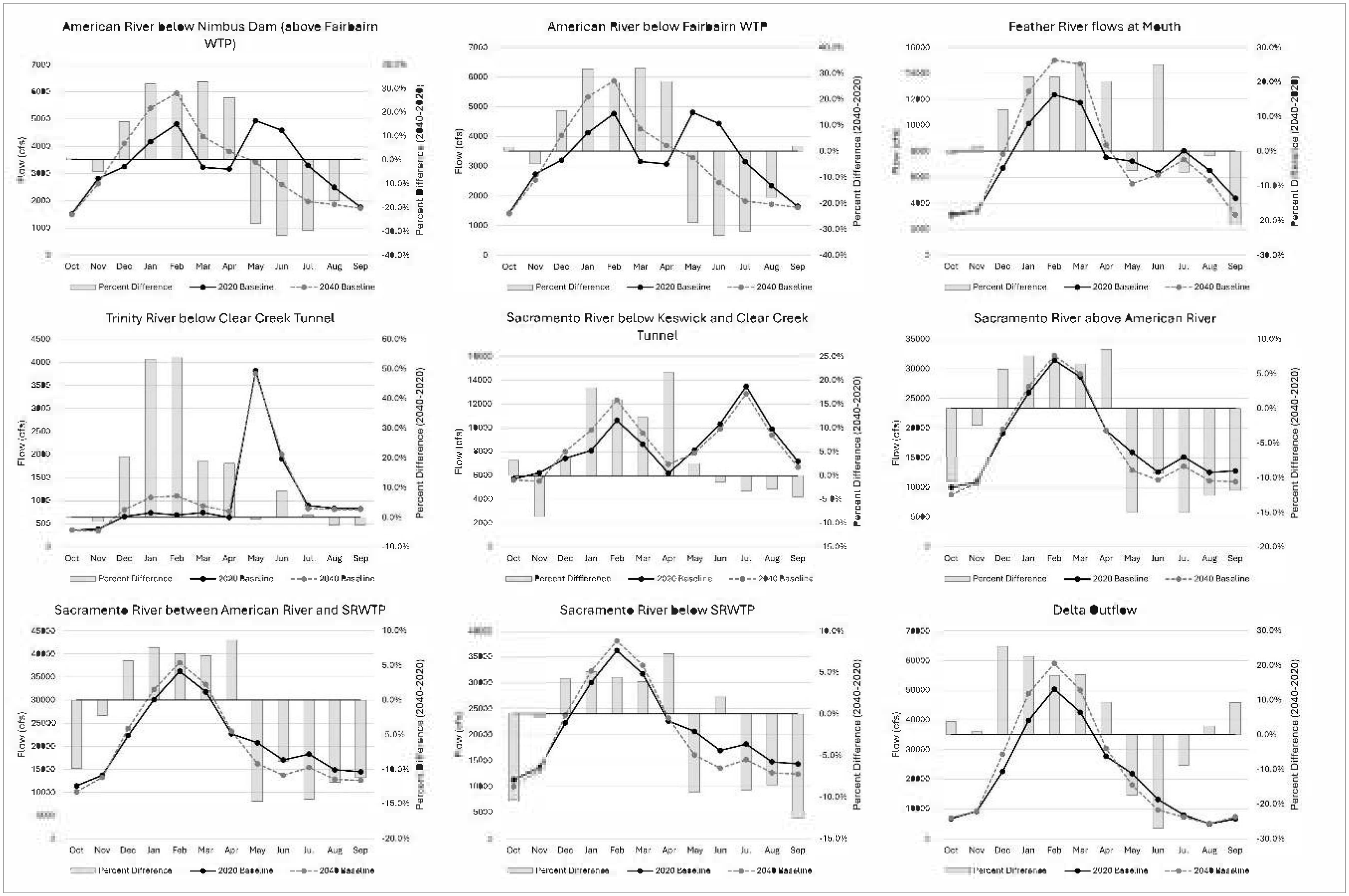

Figure 7
Comparison of Monthly Average CalSim 3 Existing versus Future Baseline Condition Stream Flows

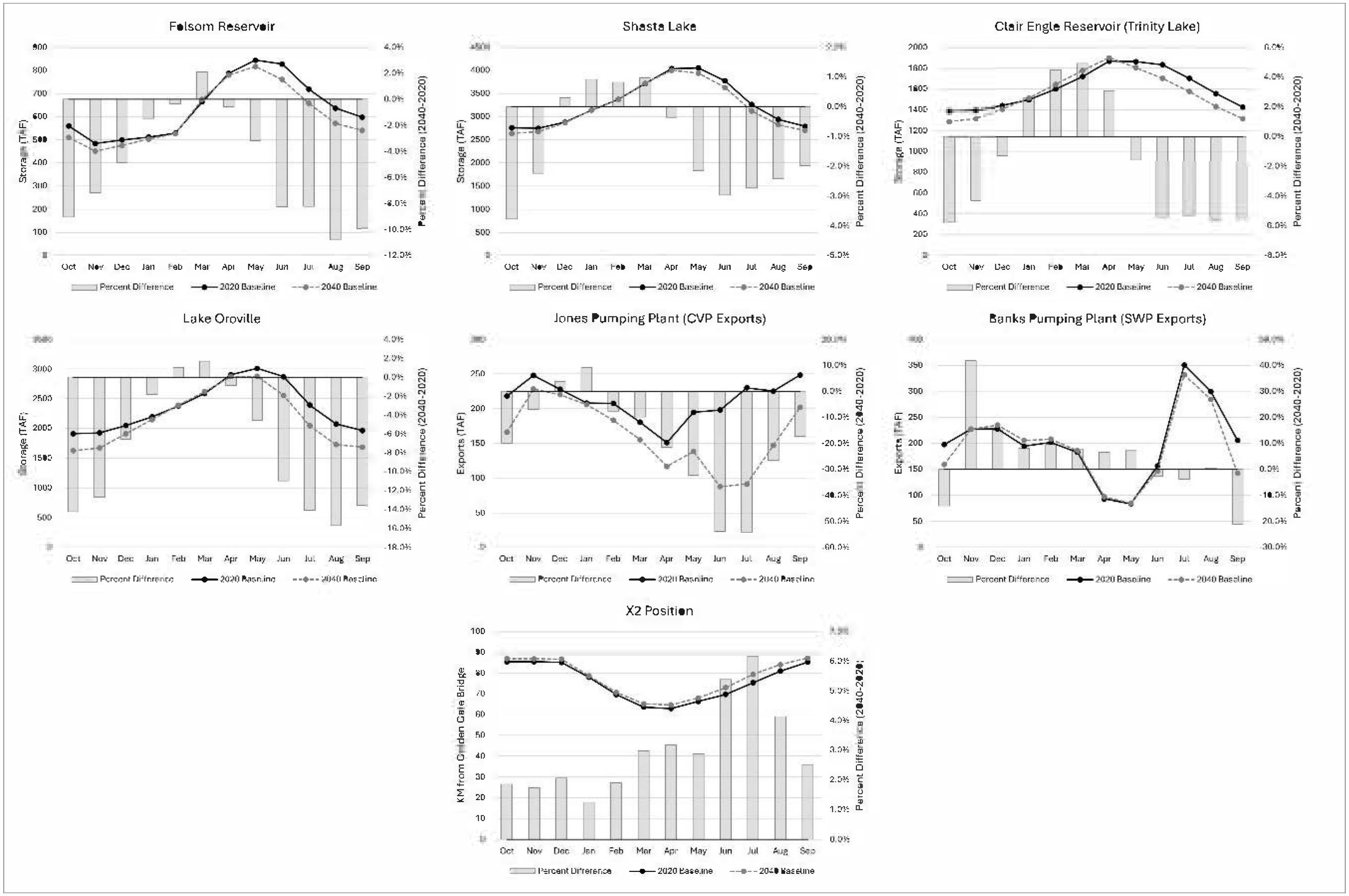

Figure 8
Comparison of Monthly Average CalSim 3 Existing versus
Future Baseline Condition Reservoir Storage, Water Supply, and Water Quality Parameters

Broadly, the input of future land use and urban growth, climate change, and sea level rise resulted in slight volumetric shifts in the runoff distribution with increases in flows between November and April and decreases in flows from May through October as secondary peaks or increases in annual hydrographs that historically occur during California's snowmelt recession period were reduced or translated into increased rainfall and associated runoff during California's winter storm period (Figure 7). The result of these shifting flow patterns is that comparisons of individual long-term monthly average values between Existing and Future Baseline conditions often exhibited large, both negative and positive, changes, but average changes were not as drastic and often manifested as increases relative to Existing Baseline conditions. CVP and SWP reservoirs (i.e., Folsom, Shasta, Trinity, and Oroville), generally exhibited year-round decreases in simulated storage under Future Baseline conditions compared to Existing Baseline conditions (Figure 8).

On average, monthly X2 position was simulated to increase under the Future Baseline Condition relative to Existing Baseline conditions (i.e., eastward shift and a more saline delta). Regardless, under both baseline conditions the simulated February through June X2 positions were all west of Collinsville (i.e., less than 81 km) in accordance with D-1641 objectives. In addition to meeting D-1641 X2 objectives, simulated results for all model scenarios also met other D-1641 objectives, such as NDOI outflow and E/I ratio standards. Salinity criteria at Rock Slough, Emmaton, Jersey Point, and Collinsville were met consistently across all model scenarios (i.e., there were either no or only negligible differences between baselines).

Comparison of Future Conditions Project Scenarios with Future Condition Baseline

This section provides a broad summary of relevant CalSim 3 future conditions model results and discussion of the simulated river and reservoir changes associated with implementation of the proposed project. Importantly, unless otherwise stated, model results always meet or are within the range of relevant uncertainty of regulatory or otherwise agreed upon flow, storage, temperature, and water quality requirements (DWR, 2017, 2021).

River Flows

Changes in simulated, long-term average flows between future baseline and future proposed project model scenarios are summarized in **Table 12**. This table depicts summary statistics (arithmetic mean) of percent and magnitude changes between future baseline and future proposed project model scenarios calculated from long-term monthly averaged model output values. Metrics are presented for all water year types and again for just Dry and Critically Dry water year types when water supplies are often most limited. These metrics provide a high-level summary of simulated expected changes to surface hydrology parameters between future baseline and future proposed project model scenarios for a broad range of conditions.

Overall, long-term averaged monthly river flows for the proposed project model scenarios were almost all found to have negligible differences compared to Future Baseline conditions (e.g., simulated changes were within 5 percent; Table 12). Differences varied by location, water year type, water use scenario, and month making generalizations difficult. Different combinations of these variables also resulted in variability in the patterns of flow changes with larger changes in flow sometimes concentrated in certain month and water year combinations (see **Exhibit A**).

TABLE 12
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE STREAMFLOW UNDER FUTURE BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (cfs)[a]	Long-term Average Dry/ Critical Years (cfs)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Flow at Trinity River below Clear Creek Tunnel				
2.0 - Future Baseline	1,136	674	-	-
2.1 - +75 MGD	1,134	674	0.1% (-2.3)	0.0% (0.0)
2.2 - +150 MGD	1,130	674	-0.1% (-6.0)	0.0% (0.0)
2.3 - Projected Demand	1,132	674	-0.1% (-4.2)	0.0% (0.0)
Total Flow at Feather River below Thermalito Afterbay				
2.0 - Future Baseline	4,409	2,140	-	-
2.1 - +75 MGD	4,410	2,150	0.1% (0.5)	0.3% (9.6)
2.2 - +150 MGD	4,411	2,160	0.2% (2.4)	0.7% (19.5)
2.3 - Projected Demand	4,410	2,154	0.1% (1.3)	0.4% (13.8)
Total Flow at Feather River at Mouth				
2.0 - Future Baseline	7,739	3,335	-	-
2.1 - +75 MGD	7,739	3,344	0.1% (0.1)	0.3% (9.3)
2.2 - +150 MGD	7,740	3,354	0.2% (1.3)	0.7% (19.3)
2.3 - Projected Demand	7,739	3,348	0.2% (0.3)	0.4% (13.6)
Total Flow at Sacramento River below Keswick and Clear Creek Tunnel				
2.0 - Future Baseline	8,710	6,287	-	-
2.1 - +75 MGD	8,711	6,294	0.0% (0.6)	0.1% (7.1)
2.2 - +150 MGD	8,717	6,321	0.1% (7.2)	0.4% (34.1)
2.3 - Projected Demand	8,714	6,311	0.1% (4.1)	0.3% (24.3)
Total Flow at Sacramento River above American River				
2.0 - Future Baseline	17,279	10,488	-	-
2.1 - +75 MGD	17,285	10,501	0.1% (6.6)	0.2% (12.9)
2.2 - +150 MGD	17,296	10,533	0.2% (17.1)	0.5% (44.3)
2.3 - Projected Demand	17,289	10,518	0.1% (10.2)	0.3% (30.0)
Total Flow at Sacramento River between American River and SRWTP intakes				
2.0 - Future Baseline	20,447	11,935	-	-
2.1 - +75 MGD	20,439	11,939	0.0% (-8.3)	0.1% (4.4)
2.2 - +150 MGD	20,440	11,961	0.1% (-6.7)	0.3% (26.3)
2.3 - Projected Demand	20,437	11,949	0.0% (-10.1)	0.2% (14.3)
Total Flow at Sacramento River below SRWTP intakes				
2.0 - Future Baseline	20,328	11,811	-	-
2.1 - +75 MGD	20,227	11,705	-0.8% (-101.0)	-1.1% (-106.2)
2.2 - +150 MGD	20,134	11,615	-1.4% (-193.8)	-1.9% (-196.2)
2.3 - Projected Demand	20,173	11,653	-1.2% (-154.6)	-1.6% (-157.9)

Location and Modeling Scenario	Long-term Average All Years (cfs)[a]	Long-term Average Dry/ Critical Years (cfs)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Flow at American River below Nimbus Dam (above FWTP intake)				
2.0 - Future Baseline	3,280	1,568	-	-
2.1 - +75 MGD	3,276	1,563	0.2% (-4.4)	0.8% (-4.5)
2.2 - +150 MGD	3,270	1,556	0.1% (-10.1)	0.6% (-12.0)
2.3 - Projected Demand	3,272	1,557	0.2% (-7.9)	0.6% (-10.5)
Total Flow at American River below FWTP intake				
2.0 - Future Baseline	3,169	1,454	-	-
2.1 - +75 MGD	3,156	1,447	0.0% (-12.7)	0.8% (-6.9)
2.2 - +150 MGD	3,150	1,439	-0.1% (-18.4)	0.6% (-14.3)
2.3 - Projected Demand	3,153	1,441	0.0% (-16.2)	0.7% (-12.9)
Total Flow at Delta outflow				
2.0 - Future Baseline	23,362	9,332	-	-
2.1 - +75 MGD	23,337	9,306	-0.1% (-24.9)	-0.1% (-26.7)
2.2 - +150 MGD	23,322	9,302	-0.2% (-40.3)	-0.2% (-30.3)
2.3 - Projected Demand	23,327	9,303	-0.2% (-35.7)	-0.2% (-28.7)

NOTES: cfs = cubic feet per second; MGD = million gallons per day

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

The largest simulated percent and magnitude decreases in monthly averaged flow for the proposed project scenarios occurred to the Sacramento River below SRWTP intakes location (Table 12). Flows in the Sacramento River below SRWTP intakes are directly influenced by proposed project diversions. On average, simulated average monthly flows at Sacramento River below SRWTP intakes were between 0.8 and 1.4 percent less than Future Baseline conditions for the three proposed project scenarios, which is nearly identical to the changes that occurred between the existing conditions scenarios. Based on comparing the by-month average flows, flow decreases were generally greatest from July through December, which corresponds to the period when simulated City demands are at their highest (Figure 5). During the remaining months, average flows differed little from Future Baseline conditions (see **Exhibit A**). Average decreases during the summer and late fall months at this location tended to be greater during dry water year types. Nonetheless, no decreases in long-term average monthly flow from Future Baseline conditions exceeded 5 percent.

Flows in the Trinity River below Clear Creek Tunnel are more indirectly influenced by proposed project diversions in the sense that flows at this location were reduced to convey more water into the Sacramento River to meet the simulated increased City demands. On average, simulated average monthly flows at Trinity River below Clear Creek Tunnel under the three proposed project scenarios were within 0.1 percent of Future Baseline conditions (Table 12). Based on comparing the by-month average flows, flow decreases at the Trinity River below Clear Creek

Tunnel model node were highly sporadic but were generally greatest from December through March (see **Exhibit A**). During the remaining months, average flows across all water year types differed little from Future Baseline conditions. During certain month and water year type combinations, average flow decreases were in excess of 5 percent (e.g., January of above normal years for the +150 MGD and Projected Demand Scenarios [**Exhibit A**]). These decreases generally reflect changes in CVP-SWP operations during periods when the model identifies water availability as being less constrained and thus available to be conveyed downstream to the SRWTP to meet simulated increased City demand.

At the Feather River and Delta Outflow output locations, as well as the other output locations on the Sacramento River (i.e., Feather River below Thermalito Afterbay, Feather River at Mouth, and Sacramento River nodes upstream of SRWTP intake) simulated percent and magnitude changes in monthly averaged flows were either negligible or generally increased for the proposed project scenarios compared to Future Baseline conditions (Table 12; see also **Exhibit A**). Increased streamflow's reflect changes in CVP-SWP operations needed to convey water downstream to the SRWTP to meet simulated increased City demand. Flow increases at the Feather River flows at Mouth model node were highly sporadic but were generally greatest in May through September (see **Exhibit A**). During the remaining months, average flows differed little from Future Baseline conditions. Flow increases on the Sacramento River nodes upstream of SRWTP intake were also generally greatest in May through September. The timing of flow increases at these model nodes corresponds to the period when simulated City demands are at their highest (Figure 5).

Lastly, simulated percent and magnitude changes in monthly averaged flow on the American River between proposed project scenarios and Future Baseline conditions were highly variable depending on project scenario, month, water year type, and output location (Table 12; see also **Exhibit A**). For the American River below Nimbus Dam output location, percent changes in average monthly flows were, on average, found to slightly increase for the proposed project scenarios compared to Future Baseline conditions, whereas magnitude changes in average monthly flows were found to slightly decrease. These differences in sign simply reflect the temporal variability in simulated changes and how rescaling of magnitudes to percentages can dampen and alter the weighting of relative changes. Downstream at the American River below FWTP intake location simulated average monthly flows were on average between 0.0 and 0.1 percent less than Future Baseline conditions for the three proposed project scenarios. Flow decreases at both locations were greatest between February and April and in July. During certain month and water year type combinations, simulated average flow decreases on the American River were in excess of 5 percent (e.g., February of dry years the +150 MGD and Projected Demand scenarios [**Exhibit A**]).

Exceedance probabilities of monthly simulated flow values for the Future Baseline and proposed project scenario simulations for each water year type for each output location are presented in **Exhibit B**. Overall, proposed project condition flows plot directly over those from the Future Baseline simulation. The greatest divergences tend to occur during Dry and Critically Dry water year types, but as described above these differences are minimal and plots typically converge meaning differences occur for only a small range of flow magnitudes (e.g., difference do not represent persistent decreases between conditions).

CVP/SWP-Related Storage Facilities

Similar to river flows, simulated changes in long-term average end of month reservoir storage volumes between the proposed project and Future Baseline conditions varied by output location, month, and water year type; the results are summarized in **Table 13** (see also **Exhibit A**).

TABLE 13
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE END OF MONTH RESERVOIR STORAGE UNDER FUTURE BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Compared Modeling Scenarios	Long-term Average All Years (TAF)[a]	Long-term Average Dry/ Critical Years (TAF)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenarios for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenarios for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Storage at Folsom Reservoir				
2.0 – Future Baseline	606	447	-	-
2.1 - +75 MGD	607	450	0.2% (1.1)	0.6% (3.0)
2.2 - +150 MGD	607	449	0.3% (0.9)	0.7% (1.9)
2.3 - Projected Demand	607	450	0.4% (1.3)	1.0% (2.9)
Total Storage at Lake Shasta				
2.0 - Future Baseline	3,218	2,632	-	-
2.1 - +75 MGD	3,204	2,612	-0.6% (-13.5)	-1.1% (-19.4)
2.2 - +150 MGD	3,187	2,572	-1.5% (-30.8)	-3.3% (-59.4)
2.3 - Projected Demand	3,191	2,579	-1.3% (-26.5)	-2.9% (-52.4)
Total Storage at Clair Engle Reservoir				
2.0 - Future Baseline	1,556	1,166	-	-
2.1 - +75 MGD	1,551	1,161	-0.4% (-4.6)	-0.5% (-4.9)
2.2 - +150 MGD	1,542	1,145	-1.3% (-13.4)	-2.2% (-21.0)
2.3 - Projected Demand	1,544	1,147	-1.2% (-11.8)	-1.9% (-18.5)
Total Storage at Lake Oroville				
2.0 - Future Baseline	2,177	1,568	-	-
2.1 - +75 MGD	2,173	1,562	-0.3% (-3.7)	-0.6% (-6.6)
2.2 - +150 MGD	2,167	1,551	-0.7% (-9.6)	-1.6% (-17.5)
2.3 - Projected Demand	2,170	1,556	-0.5% (-6.8)	-1.1% (-12.4)

NOTES: TAF = MGD = million gallons per day; thousand acre-feet

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

At Folsom Reservoir, long-term average end of month reservoir storage values were, on average, found to increase slightly under the proposed project scenarios compared to Future Baseline conditions. The long-term average increases under the three proposed project scenarios ranged from 0.2 to 0.4 percent (0.9 to 1.3 TAF) (Table 13). Based on comparing the by-month average storage values, slight decreases in end of month Folsom storage, on the order of 0.1 to 0.2 percent, occurred between May and July, but the timing and magnitude of such decreases varied by project scenario (see **Exhibit A**). Across all three proposed project scenarios the greatest decrease in average monthly storage for any month and water year type combination was 1.7 percent (7.8 TAF). No simulated decrease in long-term average end-of-month storage at Folsom Reservoir was in excess of 5 percent and none of the long-term average decreases exceeded 1 percent of Folsom Reservoir's total storage capacity (9.7 TAF) (see **Exhibit A**).

At other CVP-SVP reservoirs (i.e., Shasta Lake, Trinity Lake, and Oroville Reservoir) simulated percent and magnitude changes in long-term average end of month reservoir storage generally decreased for the proposed project scenarios compared to Future Baseline conditions (Table 13; see also **Exhibit A**). These decreases reflect changes in CVP-SWP operations needed to convey water downstream to the SRWTP intakes to meet simulated increased City demand. Decreases in storage were progressively greater from the +75 MGD project scenario to the +150 MGD project scenario. Decreases under the Projected Demand project scenario were slightly less than those for the +150 MGD project scenario. On average, storage decreases at Shasta Lake were greater than 10 TAF for all three proposed project scenarios. Average decreases were greater than 10 TAF at Trinity Lake for the +150 MGD and Projected Demand project scenarios. Average decreases at Lake Oroville were less than 10 TAF for all three proposed project scenarios. Considering all water year types, no average decreases exceeded 1 percent of any of these reservoirs total reservoir capacity for any of the three proposed project scenarios (Table 6 and Table 13). Average storage decreases at Shata Lake under the +150 MGD and Projected Demand project scenarios were 1.3 and 1.2 percent of total reservoir capacity, respectively. Based on comparing the by-month average storage values, relatively large storage decreases (e.g., in excess of 5 percent, 10 TAF, or 1 percent of total reservoir capacity) were simulated to occur during certain months and water year types, at all three locations (see **Exhibit A**). Due to carry-over conditions, whereby a decrease in one month is propagated forward and thus result in similar magnitude decreases in subsequent months, these decreases often persisted throughout the year. The greatest decreases tended to occur between June and February and had a slight tendency to be elevated in dryer water year types.

Delta Water Quality

Changes in CalSim 3 simulated, long-term X2 position are summarized in **Table 14**. Simulated average differences in X2 position between proposed project conditions and Future Baseline conditions were typically negligible. The maximum increase in long-term monthly average X2 position between all proposed project scenarios and Future Baseline conditions was 0.6 km (see **Exhibit A**). Comparison of February through June X2 position found that all X2 locations were west of Collinsville (i.e., less than 81 km) in accordance with D-1641 objectives. In addition to meeting D-1641 X2 objectives, simulated results for all model scenarios also met other D-1641 objectives, NDOI outflow standards and E/I ratio. Salinity criteria at Rock Slough, Emmaton, Jersey Point, and Collinsville were met consistently across all model scenarios (i.e., there were either no or only negligible differences between proposed project conditions and the existing conditions baseline) and on a monthly basis were found to be met on greater than 93 percent of simulation months, which is consistent with other CalSim 3 modeling (DWR, 2017, 2021).

TABLE 14
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM X2 LOCATION UNDER FUTURE BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (km)[a]	Long-term Average Dry/ Critical Years (km)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
X2 Location				
2.0 – Future Baseline	77.6	81.9	-	-
2.1 - +75 MGD	77.6	81.9	0.0% (0.02)	0.1% (0.04)
2.2 - +150 MGD	77.6	81.9	0.0% (0.03)	0.1% (0.05)
2.3 - Projected Demand	77.6	81.9	0.0% (0.03)	0.1% (0.05)

NOTES: MGD = million gallons per day

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

Instream Flow and Reservoir Criteria

As discussed in Section 4.1.4, *CalSim 3 Model Operation and Regulatory Requirements*, meeting regulatory requirements, including Delta water quality objectives, are the highest operational priority in the CalSim 3 model and are given precedent of discretionary diversions to meet demands. As such, D-893 minimum flows at the H Street bridge and Hodge Flow Criteria are always met in all simulations. Further, minimum release requirements at Nimbus Dam based on flow objectives defined in the American River Modified Flow Management Standard, per the 2017 WFA, are met with nearly the same frequency in all these simulations (greater than 98.9 percent of simulation months).

5.1.2 Water Supply Effects

This subsection describes and presents results of the simulated environmental changes associated with proposed project diversion-related changes to modeled water operations and water supply (e.g., reservoir storage and annual water deliveries). Such changes could result in impacts on resources dependent upon baseline hydrologic conditions. Thus, descriptions of estimated potential changes to water supply presented in this section provide a basis for understanding potential impacts on other resources. Additional results are presented in **Exhibit A**, **Exhibit B**, and **Exhibit C**.

As discussed in Section 4.1.5, *CalSim 3 Model Outputs*, all results are presented relative to existing and future baseline conditions. For each set of model scenario comparisons, results are generally presented as long-term annual or monthly averages over the entire simulation period of water years 1922-2015 and by Water Year Type.

Water Supply Results Summary – Existing Conditions

Comparison of Existing Conditions Project Scenarios with Existing Condition Baseline

Folsom Reservoir and Lower American River

Water supply availability and use in Folsom Reservoir and the lower American River are most directly influenced by Folsom Reservoir storage and surface water elevations and flows in the lower American River. Substantial changes in Folsom Reservoir storage and surface water elevations could impede the ability of others to pump and divert water from the reservoir. Similarly, others' ability to divert could result from changes in lower American River flows and/or temperature impacts that would trigger regulatory constraints on supply diversions.

As presented in Section 5.1.1, *Surface Water Changes*, based on CalSim 3 modeling results, changes in average end-of-month storage and water surface elevation at Folsom Lake under the proposed project model scenarios were all relatively negligible compared to the Existing Conditions Baseline. Based on comparing the by-month average storage values, across all water year types and all three proposed project scenarios, the maximum decrease in average end-of-month Folsom Lake storage under Proposed Project conditions was 2.1 percent (5.2 TAF). However, decreases of this magnitude were temporally limited and, on average, the long-term monthly decrease was much more limited, ranging from 0.3 to 0.4 percent (1.7 to 2.2 TAF). Overall, from a water supply perspective, the proposed project's simulated storage volumes are largely the same as those for the existing-conditions baseline simulation. Further, reservoir levels remain well above the level for the municipal intakes on Folsom Lake (elevation 325 feet mean sea level for El Dorado Irrigation District (EID) intake and 330 feet mean sea level for the Cities of Folsom and Roseville, and San Juan Water District). These elevations correspond to storage capacity of approximately 80 and 90 TAF, respectively. Therefore, the proposed project would not reduce surface water levels within Folsom Reservoir enough to impede the ability of lower American River water users who divert/pump water from Folsom Reservoir (the Cities of Folsom and Roseville and San Juan Water District) to access their supplies and would not be expected to substantially affect the water supply because of changes to Folsom Reservoir storage volume and elevation. As discussed in Section 5.1.1, *Surface Water Changes,* drivers for changes in simulated reservoir storages, such as those at Folsom Reservoir, generally include: (1) releasing water to meet simulated increased City demand; (2) re-balancing of CVP North-of-Delta reservoirs in accordance with the dynamic requirements under the COA between the CVP and SWP; and (3) to maintain compliance with existing water quality standards (including minimum and recreational flow requirements and objectives) pursuant to applicable agreements and regulatory requirements.

As presented in Section 5.1.2, based on CalSim 3 modeling results, changes in monthly average flows for the lower American River under the proposed project model scenarios were all relatively negligible compared to the Existing Conditions Baseline. For instance, on average, long-term average monthly flows on the lower American River downstream of the FWTP intake location would decrease by between 0.4 and 0.6 percent for the three proposed project scenarios.

The decision by Judge Hodge in *Environmental Defense Fund, et al. v. East Bay Municipal Utility District*, issued in 1989, regulates water diversions from the American River by setting seasonal minimum flow requirements, known as "Hodge Flows," to protect fish populations, particularly salmon and steelhead, while balancing municipal water needs. In 2004 the City of Sacramento made a separate voluntary commitment in its agency-specific agreement under the Water Forum Agreement to operate its water diversions from the American River contingent on maintaining minimum Hodge Flows levels. These flows vary seasonally, with the highest requirement of 3,000 cfs from March to June, and lower limits of 1,750–2,000 cfs at other times of the year. If river flows drop below these thresholds, the City of Sacramento must reduce diversions from the American River and instead redirect diversions to the water intake on the Sacramento River under some of its permits and/or use groundwater sources. Importantly, under the proposed project model scenarios there would be effectively no difference in the simulated number of times the Hodge Flows condition would be triggered approximately over the simulated 94-year or 1,128-month period relative to Existing Baseline Conditions.

In summary, the proposed project would not be expected to cause substantial reductions in surface water or changes in water system operations in the lower American River portion of the Study Area (i.e., Folsom Reservoir and lower American River). Because no substantial reductions in surface water would occur, there would subsequently be no indirect effects that would prompt existing surface water users to need to access additional groundwater supplies in lieu of surface water.

Greater CVP/SWP System and South-of-Delta Deliveries

To assess the potential effect of the proposed project as compared to existing conditions on the SWP and CVP system and south-of-Delta deliveries, the effects on Banks Pumping Plant and Jones Pumping Plant exports and storage of major SWP and CVP reservoirs were evaluated.

Changes in operations at and releases from SWP and CVP reservoirs due to implementation of the proposed project resulted in associated changes in the operations of SWP and CVP facilities and water deliveries. Assessment of changes to SWP and CVP water supplies and water exports are summarized below.

Changes in simulated, long-term average annual SWP and CVP exports (or deliveries) from the Banks and Jones Pumping Plants are summarized in **Table 15**. SWP deliveries to its long-term water contractors are presented by SWP contract year and CVP deliveries to its contractors are presented by CVP contract year (March–February).

Comparison of average total annual deliveries found percent differences in CVP exports from Jones Pumping Plant between existing baseline and existing proposed project model scenarios were relatively minor when considering all water year types and when considering only Dry and Critically Dry years (i.e., differences in average annual exports were all less than 0.4 percent for all water year types and less than 1.5 percent for Dry and Critically Dry years). These translated into magnitude differences in average total annual deliveries ranging from 5.9 TAF to 10.3 TAF (**Table 15**). Decreases were generally greatest between July and October, corresponding to periods with higher City demand.

TABLE 15
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE ANNUAL CVP AND SWP EXPORTS UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (TAF)[a]	Long-term Average Dry/ Critical Years (TAF)[a]	Comparison of Long-term Average Annual Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Annual Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Jones Pumping Plant - CVP				
1.0 – Existing Baseline	2,546	2,014	-	-
1.1 - +75 MGD	2,540	1,995	-0.2% (-5.9)	-0.9% (-18.7)
1.2 - +150 MGD	2,536	1,984	-0.4% (-10.3)	-1.5% (-29.3)
1.3 - Projected Demand	2,538	1,989	-0.3% (-8.3)	-1.2% (-24.8)
Banks Pumping Plant - SWP				
1.0 – Existing Baseline	2,431	1,284	-	-
1.1 - +75 MGD	2,425	1,272	-0.3% (-6.2)	-0.9% (-11.8)
1.2 - +150 MGD	2,419	1,263	-0.5% (-12.8)	-1.7% (-21.6)
1.3 - Projected Demand	2,422	1,266	-0.4% (-9.7)	-1.5% (-18.7)

NOTES: MGD = million gallons per day; TAF = thousand acre-feet

a. Calculated as arithmetic mean of long-term average of annual sums from entire simulation period (water years 1922-2015).
b. Calculated from long-term annual sums from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

Comparison of average total annual deliveries found percent differences in SWP exports from Banks Pumping Plant between existing baseline and existing proposed project model scenarios were relatively minor when considering all water year types and when considering only Dry and Critically Dry years (i.e., differences in average annual exports were all less than 0.5 percent for all water year types and less than 1.7 percent for Dry and Critically Dry years). These translated into magnitude differences in average total annual deliveries ranging from 6.2 TAF to 12.8 TAF (Table 15). Decreases were generally greatest between August and October, corresponding to periods with higher City demand.

It should be noted that SWP and CVP exports, and by connection SWP and CVP upstream reservoir releases for Delta outflow requirements and Delta export objectives, are under the discretion of the operators of these two projects, who can reduce allocations to contractors (i.e., it is up to the operators of the SWP and CVP to control how any proposed project-related effect is manifested). Further, pursuant to the City's 1957 permanent water rights operating contract with Reclamation, it is stipulated that Reclamation would operate its facilities so as to make available in the lower American River sufficient water under the City's water right for the City's diversions up to the amounts specified in the operating contract, and to operate its CVP Sacramento River storage facilities so as not to interfere with the City's diversions, under the City's water rights, up to the amounts specified in the operating contract. This includes potential reduction in deliveries SWP and CVP water contractors that have water rights junior to those of the City.

Changes in existing condition simulated long-term average end-of-September storage at Folsom Reservoir, Shasta Lake, Trinity Lake, and Lake Oroville are summarized in **Table 16**. The end of September marks the end of the water year when water supplies are often most stressed, and end-of-September storage serves as an indicator for reservoir carry-over storage going into the new water year. Based on CalSim 3 modeling results, long-term average decreases in end-of-September storage were greater than 10 TAF at Shasta Lake for all proposed project scenarios for all water year types and when considering only Dry and Critically Dry years and were greater than 10 TAF at Trinity Lake and Lake Oroville for all proposed project scenarios when considering only Dry and Critically Dry years. No average decreases in end-of-September storage at Shasta Lake, Trinity Lake, or Lake Oroville were greater than 1 percent of each reservoir's total storage capacity (**Table 17**). Long-term average end-of-September storage tended to slightly increase at Folsom Reservoir under the proposed project scenarios.

TABLE 16
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE END-OF-SEPTEMBER RESERVOIR STORAGE UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (TAF)[a]	Long-term Average Dry/ Critical Years (TAF)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Total Storage at Folsom Reservoir				
1.0 – Existing Baseline	598	473	-	-
1.1 - +75 MGD	600	473	0.2% (1.9)	-0.5% (0.2)
1.2 - +150 MGD	600	475	0.2% (2.1)	-0.3% (2.1)
1.3 - Projected Demand	599	471	0.1% (1.4)	-1.2% (-2.0)
Total Storage at Lake Shasta				
1.0 – Existing Baseline	2,790	2,110	-	-
1.1 - +75 MGD	2,776	2,079	-0.9% (-13.9)	-2.2% (-30.3)
1.2 - +150 MGD	2,772	2,073	-1.0% (-17.6)	-2.5% (-36.4)
1.3 - Projected Demand	2,774	2,076	-1.0% (-16.2)	-2.4% (-33.1)
Total Storage at Clair Engle Reservoir				
1.0 – Existing Baseline	1,426	932	-	-
1.1 - +75 MGD	1,420	922	-0.7% (-5.9)	-1.2% (-10.1)
1.2 - +150 MGD	1,416	919	-0.9% (-9.2)	-1.5% (-13.2)
1.3 - Projected Demand	1,418	919	-0.8% (-7.7)	-1.4% (-12.7)
Total Storage at Lake Oroville				
1.0 – Existing Baseline	1,964	1,304	-	-
1.1 - +75 MGD	1,959	1,293	-0.5% (-4.9)	-1.2% (-11.0)
1.2 - +150 MGD	1,954	1,282	-0.9% (-9.4)	-2.3% (-21.8)
1.3 - Projected Demand	1,957	1,286	-0.7% (-6.9)	-1.9% (-17.9)

NOTES: MGD = million gallons per day; TAF = thousand acre-feet

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

Water Supply Results Summary – Future Conditions

Comparison of Future Conditions Baseline with Existing Condition Baseline

As discussed in Chapter 4, *Modeling Approach,* a future conditions baseline model was developed that includes projected (2040) changes in land use and urban growth (e.g., increased water demands), climate change, and sea level rise. Differences in these inputs result in Future Baseline conditions that differ from Existing Baseline conditions. To characterize the effect of these different inputs, comparison was made between the Existing Baseline conditions and Future Baseline conditions.

Changes in simulated long-term average total annual SWP and CVP exports at Banks Pumping Plants and Jones Pumping Plant and between Existing and Future Baseline Conditions are summarized in **Table 17**. Simulation results indicate the potential for decreases in average annual total CVP deliveries from Jones Pumping Plant by approximately 23.6 percent (601 TAF per year) under the Future Baseline conditions relative to Existing Baseline conditions. Comparison of long-term average annual total SWP deliveries from Banks Pumping Plant found deliveries to decrease by 4.6 percent (112 TAF per year) under the Future Baseline conditions relative to Existing Baseline conditions. Ultimately, the simulation results suggest less water may be available for south-of-Delta export in the future under the simulated hydrologic conditions.[17] Temporally, export reductions tended to coincide with reductions in reservoir storage and river flows.

TABLE 17
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE ANNUAL CVP AND SWP EXPORTS UNDER EXISTING AND FUTURE BASELINE CONDITIONS FOR FULL SIMULATION PERIOD

Location and Compared Modeling Scenarios	Long-term Average All Years (TAF)[a]	Comparison of Long-term Average Changes between Baseline conditions for All Years (Percent [magnitude])[b]
		Average Change
Average Annual Jones Pumping Plant - SWP		
1.0.0 - Existing Baseline Conditions	2,546	-
2.0.0 - Future Baseline Conditions	1,945	-
2.0.0-1.0.0 (Future - Existing)	-	-23.6% (-600.9)
Average Annual Banks Pumping Plant - CVP		
1.0.0 - Existing Baseline Conditions	2,431	-
2.0.0 - Future Baseline Conditions	2,320	-
2.0.0-1.0.0 (Future - Existing)	-	-4.6% (-111.6)
End-of-September Storage at Folsom Reservoir		
1.0.0 - Existing Baseline Conditions	598	-
2.0.0 - Future Baseline Conditions	541	-
2.0.0-1.0.0 (Future - Existing)	-	-9.5% (-56.7)

[17] This finding comes with the caveat that it is based on theoretical simulation of a complex water system under a single future hydrologic condition while maintaining current operational logic. Notably, many equally likely future hydrologic conditions are plausible, and it is likely that future operations would adjust to conditions rather than continue to follow constant operating and regulatory criteria. The future conditions models, as is common practice, do not include proposed projects yet to be constructed or implemented such as Site Reservoir or raising Folsom Dam.

Location and Compared Modeling Scenarios	Long-term Average All Years (TAF)[a]	Comparison of Long-term Average Changes between Baseline conditions for All Years (Percent [magnitude])[b] Average Change
End-of-September Storage at Lake Shasta		
1.0.0 - Existing Baseline Conditions	2,790	-
2.0.0 - Future Baseline Conditions	2,695	-
2.0.0-1.0.0 (Future - Existing)	-	-3.4% (-94.5)
End-of-September Storage at Clair Engle Reservoir		
1.0.0 - Existing Baseline Conditions	1,426	-
2.0.0 - Future Baseline Conditions	1,314	-
2.0.0-1.0.0 (Future - Existing)	-	-7.8% (-111.9)
End-of-September Storage at Lake Oroville		
1.0.0 - Existing Baseline Conditions	1,964	-
2.0.0 - Future Baseline Conditions	1,685	-
2.0.0-1.0.0 (Future - Existing)	-	-14.2% (-278.9)

NOTES: TAF = thousand acre-feet

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

Comparison of long-term average end-of-September storage at Folsom Reservoir, Shasta Lake, Trinity Lake, and Lake Oroville between Existing and Future Baseline conditions found that average storage was simulated to decrease by more than 10 TAF at all locations and average decreases were all in excess of 1 percent of each reservoir's total storage capacity (Table 17). Ultimately, the simulation results suggest that a combination of increased future demands and changes in hydrology would result in non-negligible decreases in end-of-September water storage at major CVP and SWP reservoirs relative to existing baseline conditions.

Comparison of Future Conditions Project Scenarios with Future Condition Baseline

Folsom Reservoir and Lower American River

As presented in Section 5.1.1, *Surface Water Changes*, based on CalSim 3 modeling results, changes in average end-of-month storage and water surface elevation at Folsom Lake under the future proposed project model scenarios were all relatively negligible compared to the Future Conditions Baseline. Across all water year types and all three future proposed project scenarios, the maximum decrease in average end-of-month Folsom Lake storage under Proposed Project conditions was 1.7 percent (7.8 TAF). However, decreases of this magnitude were temporally limited and, on average, the long-term monthly decrease was much more limited, ranging from 0.2 to 0.4 percent (0.9 to 1.3 TAF). Overall, from a water supply perspective, the proposed project's simulated storage volumes are largely the same as those for the future-conditions baseline simulation. Furthermore, reservoir levels remain well above the level for the municipal intakes on Folsom Lake (elevation 325 feet mean sea level for EID intake and 330 feet mean sea level for the Cities of Folsom and Roseville, and San Juan Water District). These elevations correspond to storage capacity of approximately 80 and 90 TAF, respectively. Therefore, under future conditions the proposed project would not reduce surface water levels within Folsom Reservoir enough to impede the ability of lower American River water users who divert/pump water from Folsom Reservoir (the Cities of Folsom and Roseville and San Juan Water District) to access their supplies and would not be expected to substantially affect the water supply because of changes to Folsom Reservoir storage volume and elevation.

As presented in Section 5.1.1, based on CalSim 3 modeling results, changes in monthly average flows for the lower American River under the future proposed project model scenarios were all relatively negligible compared to the Future Conditions Baseline. For instance, on average, long-term average monthly flows on the lower American River downstream of the FWTP intake location would decrease by between 0.0 and 0.1 percent for the three future proposed project scenarios. Lastly, under the future proposed project model scenarios there would be effectively no difference in the simulated number of times the Hodge Flows condition would be triggered over the simulated 94-year or 1,128-month period relative to Future Baseline Conditions.

In summary, the proposed project would not be expected to cause substantial reductions in surface water or changes in water system operations under future conditions in the lower American River portion of the Study Area (i.e., Folsom Reservoir and lower American River). Because no substantial reductions in surface water would occur, there would subsequently be no indirect effects that would prompt existing surface water users to need to access additional groundwater supplies in lieu of surface water.

CVP/SWP Reservoir Storage and South Delta Deliveries

Changes in operations at and releases from SWP and CVP reservoirs resulting from implementation of the proposed project propagate into associated changes in the operations of SWP and CVP facilities and water deliveries. Assessment of changes to SWP and CVP water supplies and water exports are summarized below.

Changes in simulated, long-term average annual SWP and CVP exports (or deliveries) from the Banks and Jones Pumping Plants are summarized in **Table 18**. SWP deliveries to its long-term water contractors are presented by SWP contract year and CVP deliveries to its contractors are presented by CVP contract year (March–February).

Comparison of average total annual deliveries found percent differences in CVP exports from Jones Pumping Plant between future baseline and future proposed project model scenarios were relatively minor when considering all water year types and when considering only Dry and Critically Dry years (i.e., differences in average annual exports were all less than 0.4 percent for all water year types and less than 1.4 percent for Dry and Critically Dry years). These translated into magnitude differences in average total annual deliveries ranging from 5.4 TAF to 7.7 TAF (Table 18). Decreases were generally greatest between July and November, corresponding to periods with higher City demand.

TABLE 18
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE ANNUAL CVP AND SWP EXPORTS UNDER FUTURE BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (TAF)[a]	Long-term Average Dry/ Critical Years (TAF)[a]	Comparison of Long-term Average Annual Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Annual Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Jones Pumping Plant - CVP (TAF)				
2.0 – Future Baseline	1,945	1,538	-	-
2.1 - +75 MGD	1,940	1,525	-0.3% (-5.4)	-0.8% (-12.8)
2.2 - +150 MGD	1,937	1,516	-0.4% (-7.7)	-1.4% (-21.5)
2.3 - Projected Demand	1,938	1,519	-0.3% (-6.7)	-1.2% (-18.4)
Banks Pumping Plant - SWP (TAF)				
2.0 – Future Baseline	2,320	1,226	-	-
2.1 - +75 MGD	2,228	1,137	-4.0% (-91.8)	-7.3% (-88.9)
2.2 - +150 MGD	2,221	1,129	-4.3% (-98.7)	-7.9% (-97.3)
2.3 - Projected Demand	2,224	1,133	-4.1% (-95.7)	-7.6% (-93.3)

NOTES: MGD = million gallons per day; TAF = thousand acre-feet

a. Calculated as arithmetic mean of long-term average of annual sums from entire simulation period (water years 1922-2015).
b. Calculated from long-term annual sums from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

Comparison of average total annual deliveries found percent differences in SWP exports from Banks Pumping Plant between future baseline and future proposed project model scenarios were greater than those at Jones Pumping Plant. For instance, when considering all water year types, differences in average annual exports were all less than 4.3 percent and were less than 7.9 percent when considering only Dry and Critically Dry years. These translated into magnitude differences in average total annual deliveries ranging from 91.8 TAF to 98.7 TAF (Table 18). Decreases were generally greatest between July and October, corresponding to periods with higher City demand. These larger changes suggest that according to CalSim 3 logic, exports from Banks Pumping Plant are more sensitive to increases in City diversions than exports from Jones Pumping Plant under the assumed future conditions and operations.

Changes in future condition simulated long-term average end-of-September storage at Folsom Reservoir, Shasta Lake, Trinity Lake, and Lake Oroville are summarized in **Table 19**. Based on CalSim 3 modeling results, long-term average decreases in end-of-September storage were greater than 10 TAF at Shasta Lake for all proposed project scenarios for all water year types and when considering only Dry and Critically Dry years, were greater than 10 TAF at Trinity Lake for the +150 MGD and Projected Demand scenarios for all water year types and when considering only Dry and Critically Dry years, and were greater than 10 TAF at Oroville Lake for the +150 MGD scenarios for all water year types and for all scenarios when considering only Dry and Critically Dry years. Decreases at Shasta Lake were greater than 1 percent of the reservoir's total storage capacity for the +150 MGD and Projected Demand scenarios when considering only Dry and

Critically Dry years. No other decreases were greater than 1 percent of any reservoir's total storage capacity (Table 19). Long-term average end-of-September storage at Folsom Reservoir exhibited little change relative to Future Baseline conditions. Drivers for these changes are generally the same as those discussed in the reservoir storage sections above (i.e., Section 5.1.1).

TABLE 19
SUMMARY OF CALSIM 3 SIMULATED LONG-TERM AVERAGE END-OF-SEPTEMBER RESERVOIR STORAGE UNDER FUTURE BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Compared Modeling Scenarios	Long-term Average All Years (TAF)[a]	Long-term Average Dry/Critical Years (TAF)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenarios for All Years (Percent (magnitude))[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenarios for Critical/Dry Water Years (Percent (magnitude))[b]
			Average Change	Average Change
Total Storage at Folsom Reservoir (TAF)				
2.0 – Future Baseline	541	337	-	-
2.1 - +75 MGD	541	337	0.0% (-0.1)	-0.1% (0.0)
2.2 - +150 MGD	541	336	0.6% (0.2)	1.6% (-1.2)
2.3 - Projected Demand	541	337	0.7% (0.3)	1.8% (-0.4)
Total Storage at Lake Shasta (TAF)				
2.0 – Future Baseline	2,695	2,019	-	-
2.1 - +75 MGD	2,679	1,995	-0.8% (-16.9)	-1.5% (-24.2)
2.2 - +150 MGD	2,656	1,947	-2.1% (-39.2)	-4.9% (-72.3)
2.3 - Projected Demand	2,663	1,958	-1.7% (-32.7)	-4.1% (-61.5)
Total Storage at Clair Engle Reservoir (TAF)				
2.0 – Future Baseline	1,314	858	-	-
2.1 - +75 MGD	1,309	855	-0.3% (-4.8)	0.2% (-3.0)
2.2 - +150 MGD	1,298	838	-1.6% (-16.0)	-2.7% (-20.6)
2.3 - Projected Demand	1,301	841	-1.2% (-12.7)	-2.1% (-17.2)
Total Storage at Lake Oroville (TAF)				
2.0 - Future Baseline	1,685	1,054	-	-
2.1 - +75 MGD	1,679	1,042	-0.5% (-5.5)	-1.5% (-11.6)
2.2 - +150 MGD	1,672	1,028	-1.3% (-12.5)	-3.6% (-25.9)
2.3 - Projected Demand	1,676	1,035	-0.9% (-9.2)	-2.4% (-18.8)

NOTES: MGD = million gallons per day; TAF = thousand acre-feet

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

5.2 HEC-5Q Results and Discussion

This section describes and presents results of the simulated changes associated with proposed project diversion-related changes to surface water temperatures in the lower American River and Sacramento River. Such changes could affect resources dependent upon baseline hydrologic conditions. Thus, descriptions of estimated potential changes to water temperatures presented in this section provide a basis for understanding potential effects on other resources.

As discussed in Section 4.2.2, *HEC-5Q Model Scenarios and Outputs*, all results are presented relative to baseline conditions. For each set of model scenario comparisons, results are generally presented as long-term annual or monthly averages over the entire simulation period of water years 1922-2015 and grouped by Water Year Type.

Additional results for each model output location are presented in **Exhibit D**. This exhibit includes results in the form of: (1) tables presenting long-term monthly average baseline model parameters and the percent change and magnitude change in average monthly model parameters from the baseline condition for each proposed project model scenario for each month for the entire model simulation and again for each water year type.

Water Temperature Results Summary – Existing Conditions

Comparison of Existing Conditions Project Scenarios with Existing Condition Baseline

Changes in simulated, long-term average water temperatures between existing baseline and existing proposed project model scenarios are summarized in **Table 20**. This table depicts summary statistics (arithmetic mean) of percent and magnitude changes between baseline and proposed project model scenarios calculated from long-term monthly averaged model output values. Metrics are presented for all water year types and again for just Dry and Critically Dry water year types when water supplies are often most limited**.** These metrics provide a high-level summary of simulated expected changes to surface water temperatures between baseline and proposed project model scenarios for a broad range of conditions.

TABLE 20
SUMMARY OF HEC-5Q SIMULATED LONG-TERM AVERAGE WATER TEMPERATURE UNDER EXISTING BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (°F)[a]	Long-term Average Dry/ Critical Years (°F)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
American River below Nimbus Dam (above Fairbairn WTP intake)				
1.0 - Baseline	56.5	57.7	-	-
1.1 - +75 MGD	56.5	57.7	0.01 (0.02%)	0.02 (0.05%)
1.2 - +150 MGD	56.5	57.7	0.01 (0.02%)	0.02 (0.03%)
1.3 - Projected Demand	56.5	57.8	0.02 (0.03%)	0.04 (0.07%)

Location and Modeling Scenario	Long-term Average All Years (°F)[a]	Long-term Average Dry/ Critical Years (°F)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b] Average Change	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b] Average Change
American River at Watt Avenue				
1.0 - Baseline	58.7	60.4	-	-
1.1 - +75 MGD	58.7	60.5	0.01 (0.01%)	0.01 (0.02%)
1.2 - +150 MGD	58.7	60.4	0.0 (0.01%)	0.0 (0.0%)
1.3 - Projected Demand	58.7	60.5	0.01 (0.02%)	0.02 (0.04%)
American River below Fairbairn WTP intake				
1.0 - Baseline	59.0	60.9	-	-
1.1 - +75 MGD	59.0	60.9	0.01 (0.01%)	0.01 (0.02%)
1.2 - +150 MGD	59.0	60.9	0 (0.01%)	-0.01 (0%)
1.3 - Projected Demand	59.0	60.9	0.01 (0.02%)	0.02 (0.03%)
American River above Sacramento River				
1.0 - Baseline	60.3	62.6	-	-
1.1 - +75 MGD	60.4	62.6	0.01 (0.02%)	0.01 (0.02%)
1.2 - +150 MGD	60.4	62.6	0.0 (0.01%)	-0.01 (-0.01%)
1.3 - Projected Demand	60.4	62.6	0.01 (0.02%)	0.01 (0.02%)
Sacramento River above American River				
1.0 - Baseline	60.0	61.2	-	-
1.1 - +75 MGD	60.0	61.2	0.0 (0.0%)	0.0 (0.0%)
1.2 - +150 MGD	60.0	61.2	0.0 (0.0%)	0.0 (0.0%)
1.3 - Projected Demand	60.0	61.2	0.0 (0.0%)	0.0 (0.0%)
Sacramento River below SRWTP (Sacramento River Pump Station) intakes				
1.0 - Baseline	59.9	61.3	-	-
1.1 - +75 MGD	59.9	61.3	0.0 (0.0%)	0.0 (0.0%)
1.2 - +150 MGD	59.9	61.3	0.0 (0.0%)	0.0 (0.0%)
1.3 - Projected Demand	59.9	61.3	0.0 (0.0%)	0.0 (0.0%)
Sacramento River at Freeport				
1.0 - Baseline	60.4	61.9	-	-
1.1 - +75 MGD	60.4	61.9	0.0 (0.0%)	0.0 (0.0%)
1.2 - +150 MGD	60.4	61.9	0.0 (0.0%)	0.0 (0.0%)
1.3 - Projected Demand	60.4	61.9	0.0 (0.0%)	0.0 (0.0%)

NOTES: MGD = million gallons per day

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

Overall, long-term averaged monthly river water temperatures for the proposed project model scenarios were almost all found to have negligible differences compared to Existing Baseline conditions (e.g., simulated changes were within 5 percent; Table 20). Differences varied by location, water year type, water use scenario, and month making generalizations difficult. Different combinations of these variables also resulted in variability in the patterns of water temperatures changes with larger changes sometimes concentrated in certain month and water year combinations (Exhibit D).

More specifically, average changes in monthly average river water temperatures at all model output locations under the proposed project scenarios were within 0.02°F and 0.03 percent of those occurring under Existing Baseline conditions when considering all water year types and were within 0.04°F and 0.07 percent of those occurring under Existing Baseline conditions when considering all just dry and critically dry water yest. The largest simulated percent and magnitude increases in monthly water temperatures for the proposed project scenarios occurred at the American River below Nimbus Dam output location, but remained negligible (Table 20). Further, there was essentially no difference in warming that occurred between Watt Avenue and below the FWTP under the proposed project scenarios relative to what occurred under Existing Baseline conditions, suggesting differences in water diversion had a negligible effect on long-term water temperatures at this location. The same was true for potential warming on the Sacramento River above and below the SRWTP.

Surface Water Results Summary – Future Conditions

Comparison of Future Conditions Baseline with Existing Condition Baseline

As discussed in Chapter 4, *Modeling Approach,* a future conditions baseline model was developed that includes projected (2040) changes in land use and urban growth, climate change, and sea level rise. Differences in these inputs result in Future Baseline conditions that differ from Existing Baseline conditions. To characterize the effect of these different inputs, comparison was made between the Existing Baseline conditions and Future Baseline conditions.

Changes between HEC-5Q simulated surface water temperatures for Existing Baseline conditions and Future Baseline Conditions are summarized in **Table 21**. The magnitude of average changes varied by output location. For instance, average water temperatures were simulated to increase more at the American River output locations compared to those on the Sacramento River. Broadly, the input of future land use and urban growth, climate change, and sea level rise resulted in slight increases in average water temperature at all output locations.

Comparison of Future Conditions Project Scenarios with Future Condition Baseline

Changes in simulated, long-term average water temperatures between Future Baseline Conditions and Future Conditions proposed project model scenarios are summarized in **Table 22**. Overall, long-term averaged monthly river water temperatures for the proposed project model scenarios were almost all found to have negligible differences compared to Future Baseline conditions (e.g., simulated changes were within 5 percent; Table 22). Differences varied by location, water year type, water use scenario, and month making generalizations difficult. Different combinations of these variables also resulted in variability in the patterns of water temperatures changes with larger changes sometimes concentrated in certain month and water year combinations (Exhibit D).

TABLE 21
SUMMARY OF HEC-5Q SIMULATED MONTHLY LONG-TERM WATER TEMPERATURE UNDER EXISTING AND FUTURE BASELINE CONDITIONS FOR FULL SIMULATION PERIOD

Location and Compared Modeling Scenarios	Long-term Average All Years (°F)[a]	Comparison of Long-term Average Monthly Changes between Baseline Conditions for All Years (Percent [magnitude])[a]
		Average Change
American River below Nimbus Dam (above Fairbairn WTP intake)		
1.0.0 - Existing Conditions	56.5	-
2.0.0 - Future Conditions	56.6	-
2.0.0-1.0.0 (Future - Existing)	-	0.15 (0.27%)
American River at Watt Avenue		
1.0.0 - Existing Conditions	58.7	-
2.0.0 - Future Conditions	59.4	-
2.0.0-1.0.0 (Future - Existing)	-	0.79 (1.35%)
American River below Fairbairn WTP intake		
1.0.0 - Existing Conditions	59.0	-
2.0.0 - Future Conditions	59.9	-
2.0.0-1.0.0 (Future - Existing)	-	0.9 (1.52%)
American River above Sacramento River		
1.0.0 - Existing Conditions	60.3	-
2.0.0 - Future Conditions	61.6	-
2.0.0-1.0.0 (Future - Existing)	-	1.3 (2.15%)
Sacramento River above American River		
1.0.0 - Existing Conditions	60.0	-
2.0.0 - Future Conditions	60.0	-
2.0.0-1.0.0 (Future - Existing)	-	0.03 (0.05%)
Sacramento River below SRWTP (Sacramento River Pump Station) intakes		
1.0.0 - Existing Conditions	59.9	-
2.0.0 - Future Conditions	60.2	-
2.0.0-1.0.0 (Future - Existing)	-	0.32 (0.53%)
Sacramento River at Freeport		
1.0.0 - Existing Conditions	60.4	-
2.0.0 - Future Conditions	60.8	-
2.0.0-1.0.0 (Future - Existing)	-	0.46 (0.77%)

NOTE:
a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).

TABLE 22
SUMMARY OF HEC-5Q SIMULATED LONG-TERM AVERAGE WATER TEMPERATURE UNDER FUTURE BASELINE AND PROPOSED PROJECT CONDITIONS FOR FULL SIMULATION PERIOD

Location and Modeling Scenario	Long-term Average All Years (°F)[a]	Long-term Average Dry/ Critical Years (°F)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
American River below Nimbus Dam (above Fairbairn WTP) intake				
2.0 - Baseline	56.6	58.5	-	-
2.1 - +75 MGD	56.6	58.5	0.0 (0.0%)	0.01 (0.02%)
2.2 - +150 MGD	56.6	58.5	-0.01 (0.0%)	0.0 (0.02%)
2.3 - Projected Demand	56.6	58.5	-0.01 (-0.01%)	0.0 (0.0%)
American River at Watt Avenue				
2.0 - Baseline	59.4	61.6	-	-
2.1 - +75 MGD	59.4	61.6	-0.01 (-0.01%)	-0.02 (-0.02%)
2.2 - +150 MGD	59.4	61.6	-0.01 (-0.02%)	-0.02 (-0.02%)
2.3 - Projected Demand	59.4	61.6	-0.02 (-0.02%)	-0.03 (-0.03%)
American River below Fairbairn WTP				
2.0 - Baseline	59.9	62.2	-	-
2.1 - +75 MGD	59.9	62.1	-0.01 (-0.01%)	-0.02 (-0.02%)
2.2 - +150 MGD	59.9	62.1	-0.02 (-0.02%)	-0.03 (-0.03%)
2.3 - Projected Demand	59.9	62.1	-0.02 (-0.02%)	-0.03 (-0.04%)
American River above Sacramento River (°F)				
2.0 - Baseline	61.6	64.1	-	-
2.1 - +75 MGD	61.6	64.1	-0.01 (-0.02%)	-0.03 (-0.04%)
2.2 - +150 MGD	61.6	64.0	-0.02 (-0.02%)	-0.04 (-0.05%)
2.3 - Projected Demand	61.6	64.0	-0.02 (-0.02%)	-0.05 (-0.05%)
Sacramento River above American River (°F)				
2.0 - Baseline	60.0	61.3	-	-
2.1 - +75 MGD	60.0	61.3	0.0 (0.0%)	0.0 (0.0%)
2.2 - +150 MGD	60.0	61.3	0.0 (0.0%)	0.0 (0.0%)
2.3 - Projected Demand	60.0	61.3	0.0 (0.0%)	0.0 (0.0%)
Sacramento River below SRWTP (Sacramento River Pump Station) intakes				
2.0 - Baseline	60.2	61.6	-	-
2.1 - +75 MGD	60.2	61.6	0.0 (-0.01%)	-0.01 (-0.01%)
2.2 - +150 MGD	60.2	61.6	-0.01 (-0.01%)	-0.01 (-0.02%)
2.3 - Projected Demand	60.2	61.6	-0.01 (-0.01%)	-0.01 (-0.02%)

Location and Modeling Scenario	Long-term Average All Years (°F)[a]	Long-term Average Dry/ Critical Years (°F)[a]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for All Years (Percent [magnitude])[b]	Comparison of Long-term Average Changes from Baseline conditions to Project Scenario for Critical/Dry Water Years (Percent [magnitude])[b]
			Average Change	Average Change
Sacramento River at Freeport				
2.0 - Baseline	60.8	62.3	-	-
2.1 - +75 MGD	60.8	62.3	-0.01 (-0.01%)	-0.01 (-0.01%)
2.2 - +150 MGD	60.8	62.3	-0.01 (-0.01%)	-0.02 (-0.02%)
2.3 - Projected Demand	60.8	62.3	-0.01 (-0.01%)	-0.02 (-0.02%)

NOTES: MGD = million gallons per day

a. Calculated as arithmetic mean of monthly results from entire simulation period (water years 1922-2015).
b. Calculated from monthly results from specified water year types (i.e., all five water year types or just critically dry and dry year types). Percentage change statistics are shown first followed by magnitude changes in parentheses.

More specifically, average changes in monthly average river water temperatures at all model output locations under the proposed project scenarios were within 0.02°F and 0.02 percent of those occurring under Future Baseline conditions when considering all water year types and were within 0.05°F and 0.05 percent of those occurring under Future Baseline conditions when considering all just dry and critically dry water yest. The largest simulated percent and magnitude increases in monthly water temperatures for the proposed project scenarios occurred at the American River below Nimbus Dam output location, but remained negligible (Table 22). Further, there was essentially no difference in warming that occurred between Watt Avenue and below the FWTP under the proposed project scenarios relative to what occurred under Future Baseline conditions, suggesting differences in water diversion had a negligible effect on long-term water temperatures at this location. The same was true for potential warming on the Sacramento River above and below the SRWTP.

CHAPTER 6
Conclusion

CalSim 3 was used to simulate predictive hydrology and environmental outputs necessary to assess potential effects of the proposed project on the environment. The proposed project was represented by developing a set of three proposed project scenarios that were modeled under both existing and future 2040 (climate change) hydrology conditions: (1) an increased SRWTP diversion of 75 MGD (phase 1, half build-out), (2) a total increased SRWTP diversion of 150 MGD (phase 2, full build-out), and (3) a Projected Demand scenario with demands based on projected City water demands from the City's 2020 UWMP. Generally, increased City diversions were represented in CalSim 3 existing and future proposed project model runs by increasing demands at the UD-26S-NU1 demand unit from those used in the existing and future baseline conditions model runs.

Under both existing and future conditions, long-term average changes to river flows associated with all proposed project scenarios were almost all found to have negligible differences compared to Baseline conditions (e.g., simulated changes were within 5 percent). During certain months and certain water year types, storage decreases at Shasta Lake, Trinity Lake, and Oroville Reservoir from the proposed project simulations were greater than 10 TAF and/or exceeded 1 percent of total reservoir capacity, relative to Baseline conditions.

Importantly, despite the simulated decreases in river flows and reservoir storages associated with the proposed project scenarios, results indicated that regulatory requirements, including Delta water quality objectives, were always met in all simulations and flow objectives such as those defined in the American River Modified Flow Management Standard, per the 2017 WFA, were met with nearly the same frequency in all these simulations (greater than 99 percent of simulation months). In reality, SWP and CVP operators and other water managers consistently monitor and adjust operations at facilities (e.g., real-time adjustment to releases) to maintain compliance with existing standards such as flow and temperature requirements or recommendations pursuant to applicable agreements and regulatory requirements.

Ultimately, increased City diversions may be met through various water sources and/or operational changes including but not limited to water releases from upstream SWP and CVP reservoir storage, reduced deliveries to junior water rights holders, or interbasin water transfers. The City's 1957 permanent water rights operating contract with Reclamation stipulates that Reclamation would operate its facilities so as to make available in the lower American River sufficient water for the City's diversions up to the amounts specified in the operating contract, and to operate its CVP Sacramento River storage facilities so as not to interfere with the City's diversions up to the amounts specified in the operating contract. While CalSim 3 simulation results indicate that changes to SWP and CVP reservoir operations, namely reductions in storage in Shasta Lake, Trinity Lake, and Oroville Reservoir and increased river releases are used to meet City demand under the proposed project scenarios, disentangling water sources used to meet City demands under each scenario and the casual mechanism(s) driving differences in proposed project scenario changes to hydrology parameters is challenging due to the interconnected relationships between river flows, water treatment plant intake diversions, and changes in reservoir storage and the complex logical dependencies of water management operations simulated by CalSim 3.

Using CalSim 3 outputs, the HEC-5Q modeling tool was used to simulate water temperatures in the American River from below Nimbus Dam downstream to the confluence with the Sacramento River and in the Sacramento River from the American River confluence downstream to Freeport. The scenarios modeled with the HEC-5Q model were the same as those modeled with the CalSim 3 model. Under both existing and future conditions, long-term average changes to water temperatures associated with all proposed project scenarios were all found to have negligible differences compared to Baseline conditions (e.g., simulated changes were within 5 percent).

CHAPTER 7
References

California Department of Fish and Wildlife (CDFW), 2020. Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta (2081-2019-066-00). Available: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/State-Water-Project/Files/ITP-for-Long-Term-SWP-Operations.pdf.

California Department of Water Resources (DWR), 2016. Chronological Reconstructed Sacramento and San Joaquin Valley Water Year Hydrologic Classification Indices. Available: http://cdec. water.ca.gov/cgi-progs/iodir/WSIHIST.

———, 2017. A Water Resources Planning Model for State Water Project and Central Valley Project. CalSim 3 Draft Report. California Department of Water Resources, Sacramento, CA. December.

———, 2019. Draft Environmental Impact Report for Long-Term Operation of the California State Water Project. State Clearinghouse No. 2019049121. Available: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/State-Water-Project/Files/Deliv-42Draft EIR v1-120519-Volume-I508.pdf.

———, 2021. CalSim 3. Modeling Support Branch, Bay-Delta Office, California Department of Water Resources, Sacramento, CA. Available: https://water.ca.gov/Library/Modeling-and-Analysis/Central-Valley-models-and-tools/CalSim-3.

———, 2022a. CalSim 3 Report, A Water Resources System Planning Model for State Water Project & Central Valley Project, August 2022.

———, 2022b. Delta Conveyance Project Draft EIR. Available: https://www.deltaconveyanceproject.com/.

———, 2022c. Delivery Capability Report and Studies 2021. Available: https://water.ca.gov/Library/Modeling-and-Analysis/Central-Valley-models-and-tools/CalSim-3/DCR2021.

———, 2023. Public Water System Statistics Surveys. Available: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Land-And-Water-Use/Public-Water-Systems-Statistics-Surveys.

———, 2025. Lake Oroville Storage. Updated through 4/20/25. Available: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/State-Water-Project/Operations-And-Maintenance/Files/Operations-Control-Office/Project-Wide-Operations/Oroville-Weekly-Reservoir-Storage-Chart.pdf.

California Department of Water Resources and United States Bureau of Reclamation (DWR and Reclamation), (2002). Benchmark Studies Assumption. California Department of Water Resources and United States Bureau of Reclamation, Mid-Pacific Region. Sacramento, California. May 17.

City of Sacramento, 2021. 2020 Urban Water Management Plan. Final Report. June. Available: http://www.cityofsacramento.org/-/media/Corporate/Files/DOU/Reports/Sacramento-2020-UWMP---Final-w-Ltr-of-Acceptance.pdf.

City of Sacramento, 2024. Sacramento 2040 General Plan. Adopted February 27, 2024.

Draper, A.J., A. Munevar, S.K. Arora, E. Reyes, N.L. Parker, F.I. Chung, and L.E. Peterson, 2004. CalSim: Generalized model for reservoir system analysis. Journal of Water Resources Planning and Management, November/December, 480-489.

Dudek, 2023. Sacramento 2040 General Plan and Climate Action & Adaptation Plan Master Environmental Impact Report SCH No. 2019012048, August 2023.

National Marine Fisheries Service (NMFS), 2019. Biological Opinion on Long-term Operations of the Central Valley Project and State Water Project. WCR-2016-00069. Series: ESA Section 7 Consultation. Available: https://repository.library.noaa.gov/view/noaa/22046.

Resource Management Associates, Inc. (RMA), 1998. HEC-5 User’s Manual: Simulation of Flood Control and Conservation Systems, Appendix on Water Quality Analysis.

Resource Management Associates and Watercourse Engineering, Inc. (RMA and WCI) 2013. Extension of the Sacramento River Water Quality Model (SRWQM) to Include American and Feather River Representations.

Sauer, V.B., and R.W. Meyer, 1992. *Determination of Error in Individual Discharge Measurements.* U.S. Geological Survey Open-File Report 92-144. Available: https://pubs.usgs.gov/of/1992/ofr92-144/.

State Water Resources Control Board (State Water Board), 2000. Revised Water Rights Decision 1641. Implementation of Water Quality Objectives for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; A Petition to Change Points of Diversion of the Central Valley Project and State Water Project in the Southern Delta and A Petition to Change Places of Use and Purposes of Use of the Central Valley Project. March 15. Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/decision_1641/index.shtml.

———, 2006. *Water Quality Control Plan Update for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary (Bay-Delta Plan).* Available: https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/wq_control_plans/.

State Water Resources Control Board, California Department of Water Resources, and California Department of Fish and Wildlife (State Water Board, DWR, and CDFW), 2023. Final Draft Scientific Basis Report Supplement in Support of Proposed Voluntary Agreements for the Sacramento River, Delta, and Tributaries Update to the San Francisco Bay/Sacramento-San Joaquin Delta Water Quality Control Plan. September. (ICF 103625.0.002.01.004.01.) Sacramento, CA.

Stantec Consulting Services Inc. and Bureau of Reclamation (Stantec and Reclamation), 2022. American River Basin Study. Available: https://www.usbr.gov/watersmart/bsp/completed.html.

United States Army Corps of Engineers (USACE), 2017. Draft Water Control Manual, Folsom Dam and Lake, American River, California. Available: https://www.spk.usace.army.mil/Missions/Civil-Works/Folsom-Water-Control-Manual-Update/.

United States Army Corps of Engineers Hydrologic Engineering Center (HEC). 1998. HEC-5 Simulation of Flood Control and Conservation Systems.

United States Bureau of Reclamation (Reclamation) 2015. Final Environmental Impact Statement, Coordinated Long-Term Operation of the Central Valley Project and State Water Project. Available: https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=21883.

———, 2024a. Final Environmental Impact Statement, Coordinated Long-Term Operation of the Central Valley Project and State Water Project. Available: https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=54661.

———, 2024b. Projects and Facilities. Last updated: June 5, 2024. Available: https://www.usbr.gov/projects/.

United States Bureau of Reclamation and California Department of Water Resources (Reclamation and DWR), 2014. Temporary Change Petition Regarding Delta Water Quality. Available: https://www.waterboards.ca.gov/drought/docs/tucp/bd_tucp.pdf.

United States Geological Survey (USGS), 1992. Policy Statement on Stage Accuracy. Office of Surface Water, Technical Memorandum Number 93.07, Washington, D.C. Available: https://water.usgs.gov/water-resources/memos/memo.php?id=1019.

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Exhibit A

CalSim 3 Modeling Results Comparison Tables

This Exhibit provides tables presenting long-term monthly average baseline model parameters and the percent change and magnitude change in average monthly model parameters from the baseline condition for each proposed project model scenario for each month for the entire model simulation and again for each water year type. Percent change and magnitude change values are calculated at each time step and then averaged accordingly using month-water year combinations. The first set of tables presents results from the existing conditions simulations (Table A.1 – A.14) followed by tables presenting results from the future conditions simulations (Table A.15 – A.28).

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Table A.1. Long-term Average End-of-Month Storage at Folsom Reservoir for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (TAF).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Total
All	Baseline	560	484	499	512	529	664	787	845	828	719	637	598	7660
	+75 MGD	5.7 (+1)	4.2 (+1)	3.6 (+0.9)	2.7 (+0.8)	1.1 (+0.3)	0.4 (+0.1)	1.4 (+0.3)	-0.1 (-0.1)	-0.3 (-0.1)	-0.2 (-0.2)	0.4 (0)	1.9 (+0.2)	21
	+150 MGD	6.2 (+1.1)	3.9 (+0.9)	3.0 (+0.8)	3.4 (+1)	2.1 (+0.5)	1.3 (+0.3)	1.7 (+0.3)	-0.1 (-0.1)	0.7 (0)	1.6 (+0)	0.7 (0)	2.1 (+0.2)	27
	Projected Demand	5.2 (+0.9)	3.8 (+0.9)	3.0 (+0.8)	2.5 (+0.8)	1.2 (+0.3)	0.5 (+0.1)	1.1 (+0.2)	-0.6 (-0.2)	0.4 (-0.1)	1.7 (+0)	0.0 (-0.1)	1.4 (+0)	20
Wet	Baseline	593	518	543	567	567	751	897	967	958	856	750	712	8679
	+75 MGD	2.0 (+0.8)	1.2 (+0.4)	-0.4 (-0.2)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	-0.2 (0)	-0.3 (-0.1)	2
	+150 MGD	-0.9 (+0.3)	0.8 (+0.3)	-0.2 (-0.1)	0.0 (+0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	-0.1 (0)	-0.1 (0)	-0.4 (-0.1)	-0.5 (-0.1)	-2
	Projected Demand	0.0 (+0.4)	1.2 (+0.4)	0.0 (-0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	-0.1 (0)	-0.1 (0)	-0.3 (-0.1)	-0.5 (-0.1)	0
Above Normal	Baseline	577	497	509	547	567	734	887	959	936	798	707	650	8367
	+75 MGD	2.3 (+0.4)	2.7 (+0.5)	2.4 (+0.5)	0.9 (+0.2)	0.0 (0)	0.0 (0)	0.0 (0)	0.3 (+0)	0.2 (+0)	0.1 (+0)	-0.1 (0)	13.2 (+2.6)	22
	+150 MGD	5.4 (+1.1)	1.8 (+0.6)	1.5 (+0.4)	0.9 (+0.2)	0.0 (+0)	0.0 (0)	0.0 (0)	0.2 (+0)	0.0 (+0)	8.7 (+1.1)	-4.8 (-0.7)	8.3 (+1.9)	22
	Projected Demand	6.4 (+0.9)	2.5 (+0.4)	2.2 (+0.4)	0.9 (+0.2)	-0.1 (0)	-0.1 (0)	-0.1 (0)	0.2 (+0)	0.1 (+0)	8.9 (+1.2)	-4.5 (-0.6)	8.8 (+2)	25
Below Normal	Baseline	598	504	508	520	538	676	836	894	865	693	625	584	7841
	+75 MGD	4.1 (+1)	6.0 (+1.6)	6.1 (+1.9)	6.4 (+2.4)	2.1 (+0.4)	-0.6 (-0.1)	-0.3 (0)	0.4 (+0)	0.0 (0)	0.7 (+0.1)	1.0 (+0.1)	0.9 (+0.1)	27
	+150 MGD	9.6 (+1.9)	7.4 (+1.8)	6.4 (+2)	6.4 (+2.3)	3.2 (+0.6)	0.5 (+0.1)	2.1 (+0.3)	2.3 (+0.3)	6.2 (+0.7)	5.9 (+0.8)	2.5 (+0.4)	2.3 (+0.4)	55
	Projected Demand	4.0 (+1)	6.2 (+1.7)	6.3 (+2)	6.6 (+2.4)	3.4 (+0.7)	0.7 (+0.1)	2.2 (+0.3)	2.4 (+0.3)	6.5 (+0.8)	7.5 (+1)	4.7 (+0.7)	4.4 (+0.7)	55
Dry	Baseline	534	465	468	457	502	596	695	761	736	676	600	564	7054
	+75 MGD	8.6 (+1.3)	0.6 (+0)	0.5 (+0)	0.6 (+0.1)	-1.2 (-0.3)	-1.2 (-0.2)	4.1 (+0.6)	-3.1 (-0.4)	-3.6 (-0.5)	-3.9 (-0.6)	-0.2 (-0.2)	-0.8 (-0.3)	0
	+150 MGD	9.9 (+1.4)	0.0 (-0.2)	-0.1 (-0.1)	0.5 (+0.1)	-1.1 (-0.2)	-1.8 (-0.3)	5.6 (+0.8)	-2.0 (-0.3)	-2.7 (-0.4)	-3.4 (-0.6)	6.2 (+0.7)	5.5 (+0.7)	17
	Projected Demand	9.3 (+1.4)	-0.5 (-0.3)	-0.6 (-0.2)	-0.2 (-0.1)	-2.0 (-0.4)	-2.7 (-0.5)	3.4 (+0.5)	-4.1 (-0.6)	-4.7 (-0.7)	-5.2 (-0.8)	-1.2 (-0.4)	-1.9 (-0.5)	-10
Critical	Baseline	444	392	418	414	428	476	495	502	501	450	394	368	5283
	+75 MGD	15.7 (+1.8)	12.9 (+2.7)	12.6 (+2.8)	6.3 (+1.4)	5.3 (+1.5)	5.3 (+1.1)	5.2 (+1.2)	1.9 (-0.2)	2.2 (-0.3)	1.8 (-0.7)	2.0 (-0.1)	1.3 (-0.7)	72
	+150 MGD	12.6 (+1.3)	11.4 (+2.3)	9.2 (+2.2)	11.2 (+3)	10.2 (+2.6)	10.1 (+2.2)	1.5 (+0.6)	-2.3 (-0.9)	-1.8 (-0.9)	-2.1 (-1.4)	-1.1 (-0.8)	-1.8 (-1.5)	57
	Projected Demand	13.0 (+1.4)	11.4 (+2.3)	9.3 (+2.2)	6.0 (+1.5)	5.1 (+1.5)	5.1 (+1.1)	0.4 (+0.4)	-3.2 (-1.1)	-1.9 (-1)	-1.8 (-1.4)	-1.2 (-1.1)	-2.1 (-2.1)	40

Notes: CalSim Node = 'S_FOLSM'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.2. Long-term Average End-of-Month Storage at Lake Shasta for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (TAF).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Total
All	Baseline	2756		2745		2878		3140		3372		3711		4035		4050		3771		3260		2940		2790		39448
	+75 MGD	-12.4	(-0.7)	-11.4	(-0.8)	-13.9	(-0.8)	-14.2	(-0.8)	-12.2	(-0.6)	-13.9	(-0.6)	-13.9	(-0.5)	-12.9	(-0.5)	-13.3	(-0.7)	-12.7	(-0.8)	-14.2	(-1)	-13.9	(-0.9)	-159
	+150 MGD	-18.1	(-1)	-15.7	(-1)	-14.4	(-0.9)	-10.8	(-0.6)	-8.1	(-0.4)	-11.6	(-0.5)	-11.9	(-0.4)	-11.3	(-0.4)	-15.3	(-0.7)	-17.0	(-1)	-19.5	(-1.2)	-17.6	(-1)	-171
	Projected Demand	-16.9	(-0.9)	-14.6	(-1)	-14.7	(-0.9)	-13.0	(-0.7)	-11.7	(-0.6)	-13.9	(-0.6)	-13.9	(-0.5)	-13.0	(-0.5)	-16.2	(-0.7)	-16.6	(-1)	-17.2	(-1.1)	-16.2	(-1)	-178
Wet	Baseline	2880		2949		3133		3483		3586		3867		4316		4501		4376		3896		3528		3284		43798
	+75 MGD	-5.8	(-0.2)	-3.8	(-0.2)	-2.8	(-0.2)	1.2	(-0.2)	-0.1	(-0.2)	-2.5	(-0.2)	0.0	(-0.2)	0.0	(-0.2)	-0.6	(-0.2)	-0.2	(-0.3)	-1.4	(-0.3)	-2.2	(-0.2)	-18
	+150 MGD	-12.4	(-0.7)	-9.4	(-0.5)	-6.1	(-0.3)	-0.5	(0)	-0.2	(0)	-2.5	(-0.1)	0.0	(0)	0.0	(0)	-1.1	(0)	-1.0	(0)	-3.3	(-0.1)	-5.3	(-0.2)	-42
	Projected Demand	-9.1	(-0.5)	-6.1	(-0.4)	-4.9	(-0.2)	0.5	(+0)	-0.7	(0)	-3.1	(-0.1)	-0.6	(0)	0.0	(0)	-1.1	(0)	-0.8	(0)	-2.6	(-0.1)	-4.1	(-0.1)	-33
Above Normal	Baseline	2865		2825		2988		3294		3616		4016		4425		4475		4255		3729		3373		3161		43022
	+75 MGD	-17.7	(-0.4)	-12.6	(-0.4)	-12.6	(-0.4)	-12.6	(-0.4)	-8.7	(-0.3)	-5.3	(-0.3)	-4.4	(-0.3)	4.1	(-0.3)	6.2	(-0.4)	12.8	(-0.5)	12.5	(-0.5)	2.7	(-0.5)	-36
	+150 MGD	-24.7	(-0.9)	-18.9	(-0.7)	-14.8	(-0.6)	-12.6	(-0.4)	-8.7	(-0.2)	-11.2	(-0.3)	-9.4	(-0.2)	-0.9	(0)	0.0	(0)	4.7	(+0.2)	11.7	(+0.4)	-0.4	(0)	-85
	Projected Demand	-35.1	(-1.6)	-28.6	(-1.5)	-24.4	(-1.2)	-22.5	(-0.9)	-18.6	(-0.6)	-8.4	(-0.2)	-7.0	(-0.2)	0.9	(+0)	2.3	(+0.1)	3.7	(+0.1)	11.6	(+0.4)	-1.6	(-0.1)	-128
Below Normal	Baseline	2915		2898		2991		3262		3520		3916		4294		4231		3861		3271		2937		2841		40937
	+75 MGD	-1.4	(-0.4)	-4.9	(-0.4)	-5.3	(-0.4)	-7.3	(-0.4)	-1.2	(-0.4)	-0.3	(-0.4)	-1.4	(-0.4)	-3.5	(-0.4)	-5.2	(-0.4)	-8.1	(-0.4)	-12.0	(-0.5)	-16.8	(-0.4)	-67
	+150 MGD	-13.8	(-0.7)	-15.5	(-0.9)	-12.4	(-0.8)	-6.9	(-0.4)	0.4	(-0.1)	-5.1	(-0.2)	-6.1	(-0.2)	-8.3	(-0.2)	-16.8	(-0.5)	-19.2	(-0.6)	-20.8	(-0.8)	-18.3	(-0.7)	-143
	Projected Demand	-7.8	(-0.4)	-10.8	(-0.7)	-8.4	(-0.6)	-3.9	(-0.3)	0.3	(-0.1)	-5.9	(-0.3)	-7.2	(-0.2)	-9.1	(-0.3)	-17.0	(-0.5)	-16.4	(-0.5)	-17.0	(-0.6)	-17.8	(-0.7)	-121
Dry	Baseline	2809		2748		2866		3044		3456		3877		4051		3954		3506		2938		2667		2606		38522
	+75 MGD	-17.9	(-0.7)	-18.0	(-0.7)	-17.6	(-0.8)	-17.3	(-0.7)	-17.5	(-0.7)	-17.1	(-0.7)	-25.5	(-0.6)	-25.3	(-0.6)	-25.1	(-0.7)	-20.7	(-0.8)	-27.4	(-0.8)	-20.9	(-0.7)	-250
	+150 MGD	-21.0	(-0.9)	-20.8	(-0.9)	-17.7	(-0.7)	-19.1	(-0.7)	-19.1	(-0.6)	-16.7	(-0.5)	-28.3	(-0.7)	-29.4	(-0.8)	-30.7	(-0.9)	-30.9	(-1.1)	-42.4	(-1.6)	-35.4	(-1.4)	-311
	Projected Demand	-23.2	(-0.9)	-22.9	(-1)	-21.9	(-0.9)	-21.6	(-0.8)	-22.6	(-0.7)	-21.0	(-0.6)	-30.6	(-0.8)	-31.0	(-0.8)	-31.4	(-0.9)	-27.2	(-1)	-31.9	(-1.2)	-24.5	(-1)	-310
Critical	Baseline	2089		1999		2071		2190		2378		2606		2673		2547		2220		1847		1624		1542		25785
	+75 MGD	-33.2	(-2.4)	-29.1	(-2.4)	-47.8	(-2.4)	-55.8	(-2.3)	-52.5	(-2.3)	-63.2	(-2.3)	-58.6	(-2.3)	-55.3	(-2.3)	-56.7	(-2.3)	-59.2	(-2.3)	-52.7	(-2.3)	-41.0	(-2.4)	-605
	+150 MGD	-28.3	(-2.3)	-20.7	(-2.4)	-30.9	(-2.6)	-28.1	(-1.9)	-25.5	(-1.8)	-35.9	(-1.9)	-29.9	(-1.6)	-28.6	(-1.7)	-38.6	(-2.7)	-50.4	(-4.5)	-52.5	(-5.3)	-37.5	(-3.7)	-407
	Projected Demand	-25.1	(-2.1)	-17.3	(-2.1)	-29.0	(-2.5)	-38.1	(-2.6)	-35.6	(-2.3)	-46.1	(-2.3)	-39.6	(-2)	-38.2	(-2.1)	-45.9	(-3.1)	-55.9	(-4.8)	-56.2	(-5.4)	-42.9	(-4)	-470

Notes: CalSim Node = 'S_SHSTA'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.3. Long-term Average End-of-Month Storage at Clair Engle Reservoir for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (TAF).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Total
All	Baseline	1387		1394		1440		1497		1599		1719		1868		1862		1833		1701		1556		1426		19283
	+75 MGD	-6.9	(-0.9)	-6.7	(-0.9)	-6.9	(-0.9)	-7.4	(-1)	-7.3	(-0.9)	-7.2	(-0.8)	-7.3	(-0.7)	-6.8	(-0.7)	-7.5	(-0.8)	-7.9	(-0.9)	-7.2	(-0.9)	-5.9	(-0.7)	-85
	+150 MGD	-10.4	(-1.2)	-10.5	(-1.2)	-10.4	(-1.2)	-10.9	(-1.2)	-10.4	(-1.1)	-10.1	(-1)	-10.6	(-0.9)	-10.1	(-0.9)	-10.5	(-1)	-10.7	(-1.2)	-10.0	(-1.1)	-9.2	(-0.9)	-124
	Projected Demand	-8.7	(-1)	-8.8	(-1)	-8.9	(-1)	-9.2	(-1.1)	-9.0	(-1)	-8.8	(-0.9)	-9.3	(-0.8)	-8.8	(-0.8)	-9.2	(-0.9)	-10.4	(-1.1)	-9.5	(-1)	-7.7	(-0.8)	-108
Wet	Baseline	1489		1517		1616		1735		1891		2026		2216		2246		2235		2121		1999		1846		22938
	+75 MGD	-3.2	(-0.3)	-1.3	(-0.1)	-0.8	(-0.1)	-0.7	(0)	-0.8	(0)	-0.7	(0)	-0.7	(0)	-0.5	(0)	-0.5	(0)	-0.9	(0)	-1.2	(-0.1)	-1.1	(-0.1)	-13
	+150 MGD	-6.3	(-0.6)	-5.2	(-0.4)	-3.6	(-0.3)	-3.4	(-0.2)	-3.0	(-0.2)	-2.6	(-0.1)	-2.6	(-0.1)	-2.2	(-0.1)	-1.6	(-0.1)	-1.8	(-0.1)	-2.4	(-0.1)	-2.6	(-0.1)	-37
	Projected Demand	-5.7	(-0.5)	-4.6	(-0.4)	-3.6	(-0.3)	-3.5	(-0.2)	-3.4	(-0.2)	-3.0	(-0.2)	-3.0	(-0.1)	-2.5	(-0.1)	-1.5	(-0.1)	-1.7	(-0.1)	-2.2	(-0.1)	-2.2	(-0.1)	-37
Above Normal	Baseline	1497		1492		1531		1626		1725		1873		2045		2072		2075		1960		1823		1689		21409
	+75 MGD	-9.9	(-1.2)	-11.5	(-1.3)	-11.5	(-1.3)	-9.9	(-1)	-9.3	(-0.9)	-8.9	(-0.7)	-8.9	(-0.6)	-8.9	(-0.6)	-8.7	(-0.7)	-8.3	(-0.7)	-8.4	(-0.7)	-8.4	(-0.8)	-113
	+150 MGD	-11.5	(-1.2)	-14.3	(-1.3)	-14.3	(-1.3)	-11.1	(-0.9)	-10.1	(-0.8)	-8.9	(-0.7)	-8.9	(-0.6)	-8.8	(-0.6)	-8.6	(-0.7)	-8.2	(-0.7)	-8.0	(-0.8)	-5.5	(-0.7)	-118
	Projected Demand	-11.0	(-1.2)	-13.8	(-1.4)	-13.8	(-1.4)	-10.6	(-1)	-10.0	(-0.9)	-9.2	(-0.7)	-9.2	(-0.6)	-9.1	(-0.6)	-8.9	(-0.6)	-8.4	(-0.7)	-8.5	(-0.7)	-6.0	(-0.6)	-119
Below Normal	Baseline	1478		1485		1500		1545		1622		1732		1893		1869		1838		1704		1524		1381		19571
	+75 MGD	-11.0	(-1.6)	-11.1	(-1.5)	-10.1	(-1.3)	-9.7	(-1.2)	-9.4	(-1.1)	-9.1	(-1)	-9.1	(-0.8)	-9.2	(-0.8)	-9.0	(-0.7)	-7.5	(-0.6)	-8.3	(-0.8)	-5.3	(-0.6)	-109
	+150 MGD	-17.9	(-2.5)	-16.8	(-2.2)	-15.9	(-2)	-15.6	(-1.9)	-15.6	(-1.7)	-15.4	(-1.5)	-15.5	(-1.3)	-15.5	(-1.2)	-15.2	(-1.2)	-14.6	(-1.2)	-15.5	(-1.4)	-14.7	(-1.4)	-188
	Projected Demand	-15.2	(-2.1)	-14.1	(-1.9)	-13.2	(-1.7)	-12.9	(-1.6)	-13.0	(-1.4)	-12.7	(-1.3)	-12.6	(-1)	-12.5	(-1)	-12.3	(-0.9)	-13.0	(-1)	-14.1	(-1.2)	-9.5	(-0.9)	-155
Dry	Baseline	1390		1385		1404		1398		1479		1602		1720		1681		1636		1467		1292		1176		17631
	+75 MGD	-2.7	(-0.3)	-2.7	(-0.3)	-3.0	(-0.3)	-3.5	(-0.3)	-3.4	(-0.3)	-3.5	(-0.3)	-2.9	(-0.2)	-3.3	(-0.2)	-5.8	(-0.4)	-10.8	(-0.8)	-11.2	(-1)	-11.2	(-1)	-64
	+150 MGD	-8.3	(-0.8)	-8.7	(-0.8)	-9.4	(-0.8)	-10.4	(-0.9)	-9.4	(-0.8)	-9.7	(-0.7)	-9.1	(-0.6)	-9.7	(-0.6)	-12.5	(-0.8)	-16.1	(-1.2)	-19.2	(-1.6)	-18.9	(-1.8)	-141
	Projected Demand	-5.5	(-0.5)	-5.8	(-0.5)	-6.8	(-0.6)	-7.3	(-0.6)	-7.0	(-0.5)	-7.1	(-0.5)	-6.5	(-0.4)	-7.1	(-0.5)	-9.8	(-0.7)	-16.1	(-1.2)	-18.3	(-1.5)	-18.2	(-1.7)	-115
Critical	Baseline	930		918		933		917		967		1038		1097		1054		985		844		729		653		11066
	+75 MGD	-10.2	(-1.4)	-12.1	(-1.8)	-15.5	(-2.3)	-20.8	(-3.2)	-20.8	(-3.1)	-20.7	(-2.6)	-22.1	(-2.5)	-18.8	(-2.3)	-21.0	(-3)	-20.0	(-3.7)	-12.8	(-2.7)	-8.8	(-1.5)	-203
	+150 MGD	-8.8	(-1.1)	-10.7	(-1.5)	-14.0	(-1.9)	-19.7	(-3)	-19.2	(-2.9)	-19.2	(-2.5)	-23.3	(-2.7)	-19.9	(-2.5)	-21.3	(-3.2)	-19.4	(-3.8)	-8.7	(-2.1)	-6.6	(-1.3)	-191
	Projected Demand	-6.3	(-0.8)	-8.1	(-1.1)	-11.3	(-1.6)	-16.9	(-2.6)	-16.5	(-2.6)	-17.1	(-2.2)	-21.2	(-2.5)	-17.9	(-2.3)	-20.3	(-3.1)	-19.8	(-3.8)	-9.0	(-2.2)	-6.3	(-1.2)	-171

Notes: CalSim Node = 'S_TRNTY'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.4. Long-term Average End-of-Month Storage at Lake Oroville for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (TAF).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Total
All	Baseline	1911	1925	2048	2196	2376	2587	2902	3009	2869	2392	2074	1964	28253
	+75 MGD	-6.2 (-0.5)	-5.5 (-0.5)	-5.8 (-0.4)	-5.4 (-0.3)	-4.9 (-0.3)	-4.1 (-0.2)	-4.3 (-0.2)	-4.8 (-0.2)	-5.3 (-0.3)	-5.0 (-0.3)	-4.8 (-0.4)	-4.9 (-0.5)	-61
	+150 MGD	-11.1 (-0.9)	-10.5 (-0.9)	-11.1 (-0.8)	-10.1 (-0.6)	-9.1 (-0.5)	-7.4 (-0.4)	-7.8 (-0.4)	-8.9 (-0.4)	-9.9 (-0.6)	-10.3 (-0.7)	-9.5 (-0.8)	-9.4 (-0.9)	-115
	Projected Demand	-8.0 (-0.7)	-7.5 (-0.6)	-8.5 (-0.6)	-7.6 (-0.5)	-7.1 (-0.4)	-5.8 (-0.3)	-6.0 (-0.3)	-6.9 (-0.3)	-7.7 (-0.4)	-8.1 (-0.6)	-7.5 (-0.7)	-6.9 (-0.7)	-87
Wet	Baseline	2049	2135	2414	2668	2837	2938	3312	3511	3479	3100	2836	2661	33941
	+75 MGD	-3.4 (-0.4)	-3.8 (-0.4)	-2.7 (-0.3)	-1.8 (-0.1)	-1.0 (0)	-0.9 (0)	0.0 (0)	0.0 (0)	-0.1 (0)	-0.3 (0)	-0.4 (0)	-0.5 (0)	-15
	+150 MGD	-4.4 (-0.6)	-4.7 (-0.7)	-5.6 (-0.5)	-4.1 (-0.2)	-1.8 (-0.1)	-1.6 (-0.1)	0.0 (0)	0.0 (0)	-0.3 (0)	-0.8 (0)	-1.3 (-0.1)	-2.4 (-0.1)	-27
	Projected Demand	-1.6 (-0.4)	-2.0 (-0.4)	-3.4 (-0.3)	-2.1 (-0.1)	-1.4 (-0.1)	-1.3 (0)	0.0 (0)	0.0 (0)	-0.3 (0)	-0.7 (0)	-1.1 (0)	-1.3 (-0.1)	-15
Above Normal	Baseline	2040	2022	2081	2381	2640	2929	3320	3505	3438	2879	2432	2186	31854
	+75 MGD	-6.7 (-0.5)	-5.8 (-0.4)	-5.8 (-0.4)	-5.3 (-0.3)	-3.3 (-0.2)	-0.3 (0)	-0.3 (0)	-0.3 (0)	-0.6 (0)	-0.4 (0)	-1.2 (-0.1)	-2.0 (-0.1)	-32
	+150 MGD	-16.6 (-1.2)	-15.2 (-1.1)	-13.3 (-0.9)	-9.1 (-0.5)	-5.3 (-0.3)	0.0 (0)	0.0 (0)	-0.4 (0)	-1.2 (0)	-2.9 (-0.1)	-4.1 (-0.2)	-2.2 (-0.1)	-70
	Projected Demand	-13.7 (-1)	-12.2 (-0.9)	-12.1 (-0.8)	-8.0 (-0.4)	-5.0 (-0.3)	0.1 (+0)	0.1 (+0)	-0.4 (0)	-0.9 (0)	-2.8 (-0.1)	-3.6 (-0.2)	-1.4 (-0.1)	-60
Below Normal	Baseline	2002	2006	2083	2172	2332	2601	3005	3106	2953	2346	1884	1791	28282
	+75 MGD	-3.9 (-0.3)	-3.1 (-0.2)	-4.5 (-0.3)	-4.3 (-0.2)	-4.4 (-0.2)	-3.8 (-0.1)	-3.9 (-0.1)	-5.1 (-0.2)	-5.7 (-0.2)	-6.1 (-0.3)	-5.1 (-0.3)	-4.2 (-0.2)	-54
	+150 MGD	-9.8 (-0.7)	-8.2 (-0.5)	-10.3 (-0.5)	-9.5 (-0.5)	-9.6 (-0.4)	-7.9 (-0.3)	-7.4 (-0.3)	-9.3 (-0.3)	-10.4 (-0.4)	-11.2 (-0.5)	-7.8 (-0.4)	-5.8 (-0.3)	-107
	Projected Demand	-6.6 (-0.5)	-5.7 (-0.4)	-7.7 (-0.4)	-7.1 (-0.4)	-7.3 (-0.3)	-6.1 (-0.2)	-5.6 (-0.2)	-7.2 (-0.2)	-8.1 (-0.3)	-8.0 (-0.4)	-4.8 (-0.3)	-2.4 (-0.1)	-77
Dry	Baseline	1739	1725	1762	1798	2020	2324	2554	2574	2287	1739	1508	1503	23533
	+75 MGD	-5.6 (-0.4)	-5.9 (-0.4)	-5.9 (-0.4)	-5.4 (-0.3)	-5.1 (-0.3)	-4.6 (-0.2)	-6.1 (-0.2)	-7.0 (-0.3)	-8.2 (-0.4)	-7.4 (-0.4)	-5.3 (-0.4)	-5.6 (-0.4)	-72
	+150 MGD	-11.0 (-0.7)	-11.6 (-0.8)	-11.8 (-0.7)	-10.7 (-0.7)	-10.9 (-0.6)	-10.5 (-0.5)	-12.8 (-0.5)	-14.8 (-0.6)	-17.7 (-0.8)	-16.9 (-1)	-10.6 (-0.7)	-10.9 (-0.7)	-150
	Projected Demand	-8.8 (-0.6)	-9.3 (-0.6)	-9.3 (-0.6)	-8.5 (-0.5)	-8.5 (-0.4)	-8.1 (-0.3)	-9.9 (-0.4)	-11.4 (-0.4)	-13.9 (-0.6)	-13.0 (-0.7)	-8.2 (-0.6)	-8.6 (-0.6)	-117
Critical	Baseline	1555	1494	1507	1522	1635	1823	1902	1850	1608	1275	1079	1076	18324
	+75 MGD	-15.9 (-1.4)	-12.2 (-1.1)	-14.4 (-1.1)	-14.8 (-1.1)	-15.0 (-1)	-14.2 (-0.8)	-15.6 (-0.9)	-16.1 (-1)	-16.4 (-1.4)	-14.5 (-1.4)	-16.2 (-2)	-17.2 (-2.2)	-183
	+150 MGD	-22.9 (-1.9)	-21.1 (-1.8)	-21.8 (-1.7)	-24.4 (-1.8)	-25.0 (-1.7)	-21.7 (-1.3)	-26.1 (-1.5)	-27.8 (-1.8)	-28.2 (-2.3)	-27.6 (-2.6)	-33.4 (-3.9)	-34.3 (-4.1)	-314
	Projected Demand	-17.7 (-1.4)	-16.0 (-1.2)	-16.8 (-1.2)	-18.7 (-1.4)	-19.2 (-1.3)	-17.6 (-1)	-20.0 (-1.2)	-21.5 (-1.3)	-21.7 (-1.7)	-22.8 (-2.1)	-27.7 (-3.2)	-28.6 (-3.4)	-248

Notes: CalSim Node = 'S_OROVL'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.5. Long-term Average Monthly Stream Flows at Trinity River below Clear Creek Tunnel for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	373	393	664	746	700	753	647	3814	1911	905	843	834	1049
	+75 MGD	-3.7 (-1)	-1.1 (0)	-4.9 (-0.3)	-4.1 (-0.6)	1.4 (-0.2)	-0.1 (0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	-9.3 (-1.1)	-9.3 (-1.1)	-3
	+150 MGD	-3.7 (-1)	2.8 (+0)	-11.7 (-1.1)	-7.8 (-1)	-1.3 (-0.4)	-0.1 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	-9.3 (-1.1)	-9.3 (-1.1)	-3
	Projected Demand	-3.8 (-1.1)	2.9 (+0.1)	-8.0 (-0.6)	-7.6 (-1)	0.2 (-0.3)	-0.1 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (+0)	-9.3 (-1.1)	-9.3 (-1.1)	-3
Wet	Baseline	373	553	1362	1472	1214	1356	838	4734	2978	1289	786	786	1478
	+75 MGD	0.0 (0)	-3.4 (-0.1)	-15.5 (-1)	-2.5 (-0.7)	4.2 (-0.6)	-0.4 (0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	-2
	+150 MGD	0.0 (0)	9.0 (+0.2)	-36.7 (-3.3)	-2.7 (-0.7)	-1.5 (-1)	-0.7 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	-3
	Projected Demand	0.0 (0)	9.0 (+0.2)	-25.3 (-2)	-2.8 (-0.7)	0.5 (-0.9)	-0.6 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	-2
Above Normal	Baseline	373	300	498	798	991	802	672	4387	2245	1048	870	870	1155
	+75 MGD	0.0 (0)	0.0 (0)	0.2 (+0)	-25.3 (-2.7)	0.0 (+0)	0.3 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	-2
	+150 MGD	0.0 (0)	0.0 (0)	0.3 (+0)	-51.7 (-5.6)	-7.1 (-0.2)	0.1 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	-5
	Projected Demand	0.0 (0)	0.0 (0)	0.2 (+0)	-51.1 (-5.6)	0.0 (+0)	0.2 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	-4
Below Normal	Baseline	373	352	300	337	384	520	513	3638	1531	806	870	870	875
	+75 MGD	0.0 (0)	0.0 (0)	0.0 (0)	-0.2 (0)	0.2 (+0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (+0)	0
	+150 MGD	0.0 (0)	0.0 (+0)	0.0 (0)	-1.4 (-0.1)	0.2 (+0)	0.3 (+0.1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0
	Projected Demand	0.0 (0)	0.0 (+0)	0.0 (0)	-0.9 (-0.1)	0.2 (+0)	0.3 (+0.1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (+0)	0
Dry	Baseline	373	300	300	300	300	300	529	3194	1059	572	870	870	747
	+75 MGD	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0
	+150 MGD	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0
	Projected Demand	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0
Critical	Baseline	372	300	300	300	300	300	564	2339	908	497	870	808	655
	+75 MGD	-25.1 (-7)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (+0)	-62.2 (-7.1)	-62.2 (-7.1)	-13
	+150 MGD	-25.1 (-7)	-0.3 (-0.1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	-62.2 (-7.1)	-62.2 (-7.1)	-13
	Projected Demand	-25.4 (-7.1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (+0)	-62.2 (-7.1)	-62.2 (-7.1)	-13

Notes: CalSim Node = 'C_TRN111'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.6. Long-term Average Monthly Stream Flows at Feather River at Mouth for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	3136	3423	6698	10145	12349	11749	7525	7229	6367	8032	6510	4396	7297
	+75 MGD	19.1 (+0.8)	9.9 (+0.5)	6.3 (+0.4)	-4.7 (+0)	-13.5 (-0.1)	-7.5 (0)	-2.0 (+0.1)	6.1 (+0.2)	6.3 (+0.2)	-0.1 (0)	-2.6 (0)	0.1 (+0)	1
	+150 MGD	34.7 (+1.3)	16.0 (+0.8)	20.0 (+0.6)	-15.4 (-0.1)	-27.1 (-0.2)	-18.4 (-0.1)	-5.2 (+0.1)	15.0 (+0.4)	16.3 (+0.5)	11.1 (+0.1)	-8.2 (+0)	-5.9 (-0.2)	3
	Projected Demand	22.6 (+0.8)	17.7 (+0.8)	21.1 (+0.6)	-13.7 (-0.1)	-16.3 (-0.2)	-15.3 (-0.1)	-3.9 (+0.1)	11.3 (+0.3)	12.1 (+0.4)	11.9 (+0.2)	-7.8 (+0)	-11.5 (-0.2)	2
Wet	Baseline	3803	5163	13514	20796	24348	22933	14814	12794	9640	8437	6862	6119	12435
	+75 MGD	11.0 (+0.3)	4.9 (+0.2)	-15.6 (-0.1)	-15.6 (-0.1)	-14.7 (-0.1)	-4.1 (0)	-15.0 (-0.1)	-2.1 (0)	1.2 (+0)	2.5 (+0)	0.5 (-0.1)	-1.2 (0)	-4
	+150 MGD	33.1 (+1)	3.5 (+0.2)	13.1 (0)	-21.5 (-0.2)	-41.4 (-0.1)	-8.0 (0)	-26.1 (-0.2)	-3.4 (-0.1)	3.7 (+0.1)	7.1 (+0.1)	5.7 (0)	15.1 (+0.2)	-2
	Projected Demand	21.9 (+0.6)	6.2 (+0.2)	20.6 (+0)	-18.3 (-0.1)	-14.4 (-0.1)	-4.2 (0)	-20.5 (-0.2)	-2.8 (0)	3.0 (+0.1)	6.4 (+0.1)	4.6 (0)	1.6 (+0)	0
Above Normal	Baseline	2920	2970	4446	11245	12586	13138	7287	9297	7397	9884	9130	6933	8103
	+75 MGD	11.6 (+0.4)	44.8 (+2.6)	3.2 (+0.1)	-6.4 (0)	-34.2 (-0.3)	-48.2 (-0.3)	-5.0 (-0.1)	-2.0 (+0)	0.3 (+0)	-0.9 (0)	12.1 (+0.1)	11.6 (+0.1)	-1
	+150 MGD	24.9 (+0.9)	45.5 (+2.7)	2.7 (+0.1)	-62.0 (-0.3)	-68.9 (-0.5)	-83.5 (-0.6)	-8.5 (-0.1)	4.0 (+0.1)	4.8 (+0.1)	31.6 (+0.3)	18.0 (+0.2)	-35.4 (-0.7)	-11
	Projected Demand	16.7 (+0.6)	43.3 (+2.5)	2.6 (+0.1)	-60.9 (-0.3)	-56.2 (-0.4)	-81.1 (-0.6)	-8.2 (-0.1)	5.4 (+0.1)	2.1 (+0.1)	33.0 (+0.4)	13.4 (+0.2)	-39.0 (-0.7)	-11
Below Normal	Baseline	3063	2806	4043	4953	7232	6842	4263	4468	4357	9137	8359	4115	5303
	+75 MGD	8.4 (+0.3)	6.8 (+0.4)	20.8 (+0.6)	1.3 (0)	-4.4 (-0.1)	-4.4 (-0.1)	-5.7 (-0.2)	17.9 (+0.4)	6.4 (+0.2)	8.4 (+0.1)	-1.4 (-0.2)	-13.7 (-0.5)	3
	+150 MGD	26.3 (+0.8)	2.2 (+0.1)	30.9 (+0.9)	-2.8 (-0.1)	-6.5 (0)	-28.6 (-0.4)	-12.4 (-0.2)	29.0 (+0.7)	17.1 (+0.5)	12.8 (+0.2)	-27.7 (-0.7)	-36.4 (-1.3)	0
	Projected Demand	18.1 (+0.6)	9.0 (+0.5)	31.4 (+0.9)	-0.6 (-0.1)	-4.4 (+0)	-21.4 (-0.3)	-11.8 (-0.2)	23.9 (+0.6)	11.7 (+0.3)	2.9 (+0.1)	-33.6 (-0.7)	-40.5 (-1)	-1
Dry	Baseline	2995	2429	2894	3142	4865	4203	3098	3470	4613	7761	4417	1981	3822
	+75 MGD	10.6 (+0.1)	-0.2 (0)	0.5 (+0)	-0.5 (0)	-19.0 (-0.4)	-5.4 (-0.1)	21.8 (+0.6)	15.9 (+0.4)	17.5 (+0.4)	12.2 (+0.2)	-44.0 (-0.6)	-2.8 (-0.1)	1
	+150 MGD	20.8 (+0.2)	-2.0 (-0.1)	3.3 (+0.1)	-0.7 (0)	-19.4 (-0.5)	-4.3 (-0.1)	31.8 (+0.9)	33.8 (+0.9)	45.9 (+0.9)	19.5 (+0.4)	-109.2 (-1.7)	-5.9 (-0.3)	1
	Projected Demand	18.7 (+0.2)	-0.8 (0)	1.4 (+0)	-0.7 (0)	-19.1 (-0.4)	-4.4 (-0.1)	25.6 (+0.7)	25.7 (+0.7)	37.5 (+0.8)	16.7 (+0.3)	-83.9 (-1.3)	-4.9 (-0.2)	1
Critical	Baseline	2167	2186	2544	2538	3030	2927	2298	2168	3630	4147	2994	1730	2697
	+75 MGD	69.6 (+4)	7.1 (+0.2)	39.2 (+1.9)	5.5 (+0.3)	-1.1 (-0.1)	13.3 (+0.6)	7.5 (+0.3)	1.1 (+0)	9.3 (+0.5)	-32.8 (-0.9)	23.4 (+0.9)	18.1 (+1)	13
	+150 MGD	75.4 (+4.3)	59.9 (+2.4)	51.2 (+2.4)	1.3 (+0.3)	-1.7 (-0.1)	14.6 (+0.6)	11.6 (+0.4)	20.6 (+0.7)	17.7 (+1.1)	-10.3 (-0.4)	85.8 (+3.2)	22.4 (+1.3)	29
	Projected Demand	40.9 (+2.6)	55.2 (+2.2)	44.6 (+2.1)	1.4 (+0.3)	-1.6 (-0.1)	14.4 (+0.6)	14.2 (+0.5)	10.5 (+0.3)	11.7 (+0.9)	13.9 (+0.3)	75.4 (+2.8)	21.6 (+1.3)	25

Notes: CalSim Node = 'C_FTR003'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.7. Long-term Average Monthly Stream Flows at Sacramento River above American River for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	10019		11011		19131		25982		31476		28633		19604		15938		12625		15177		12565		12845		17917
	+75 MGD	21.7	(+0.3)	-40.6	(-0.4)	54.2	(+0.6)	29.9	(+0.5)	-37.2	(-0.2)	29.7	(+0.2)	4.0	(+0.1)	-5.0	(0)	17.8	(+0.2)	4.6	(+0.1)	30.6	(+0.3)	7.1	(-0.1)	10
	+150 MGD	54.1	(+0.6)	-52.9	(-0.6)	6.9	(+0.2)	-27.1	(+0)	-58.5	(-0.2)	23.9	(+0.2)	12.4	(+0.3)	8.6	(+0.1)	78.0	(+0.8)	49.2	(+0.5)	37.5	(+0.7)	-7.6	(-0.2)	10
	Projected Demand	43.8	(+0.5)	-54.5	(-0.6)	26.9	(+0.3)	3.9	(+0.3)	-30.6	(-0.1)	20.9	(+0.2)	9.6	(+0.2)	0.6	(+0)	62.7	(+0.7)	39.8	(+0.4)	8.6	(+0.3)	-20.1	(-0.3)	9
Wet	Baseline	11904		14711		31353		41916		49577		44899		33968		24844		16744		16354		14140		17073		26457
	+75 MGD	12.3	(+0.1)	-57.1	(-0.8)	2.9	(+0.1)	-15.2	(0)	16.6	(+0)	53.6	(+0.1)	-22.8	(-0.1)	-10.5	(0)	4.8	(+0.1)	-3.0	(0)	14.9	(+0.1)	8.7	(+0.1)	0
	+150 MGD	54.0	(+0.5)	-65.5	(-0.9)	-17.8	(0)	-24.8	(-0.1)	1.2	(0)	47.3	(+0.1)	-35.5	(-0.1)	-17.4	(-0.1)	6.1	(+0.1)	0.8	(+0)	38.1	(+0.2)	48.9	(+0.3)	3
	Projected Demand	43.8	(+0.4)	-67.9	(-1)	8.5	(+0.1)	-23.3	(-0.1)	26.4	(+0)	50.4	(+0.1)	-28.0	(-0.1)	-24.2	(-0.1)	-2.6	(+0.1)	-1.3	(0)	29.9	(+0.2)	22.9	(+0.2)	3
Above Normal	Baseline	9988		10436		17609		33573		37462		35174		19751		19577		13715		16891		15753		16098		20502
	+75 MGD	19.1	(+0.2)	-32.7	(-0.2)	-7.4	(0)	-2.1	(0)	-81.7	(-0.2)	-55.4	(-0.1)	-23.1	(-0.1)	-106.0	(-0.9)	-30.0	(-0.5)	-94.5	(-0.6)	11.1	(+0)	193.7	(+1.3)	-17
	+150 MGD	130.3	(+1.3)	-29.4	(+0)	-81.0	(-0.5)	-30.4	(-0.1)	-113.9	(-0.3)	-35.1	(-0.1)	-35.9	(-0.1)	-99.2	(-0.8)	-1.6	(-0.2)	-32.7	(-0.3)	-95.2	(-0.6)	148.0	(+1)	-23
	Projected Demand	134.6	(+1.4)	-43.6	(-0.2)	-67.0	(-0.4)	-26.5	(-0.1)	-101.2	(-0.2)	-129.6	(-0.3)	-36.3	(-0.1)	-95.9	(-0.8)	-15.2	(-0.4)	13.7	(+0)	-110.1	(-0.7)	152.5	(+1)	-27
Below Normal	Baseline	9823		10310		14886		18560		22818		21611		13690		11673		9992		16478		14554		12212		14717
	+75 MGD	-44.5	(-0.6)	2.2	(+0.2)	19.2	(+0.2)	4.3	(+0)	-97.2	(-0.3)	0.9	(+0)	-9.5	(0)	41.1	(+0.4)	34.1	(+0.3)	24.4	(+0.2)	64.1	(+0.4)	13.1	(+0.2)	4
	+150 MGD	-24.2	(-0.4)	-35.4	(-0.3)	-30.4	(-0.3)	-106.2	(-0.8)	-127.4	(-0.2)	6.4	(-0.1)	-6.3	(+0)	60.0	(+0.6)	167.0	(+1.7)	43.9	(+0.3)	13.7	(+0)	-87.6	(-0.7)	-11
	Projected Demand	-29.3	(-0.4)	-25.0	(-0.1)	-16.0	(-0.2)	-86.6	(-0.7)	-71.2	(+0)	31.9	(+0)	-4.8	(+0)	52.4	(+0.5)	150.5	(+1.6)	12.5	(+0.1)	-3.2	(-0.1)	-102.4	(-0.8)	-8
Dry	Baseline	9101		9127		10313		12690		20937		17578		10772		9723		11166		15367		9580		8175		12044
	+75 MGD	60.4	(+0.7)	-2.4	(+0)	-1.6	(0)	0.3	(+0)	-18.9	(-0.1)	-13.3	(-0.1)	130.3	(+1.3)	37.7	(+0.4)	61.4	(+0.5)	41.2	(+0.3)	64.2	(+1.3)	-76.4	(-0.9)	24
	+150 MGD	61.7	(+0.7)	-4.6	(0)	-29.5	(-0.3)	30.3	(+0.3)	-37.8	(-0.1)	-55.8	(-0.3)	191.8	(+1.9)	80.4	(+0.8)	124.4	(+1)	94.9	(+0.7)	99.6	(+2.3)	-75.0	(-0.9)	40
	Projected Demand	55.3	(+0.6)	-7.0	(0)	-0.8	(+0)	2.6	(+0)	-10.7	(-0.1)	-45.7	(-0.2)	159.2	(+1.6)	61.2	(+0.6)	101.2	(+0.8)	68.8	(+0.5)	1.1	(+0.8)	-79.4	(-0.9)	26
Critical	Baseline	7364		6827		10997		12187		13208		11842		8084		7540		8667		8928		6743		7328		9143
	+75 MGD	103.9	(+1.9)	-122.7	(-1.2)	335.3	(+3.7)	227.8	(+3.2)	-41.1	(-0.5)	145.6	(+1.6)	-38.8	(-0.2)	-27.8	(-0.3)	11.2	(+0.3)	32.6	(+0.3)	-10.6	(-0.1)	-70.2	(-0.9)	45
	+150 MGD	103.4	(+1.9)	-128.9	(-1.3)	235.5	(+2.5)	29.5	(+1.3)	-54.4	(-0.7)	142.7	(+1.5)	-19.1	(+0.1)	-6.1	(-0.1)	107.7	(+1.5)	179.6	(+2)	116.6	(+1.9)	-59.5	(-0.7)	54
	Projected Demand	68.0	(+1.3)	-135.3	(-1.4)	246.1	(+2.7)	231.5	(+3.3)	-50.8	(-0.6)	145.9	(+1.6)	-19.1	(+0.1)	-13.9	(-0.2)	87.2	(+1.2)	159.8	(+1.8)	92.1	(+1.5)	-63.1	(-0.8)	62

Notes: CalSim Node = 'C_SAC064'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.8. Long-term Average Monthly Stream Flows at Sacramento River between American River and SRWTP Intakes for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	11443		13750		22323		30091		36246		31783		22699		20759		17066		18314		14911		14497		21157
	+75 MGD	-49.6	(-0.6)	-51.6	(-0.3)	22.2	(+0.5)	-9.6	(+0.3)	-66.3	(-0.3)	-8.2	(+0)	-47.3	(-0.2)	2.0	(+0.2)	9.0	(+0.1)	-8.8	(0)	8.8	(+0)	-28.5	(-0.2)	-19
	+150 MGD	-34.0	(-0.5)	-64.3	(-0.3)	-39.0	(+0.1)	-106.8	(-0.3)	-119.2	(-0.4)	-25.5	(-0.1)	-41.4	(0)	7.3	(+0.3)	37.6	(+0.4)	8.2	(+0.2)	25.5	(+0.2)	-55.7	(-0.5)	-34
	Projected Demand	-33.0	(-0.5)	-72.4	(-0.5)	-16.9	(+0.2)	-55.8	(+0)	-83.9	(-0.3)	-22.2	(0)	-43.8	(-0.1)	4.4	(+0.2)	26.6	(+0.3)	-0.9	(+0.1)	16.9	(+0.2)	-61.3	(-0.5)	-29
Wet	Baseline	13510		18297		37413		50392		58373		50594		39602		33049		23571		20288		17251		19055		31783
	+75 MGD	-49.2	(-0.6)	-86.8	(-0.7)	-28.7	(+0.2)	-84.3	(-0.2)	-47.0	(-0.1)	-7.6	(0)	-73.0	(-0.2)	-35.5	(-0.1)	-9.5	(0)	-20.0	(-0.1)	0.3	(0)	-6.8	(0)	-37
	+150 MGD	-18.4	(-0.4)	-149.0	(-1)	-88.4	(+0)	-123.3	(-0.3)	-98.0	(-0.2)	-33.0	(-0.1)	-101.1	(-0.3)	-59.8	(-0.2)	-26.5	(-0.1)	-34.3	(-0.2)	6.3	(+0)	14.1	(+0.1)	-59
	Projected Demand	-24.4	(-0.4)	-137.1	(-1)	-50.5	(+0.1)	-111.5	(-0.3)	-64.0	(-0.1)	-22.5	(-0.1)	-86.1	(-0.2)	-58.1	(-0.2)	-26.5	(-0.1)	-27.4	(-0.1)	6.4	(+0)	-2.0	(+0)	-50
Above Normal	Baseline	11428		12941		19766		38171		42614		38711		22619		25509		19223		20747		18365		18105		24017
	+75 MGD	7.8	(+0.1)	-77.6	(-0.5)	-46.8	(-0.3)	-33.3	(-0.1)	-126.7	(-0.2)	-108.0	(-0.3)	-61.6	(-0.3)	-129.2	(-0.6)	-41.2	(-0.3)	-107.6	(-0.5)	-0.3	(0)	-31.2	(-0.2)	-63
	+150 MGD	108.9	(+1)	-20.6	(+0.2)	-142.2	(-0.8)	-99.9	(-0.3)	-188.4	(-0.4)	-103.7	(-0.3)	-87.8	(-0.4)	-135.6	(-0.7)	-27.0	(-0.2)	-204.9	(-1)	91.4	(+0.5)	-87.7	(-0.5)	-75
	Projected Demand	118.0	(+1.1)	-23.8	(+0.1)	-123.0	(-0.7)	-78.5	(-0.2)	-168.9	(-0.3)	-191.5	(-0.5)	-81.6	(-0.3)	-128.0	(-0.7)	-33.9	(-0.2)	-151.0	(-0.7)	82.6	(+0.5)	-78.3	(-0.5)	-72
Below Normal	Baseline	11117		13175		17289		20443		25980		23486		15647		15413		13734		20306		16644		13865		17258
	+75 MGD	-55.6	(-0.6)	-72.2	(-0.5)	-22.0	(-0.1)	-52.1	(-0.3)	-77.5	(-0.4)	2.7	(-0.1)	-46.4	(-0.3)	13.0	(+0.1)	28.7	(+0.2)	0.4	(+0)	47.4	(+0.2)	2.4	(+0.1)	-19
	+150 MGD	-63.5	(-0.8)	-59.2	(-0.2)	-72.0	(-0.4)	-170.1	(-1.2)	-157.6	(-0.5)	-3.1	(-0.2)	-77.7	(-0.4)	28.6	(+0.3)	66.9	(+0.5)	20.9	(+0.1)	40.6	(+0.2)	-108.3	(-0.8)	-46
	Projected Demand	-45.8	(-0.5)	-111.9	(-0.9)	-71.8	(-0.5)	-151.2	(-1)	-93.7	(-0.3)	29.2	(-0.1)	-68.3	(-0.3)	26.8	(+0.3)	54.3	(+0.4)	-24.6	(-0.1)	21.2	(+0.1)	-117.6	(-0.8)	-46
Dry	Baseline	10492		11312		11820		14015		22920		19181		12338		11796		13648		17072		11528		9565		13807
	+75 MGD	-54.3	(-0.6)	92.5	(+1.1)	-26.4	(-0.2)	-47.4	(-0.4)	-37.1	(-0.3)	-52.4	(-0.3)	18.6	(+0.2)	141.9	(+1.3)	61.5	(+0.4)	38.6	(+0.2)	-2.5	(+0)	-73.4	(-0.7)	5
	+150 MGD	-90.6	(-1.1)	108.6	(+1.3)	-64.7	(-0.6)	-38.0	(-0.2)	-74.4	(-0.4)	-93.0	(-0.5)	35.2	(+0.4)	180.3	(+1.6)	117.0	(+0.8)	89.3	(+0.6)	-71.7	(-0.4)	-80.0	(-0.8)	2
	Projected Demand	-92.2	(-1)	110.8	(+1.4)	-31.5	(-0.2)	-56.6	(-0.4)	-39.6	(-0.3)	-77.6	(-0.4)	29.6	(+0.3)	165.0	(+1.5)	97.5	(+0.7)	64.5	(+0.4)	-73.9	(-0.5)	-81.0	(-0.8)	1
Critical	Baseline	8628		8391		12090		13197		14734		12973		9470		8996		10421		10290		8077		8267		10461
	+75 MGD	-85.0	(-1)	-86.4	(-0.9)	315.4	(+3.3)	280.7	(+3.5)	-71.7	(-0.7)	109.3	(+1)	-56.7	(-0.5)	17.8	(+0.2)	0.7	(+0.2)	31.1	(+0.3)	-13.0	(-0.1)	-70.0	(-0.7)	31
	+150 MGD	-78.7	(-0.9)	-125.7	(-1.3)	236.7	(+2.4)	-56.4	(+0.7)	-96.0	(-0.9)	99.5	(+1)	95.6	(+1.1)	42.3	(+0.4)	93.7	(+1.2)	169.1	(+1.7)	97.2	(+1.3)	-67.3	(-0.7)	34
	Projected Demand	-93.2	(-1.1)	-122.5	(-1.3)	248.9	(+2.6)	233.8	(+3.1)	-88.8	(-0.9)	105.8	(+1)	33.8	(+0.5)	33.1	(+0.3)	67.3	(+0.9)	146.9	(+1.5)	80.4	(+1.1)	-62.9	(-0.6)	49

Notes: CalSim Node = 'C_SAC063'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

CalSim_3_Existing_Surface_Hydro.xlsx, Sheet: Sac 63 R Detail; 1/17/2025, 9:46 AM

Table A.9. Long-term Average Monthly Stream Flows at Sacramento River below SRWTP Intakes for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	11337	13695	22277	30045	36200	31733	22637	20672	16966	18200	14795	14376	21078
	+75 MGD	-170.5 (-1.8)	-110.5 (-0.9)	-22.5 (+0.1)	-41.8 (+0.1)	-95.2 (-0.4)	-53.1 (-0.2)	-111.0 (-0.7)	-74.8 (-0.5)	-89.5 (-0.7)	-105.3 (-0.6)	-111.4 (-0.9)	-151.3 (-1.3)	-95
	+150 MGD	-269.0 (-2.9)	-181.4 (-1.5)	-141.7 (-0.7)	-194.3 (-0.9)	-195.9 (-0.8)	-135.4 (-0.6)	-175.5 (-1)	-142.4 (-1)	-160.9 (-1.1)	-191.2 (-1.1)	-207.4 (-1.6)	-308.6 (-2.6)	-192
	Projected Demand	-218.5 (-2.4)	-164.0 (-1.4)	-92.5 (-0.4)	-117.7 (-0.3)	-136.8 (-0.6)	-104.1 (-0.4)	-146.8 (-0.9)	-114.5 (-0.8)	-128.2 (-0.9)	-152.7 (-0.9)	-165.2 (-1.3)	-252.8 (-2.1)	-150
Wet	Baseline	13406	18241	37366	50346	58326	50542	39538	32970	23477	20187	17145	18950	31708
	+75 MGD	-164.3 (-1.6)	-141.6 (-1.1)	-59.6 (+0.1)	-109.3 (-0.3)	-72.1 (-0.1)	-40.6 (-0.1)	-115.4 (-0.4)	-77.6 (-0.3)	-67.1 (-0.4)	-75.1 (-0.4)	-83.0 (-0.5)	-85.4 (-0.5)	-91
	+150 MGD	-241.8 (-2.5)	-259.1 (-2)	-157.4 (-0.3)	-173.9 (-0.4)	-150.7 (-0.3)	-110.9 (-0.3)	-188.2 (-0.7)	-142.0 (-0.6)	-141.1 (-0.7)	-146.5 (-0.7)	-156.6 (-0.9)	-154.1 (-0.8)	-169
	Projected Demand	-200.8 (-2.1)	-222.3 (-1.7)	-102.1 (-0.1)	-150.2 (-0.4)	-103.0 (-0.2)	-80.1 (-0.2)	-153.5 (-0.5)	-123.4 (-0.5)	-115.8 (-0.6)	-112.8 (-0.6)	-122.7 (-0.7)	-123.9 (-0.7)	-134
Above Normal	Baseline	11319	12886	19720	38125	42567	38660	22556	25429	19127	20647	18253	17997	23940
	+75 MGD	-118.2 (-1)	-136.5 (-1)	-87.9 (-0.5)	-63.2 (-0.2)	-150.8 (-0.3)	-147.4 (-0.4)	-118.8 (-0.6)	-185.2 (-1)	-115.0 (-0.8)	-158.8 (-0.8)	-106.4 (-0.6)	-168.0 (-0.9)	-130
	+150 MGD	-136.9 (-1.3)	-139.3 (-0.9)	-235.3 (-1.4)	-176.8 (-0.6)	-248.8 (-0.6)	-195.6 (-0.6)	-207.4 (-1)	-243.0 (-1.3)	-173.9 (-1.1)	-332.3 (-1.6)	-95.0 (-0.5)	-370.8 (-2.1)	-213
	Projected Demand	-75.9 (-0.7)	-115.8 (-0.7)	-191.7 (-1.1)	-133.5 (-0.5)	-208.4 (-0.5)	-260.9 (-0.7)	-173.7 (-0.8)	-213.7 (-1.1)	-148.3 (-1)	-248.6 (-1.2)	-64.5 (-0.3)	-298.9 (-1.7)	-178
Below Normal	Baseline	11008	13120	17243	20397	25933	23436	15584	15325	13633	20195	16524	13732	17178
	+75 MGD	-176.2 (-1.9)	-125.2 (-1)	-67.9 (-0.5)	-88.2 (-0.5)	-104.9 (-0.5)	-49.5 (-0.3)	-116.2 (-0.8)	-68.1 (-0.5)	-72.2 (-0.5)	-83.0 (-0.4)	-89.7 (-0.6)	-140.0 (-1)	-98
	+150 MGD	-299.7 (-3.2)	-160.1 (-1.1)	-177.1 (-1.3)	-275.2 (-1.8)	-232.4 (-0.9)	-133.4 (-0.9)	-225.4 (-1.5)	-128.8 (-0.9)	-144.3 (-1.1)	-149.0 (-0.8)	-216.0 (-1.4)	-397.5 (-3)	-212
	Projected Demand	-231.8 (-2.4)	-194.5 (-1.7)	-148.9 (-1.2)	-224.1 (-1.5)	-145.9 (-0.6)	-67.8 (-0.6)	-181.5 (-1.2)	-98.4 (-0.7)	-110.4 (-0.8)	-153.9 (-0.8)	-181.8 (-1.1)	-338.4 (-2.5)	-173
Dry	Baseline	10384	11257	11774	13969	22874	19133	12277	11698	13540	16934	11406	9430	13723
	+75 MGD	-181.8 (-2)	33.6 (+0.5)	-85.5 (-0.7)	-85.6 (-0.6)	-72.6 (-0.5)	-106.0 (-0.6)	-62.8 (-0.5)	30.8 (+0.3)	-86.6 (-0.7)	-130.8 (-0.8)	-153.0 (-1.3)	-220.5 (-2.3)	-93
	+150 MGD	-337.5 (-3.6)	-9.9 (+0)	-203.2 (-1.8)	-151.7 (-1.1)	-182.0 (-0.9)	-227.1 (-1.3)	-138.1 (-1.2)	-37.7 (-0.3)	-177.7 (-1.4)	-255.7 (-1.5)	-380.2 (-3.2)	-378.7 (-4)	-207
	Projected Demand	-287.1 (-3.1)	19.2 (+0.4)	-132.6 (-1.1)	-135.1 (-1)	-111.7 (-0.7)	-177.5 (-1)	-103.1 (-0.9)	-7.9 (0)	-132.1 (-1)	-198.0 (-1.2)	-306.2 (-2.6)	-309.0 (-3.2)	-157
Critical	Baseline	8526	8339	12046	13154	14690	12927	9414	8900	10312	10155	7951	8135	10379
	+75 MGD	-207.0 (-2.6)	-163.2 (-1.8)	256.3 (+2.8)	243.8 (+3.2)	-107.7 (-1)	55.7 (+0.6)	-141.6 (-1.4)	-105.2 (-1.3)	-146.5 (-1.3)	-129.9 (-1.3)	-163.3 (-2)	-217.1 (-2.5)	-69
	+150 MGD	-314.2 (-4.1)	-280.2 (-3.3)	98.3 (+1.1)	-174.5 (-0.3)	-206.3 (-1.7)	-34.7 (-0.2)	-85.5 (-0.8)	-198.0 (-2.5)	-199.2 (-1.8)	-158.6 (-1.6)	-201.2 (-2.5)	-366.2 (-4.4)	-177
	Projected Demand	-279.3 (-3.6)	-241.9 (-2.9)	147.9 (+1.6)	152.6 (+2.5)	-162.5 (-1.4)	6.0 (+0.2)	-104.9 (-1)	-157.7 (-2)	-160.9 (-1.5)	-102.6 (-1)	-155.1 (-1.9)	-291.1 (-3.5)	-113

Notes: CalSim Node = 'C_SAC062'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.10. Long-term Average Monthly Stream Flows at Sacramento River at Freeport for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	11272	13724	22574	30312	36635	32284	22601	20623	16905	18110	14709	14297	21171
	+75 MGD	-170.5 (-1.8)	-110.5 (-1)	-22.6 (+0.2)	-41.9 (+0.2)	-95.2 (-0.4)	-53.1 (-0.2)	-110.9 (-0.7)	-74.7 (-0.5)	-89.4 (-0.7)	-105.2 (-0.7)	-111.3 (-0.9)	-151.3 (-1.3)	-95
	+150 MGD	-269.0 (-3)	-181.5 (-1.5)	-141.8 (-0.7)	-194.4 (-0.8)	-196.0 (-0.8)	-135.4 (-0.6)	-175.5 (-1)	-142.4 (-1)	-160.9 (-1.1)	-191.2 (-1.1)	-207.3 (-1.6)	-308.6 (-2.6)	-192
	Projected Demand	-218.5 (-2.4)	-164.1 (-1.4)	-92.6 (-0.4)	-117.8 (-0.3)	-136.9 (-0.6)	-104.0 (-0.4)	-146.8 (-0.9)	-114.5 (-0.8)	-128.2 (-0.9)	-152.8 (-0.9)	-165.2 (-1.3)	-252.9 (-2.1)	-150
Wet	Baseline	13345	18342	37743	50485	58981	51299	39510	32926	23418	20120	17083	18896	31846
	+75 MGD	-164.3 (-1.7)	-141.6 (-1.1)	-59.6 (+0.1)	-109.3 (-0.3)	-72.1 (-0.1)	-40.6 (-0.1)	-115.4 (-0.4)	-77.6 (-0.3)	-67.1 (-0.4)	-75.1 (-0.4)	-83.0 (-0.5)	-85.4 (-0.5)	-91
	+150 MGD	-241.8 (-2.5)	-259.1 (-2)	-157.4 (-0.3)	-173.9 (-0.4)	-150.7 (-0.3)	-110.9 (-0.3)	-188.2 (-0.7)	-142.0 (-0.6)	-141.1 (-0.8)	-146.5 (-0.7)	-156.6 (-0.9)	-154.1 (-0.8)	-169
	Projected Demand	-200.8 (-2.1)	-222.3 (-1.7)	-102.1 (-0.1)	-150.2 (-0.4)	-103.0 (-0.2)	-80.1 (-0.2)	-153.5 (-0.5)	-123.4 (-0.5)	-115.8 (-0.6)	-112.8 (-0.6)	-122.7 (-0.7)	-123.9 (-0.7)	-134
Above Normal	Baseline	11281	12922	20238	38711	43125	39224	22527	25385	19068	20581	18191	17943	24099
	+75 MGD	-118.2 (-1)	-136.5 (-1)	-87.9 (-0.5)	-63.2 (-0.2)	-150.8 (-0.3)	-147.3 (-0.4)	-118.7 (-0.6)	-185.0 (-1)	-114.7 (-0.8)	-158.5 (-0.8)	-106.0 (-0.6)	-167.8 (-0.9)	-130
	+150 MGD	-137.8 (-1.3)	-140.0 (-0.9)	-235.9 (-1.4)	-177.3 (-0.6)	-249.2 (-0.6)	-195.4 (-0.6)	-207.2 (-1)	-242.5 (-1.3)	-173.2 (-1.1)	-331.6 (-1.6)	-94.3 (-0.5)	-370.3 (-2.1)	-213
	Projected Demand	-76.8 (-0.7)	-116.5 (-0.8)	-192.3 (-1.1)	-134.0 (-0.4)	-208.9 (-0.5)	-260.8 (-0.7)	-173.6 (-0.8)	-213.4 (-1.1)	-147.9 (-1)	-248.2 (-1.2)	-64.1 (-0.3)	-298.6 (-1.7)	-178
Below Normal	Baseline	10944	13158	17448	20726	26164	23826	15556	15282	13576	20124	16457	13673	17245
	+75 MGD	-176.0 (-1.9)	-125.4 (-1)	-68.0 (-0.5)	-88.3 (-0.5)	-104.9 (-0.5)	-49.4 (-0.3)	-116.2 (-0.8)	-68.1 (-0.5)	-72.2 (-0.5)	-83.0 (-0.4)	-89.7 (-0.6)	-140.0 (-1)	-98
	+150 MGD	-299.3 (-3.2)	-160.2 (-1)	-177.1 (-1.3)	-275.1 (-1.8)	-232.4 (-0.9)	-133.3 (-0.9)	-225.3 (-1.6)	-128.6 (-0.9)	-144.0 (-1.1)	-148.7 (-0.8)	-215.7 (-1.4)	-397.3 (-3)	-211
	Projected Demand	-231.5 (-2.5)	-194.6 (-1.7)	-149.1 (-1.2)	-224.1 (-1.5)	-145.9 (-0.6)	-67.8 (-0.6)	-181.5 (-1.2)	-98.2 (-0.7)	-110.1 (-0.8)	-153.6 (-0.8)	-181.5 (-1.1)	-338.2 (-2.5)	-173
Dry	Baseline	10312	11211	12002	14247	23381	19645	12241	11652	13480	16807	11283	9312	13798
	+75 MGD	-181.7 (-2)	33.6 (+0.4)	-85.5 (-0.7)	-85.6 (-0.6)	-72.6 (-0.5)	-106.0 (-0.6)	-62.7 (-0.5)	31.0 (+0.3)	-86.3 (-0.7)	-130.4 (-0.8)	-152.7 (-1.3)	-220.3 (-2.3)	-93
	+150 MGD	-337.5 (-3.7)	-9.9 (0)	-203.2 (-1.8)	-151.7 (-1.1)	-182.0 (-0.9)	-227.1 (-1.2)	-138.0 (-1.2)	-37.4 (-0.3)	-177.2 (-1.4)	-255.2 (-1.5)	-379.7 (-3.2)	-378.4 (-4)	-206
	Projected Demand	-287.1 (-3.1)	19.2 (+0.3)	-132.6 (-1.1)	-135.1 (-1)	-111.7 (-0.7)	-177.5 (-1)	-103.0 (-0.9)	-7.6 (0)	-131.7 (-1)	-197.6 (-1.2)	-305.8 (-2.6)	-308.7 (-3.3)	-157
Critical	Baseline	8435	8280	12209	13309	14789	13326	9344	8827	10239	10007	7806	7993	10380
	+75 MGD	-207.0 (-2.6)	-163.2 (-2)	256.3 (+3.1)	243.8 (+3.4)	-107.7 (-1)	55.7 (+0.6)	-141.6 (-1.4)	-105.2 (-1.3)	-146.5 (-1.4)	-129.8 (-1.3)	-163.3 (-2.1)	-217.1 (-2.6)	-69
	+150 MGD	-313.9 (-4.1)	-280.3 (-3.5)	98.2 (+1.4)	-174.5 (-0.1)	-206.3 (-1.8)	-34.7 (-0.2)	-85.5 (-0.8)	-198.9 (-2.5)	-200.6 (-1.9)	-160.2 (-1.6)	-202.7 (-2.6)	-367.3 (-4.5)	-177
	Projected Demand	-279.1 (-3.7)	-242.0 (-3)	147.8 (+1.9)	152.6 (+2.7)	-162.5 (-1.4)	6.0 (+0.2)	-104.9 (-1)	-158.6 (-2)	-162.3 (-1.5)	-104.1 (-1.1)	-156.6 (-2)	-292.3 (-3.5)	-113

Notes: CalSim Node = 'C_SAC049'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.11. Long-term Average Monthly Stream Flows at American River below Nimbus Dam (above FWTP Intake) for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	1521		2814		3250		4168		4818		3224		3165		4938		4585		3297		2500		1783		3339
	+75 MGD	-69.9	(-2.9)	21.1	(+2.1)	2.9	(+1)	8.0	(+2.8)	22.0	(+1.6)	4.0	(+0.1)	-22.2	(-0.3)	17.7	(+1)	-4.8	(-0.2)	-9.1	(-0.2)	-17.3	(-0.6)	-32.9	(-1)	-7
	+150 MGD	-82.2	(-3.7)	25.7	(+3)	0.1	(+1.2)	-20.2	(+1.6)	6.5	(+1)	-1.6	(-0.1)	-20.5	(+1)	13.8	(+1)	-31.5	(-0.7)	-31.6	(-0.9)	-2.5	(+0.7)	-41.2	(-1.4)	-15
	Projected Demand	-73.1	(-3.1)	16.3	(+2.4)	0.2	(+1)	-2.4	(+2.1)	11.8	(+1.2)	2.7	(+0.1)	-22.2	(+0.3)	16.7	(+1.1)	-29.6	(-0.7)	-33.7	(-1)	15.4	(+1.2)	-36.4	(-1.2)	-11
Wet	Baseline	1700		3644		6121		8515		8834		5756		5682		8311		6942		4070		3251		2121		5412
	+75 MGD	-58.5	(-2.8)	6.5	(+2.6)	17.4	(+3.9)	-14.0	(-0.4)	-7.9	(-0.1)	-6.8	(-0.2)	-7.7	(-0.2)	-8.6	(-0.1)	-9.4	(-0.1)	-11.4	(-0.3)	-8.8	(-0.2)	-9.5	(-0.4)	-10
	+150 MGD	-64.3	(-3.1)	-42.3	(+1.2)	-3.5	(+3.2)	-20.2	(-0.5)	-19.2	(-0.3)	-18.2	(-0.5)	-17.7	(-0.4)	-20.3	(-0.3)	-21.4	(-0.3)	-22.7	(-0.6)	-19.0	(-0.5)	-23.0	(-1.1)	-24
	Projected Demand	-62.5	(-3)	-30.3	(+1.6)	5.8	(+3.5)	-12.6	(-0.4)	-13.4	(-0.2)	-12.3	(-0.3)	-12.9	(-0.3)	-14.6	(-0.2)	-15.7	(-0.2)	-17.0	(-0.4)	-14.0	(-0.4)	-15.2	(-0.7)	-18
Above Normal	Baseline	1533		2582		2208		4670		5178		3625		2931		6063		5644		4016		2766		2143		3613
	+75 MGD	-11.0	(-0.5)	-13.1	(-0.6)	-1.2	(-0.1)	18.5	(+0.2)	10.5	(+0.5)	-5.3	(-0.2)	-5.6	(-0.3)	-11.1	(-0.3)	-6.8	(-0.1)	-8.2	(-0.2)	-6.1	(-0.2)	-231.6	(-5.5)	-23
	+150 MGD	-16.9	(-1)	45.0	(+1.7)	-9.7	(-0.5)	-4.8	(-0.3)	0.7	(+0.2)	-13.6	(-0.5)	-14.5	(-0.6)	-19.4	(-0.5)	-15.6	(-0.3)	-161.5	(-4.4)	198.0	(+10.7)	-239.7	(-5.9)	-21
	Projected Demand	-14.1	(-0.8)	53.9	(+2)	-6.5	(-0.3)	10.7	(0)	7.9	(+0.4)	-9.4	(-0.3)	-10.0	(-0.4)	-17.4	(-0.4)	-11.4	(-0.2)	-156.7	(-4.3)	201.2	(+10.8)	-237.5	(-5.8)	-16
Below Normal	Baseline	1392		2941		2459		1948		3222		1954		2035		3864		3902		4006		2259		1774		2646
	+75 MGD	-7.8	(-0.5)	-36.9	(-1.6)	-7.5	(-0.6)	-12.9	(-1)	72.4	(+5.6)	35.9	(+1.4)	-11.1	(-0.4)	-18.2	(-0.4)	-1.2	(0)	-19.3	(-0.4)	-12.2	(-0.6)	-6.6	(-0.4)	-2
	+150 MGD	-31.3	(-1.9)	21.1	(+1.6)	3.5	(+0.1)	-12.9	(+0.3)	38.0	(+4.3)	30.1	(+1)	-41.9	(-1.5)	-17.2	(-0.2)	-91.0	(-1.6)	-12.9	(-0.3)	36.5	(+2.1)	-11.8	(-0.7)	-8
	Projected Demand	-10.8	(-0.8)	-46.9	(-2)	-12.9	(-1)	-15.9	(-1.2)	43.3	(+4.5)	34.7	(+1.2)	-35.9	(-1.2)	-13.5	(-0.1)	-89.4	(-1.6)	-29.7	(-0.6)	31.5	(+1.8)	-8.7	(-0.5)	-13
Dry	Baseline	1488		2266		1574		1387		2043		1685		1645		2191		2648		1881		2103		1513		1869
	+75 MGD	-116.0	(-4.2)	126.8	(+5.7)	-4.7	(-0.7)	-6.6	(-0.5)	26.2	(+1.1)	-5.9	(-0.3)	-93.7	(-1.7)	110.8	(+5.3)	3.0	(+0.2)	-0.1	(0)	-64.0	(-2.1)	5.1	(+0.2)	-2
	+150 MGD	-149.7	(-5.8)	149.3	(+6.9)	-11.4	(-1.2)	-22.1	(-1.4)	15.1	(+0.6)	-0.2	(0)	-135.1	(-3.4)	110.0	(+5.3)	-0.9	(-0.1)	0.1	(+0)	-165.3	(-5)	0.1	(-0.2)	-18
	Projected Demand	-146.7	(-5.5)	151.9	(+7)	-8.6	(-1)	-15.0	(-1)	21.0	(+0.8)	3.4	(+0.2)	-109.8	(-2.3)	112.2	(+5.4)	1.0	(+0)	-0.2	(0)	-70.6	(-2.3)	2.0	(0)	-5
Critical	Baseline	1370		1658		1149		1087		1580		1208		1485		1575		1917		1529		1496		1071		1427
	+75 MGD	-189.7	(-7.1)	52.2	(+5.2)	0.4	(+0.4)	95.5	(+21.7)	11.7	(+0.3)	-3.4	(-0.3)	-3.4	(+1)	48.6	(+2.1)	-8.1	(-1.1)	0.9	(0)	-0.1	(-0.1)	2.2	(-0.4)	1
	+150 MGD	-179.3	(-7.9)	20.6	(+5.6)	24.2	(+2.5)	-42.9	(+13.2)	7.1	(0)	-7.4	(-0.7)	132.5	(+14.2)	54.2	(+2.2)	-8.5	(-1.5)	-5.0	(-0.5)	-14.4	(-1)	-3.4	(-0.9)	-2
	Projected Demand	-160.0	(-6.2)	28.4	(+6.1)	24.4	(+2.5)	44.1	(+17.8)	9.2	(+0.1)	-5.6	(-0.5)	69.1	(+7.9)	51.6	(+2.1)	-15.8	(-1.9)	-8.8	(-0.9)	-8.0	(-0.6)	3.4	(-0.4)	3

Notes: CalSim Node = 'C_AMR009'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.12. Long-term Average Monthly Stream Flows at American River below FWTP Intake for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	1421	2729	3197	4121	4772	3152	3068	4808	4432	3144	2347	1654	3237
	+75 MGD	-67.6 (-2.9)	-7.4 (+1.5)	-28.8 (-0.4)	-36.4 (+0.7)	-26.0 (-0.2)	-35.3 (-1.7)	-48.3 (-1.4)	10.3 (+1)	-4.8 (-0.2)	-9.1 (-0.2)	-17.3 (-0.7)	-31.5 (-1)	-25
	+150 MGD	-84.1 (-4.4)	3.1 (+2.8)	-15.0 (+0.9)	-43.0 (+0.2)	-19.1 (-0.2)	-23.8 (-1.2)	-38.1 (+0.3)	2.1 (+0.7)	-39.6 (-1.1)	-40.5 (-1.3)	-12.4 (+0.3)	-48.3 (-2.1)	-30
	Projected Demand	-79.8 (-3.9)	-3.2 (+2.5)	-38.6 (-0.4)	-72.4 (-0.7)	-52.8 (-1)	-42.3 (-2)	-46.6 (+0.2)	6.5 (+1)	-31.5 (-0.8)	-31.6 (-0.9)	-2.5 (+0.8)	-39.0 (-1.4)	-36
Wet	Baseline	1601	3571	6085	8497	8804	5696	5593	8173	6788	3916	3097	1978	5317
	+75 MGD	-57.3 (-2.9)	-25.6 (+2.2)	-28.1 (+3.2)	-65.7 (-1.2)	-59.8 (-0.8)	-58.1 (-1.4)	-47.1 (-1)	-21.1 (-0.3)	-9.4 (-0.2)	-11.4 (-0.3)	-8.8 (-0.2)	-9.5 (-0.5)	-34
	+150 MGD	-63.3 (-3.6)	-55.5 (+1.6)	-20.4 (+3.3)	-33.0 (-0.9)	-38.1 (-0.7)	-36.6 (-1)	-34.1 (-0.8)	-31.6 (-0.5)	-26.3 (-0.4)	-28.6 (-0.8)	-27.5 (-0.8)	-30.7 (-1.5)	-36
	Projected Demand	-63.1 (-3.2)	-74.4 (+0.8)	-62.2 (+2.3)	-90.0 (-1.7)	-89.6 (-1.2)	-72.0 (-1.7)	-57.1 (-1.2)	-32.9 (-0.5)	-21.4 (-0.3)	-22.7 (-0.6)	-19.0 (-0.5)	-21.8 (-1.1)	-52
Above Normal	Baseline	1434	2495	2155	4630	5146	3550	2830	5924	5490	3862	2612	2003	3511
	+75 MGD	-7.9 (-0.4)	-41.7 (-1.5)	-36.5 (-1.7)	-28.4 (-1.4)	-42.0 (-0.9)	-50.0 (-1.7)	-35.8 (-1.3)	-20.1 (-0.4)	-6.8 (-0.1)	-8.2 (-0.2)	-6.1 (-0.2)	-220.0 (-5.2)	-42
	+150 MGD	-19.0 (-1.3)	18.2 (+0.8)	-29.7 (-0.9)	-25.3 (-1.4)	-14.6 (-0.5)	-43.8 (-1.6)	-39.1 (-1.4)	-33.1 (-0.7)	-22.9 (-0.4)	-170.1 (-4.9)	188.5 (+11.3)	-235.0 (-6)	-36
	Projected Demand	-13.9 (-0.9)	16.4 (+0.8)	-54.4 (-2.5)	-62.5 (-2.2)	-66.7 (-1.5)	-61.6 (-2.1)	-44.6 (-1.7)	-28.4 (-0.6)	-15.6 (-0.3)	-161.5 (-4.6)	198.0 (+11.7)	-225.2 (-5.5)	-43
Below Normal	Baseline	1291	2854	2401	1887	3164	1879	1936	3733	3748	3852	2105	1654	2542
	+75 MGD	-7.0 (-0.5)	-70.4 (-2.6)	-38.0 (-2.2)	-53.3 (-3.8)	22.9 (+3.8)	4.0 (-0.5)	-33.3 (-1.6)	-24.3 (-0.6)	-1.2 (0)	-19.3 (-0.4)	-12.2 (-0.6)	-6.6 (-0.4)	-20
	+150 MGD	-37.3 (-2.6)	-11.3 (+0.9)	-16.9 (-0.9)	-40.2 (-1.2)	-1.6 (+2.7)	10.4 (-0.2)	-61.0 (-2.6)	-30.8 (-0.6)	-102.1 (-1.9)	-24.5 (-0.6)	25.8 (+1.8)	-20.9 (-1.3)	-26
	Projected Demand	-30.4 (-2)	-14.9 (+0.6)	-33.7 (-1.6)	-56.7 (-2.4)	-22.2 (+2.1)	-2.1 (-0.9)	-64.1 (-2.7)	-23.3 (-0.3)	-91.0 (-1.6)	-12.9 (-0.3)	36.5 (+2.3)	-11.8 (-0.7)	-27
Dry	Baseline	1386	2175	1503	1322	1988	1606	1547	2070	2493	1727	1949	1394	1763
	+75 MGD	-111.4 (-4.2)	98.2 (+4.8)	-22.0 (-2.2)	-45.1 (-4)	-15.1 (-1.4)	-36.5 (-2.4)	-108.6 (-2.9)	107.0 (+5.5)	3.0 (+0.2)	-0.1 (0)	-64.0 (-2.3)	5.1 (+0.2)	-16
	+150 MGD	-151.2 (-6.3)	121.1 (+6.1)	-23.6 (-2)	-50.9 (-4.1)	-7.2 (-0.8)	-23.4 (-1.5)	-146.8 (-4.3)	98.8 (+5)	-10.1 (-0.6)	-8.6 (-0.5)	-175.5 (-5.8)	-9.7 (-1)	-32
	Projected Demand	-145.1 (-5.9)	120.7 (+6.1)	-28.8 (-2.8)	-61.8 (-5)	-29.7 (-2)	-30.8 (-2)	-150.0 (-4.6)	106.2 (+5.5)	-0.9 (-0.1)	0.1 (+0)	-165.3 (-5.2)	0.1 (-0.3)	-32
Critical	Baseline	1264	1564	1089	1016	1519	1129	1381	1459	1768	1379	1346	953	1322
	+75 MGD	-185.8 (-7.4)	39.2 (+5.4)	-17.0 (-1.7)	55.7 (+19.1)	-28.9 (-3.1)	-34.1 (-3.7)	-16.2 (-0.1)	47.7 (+2.2)	-8.1 (-1.3)	0.9 (-0.1)	-0.1 (-0.2)	2.2 (-0.6)	-12
	+150 MGD	-181.7 (-9.1)	3.7 (+6)	22.0 (+3.4)	-74.9 (+11.2)	-23.3 (-2.4)	-33.2 (-2.8)	114.2 (+14.2)	45.3 (+1.7)	-18.1 (-2.5)	-16.5 (-1.5)	-25.7 (-2.1)	-13.4 (-2.3)	-17
	Projected Demand	-175.4 (-8.3)	9.2 (+6.3)	6.9 (+0.5)	-80.1 (+10.5)	-36.4 (-3.6)	-38.1 (-4.1)	119.7 (+14.7)	53.4 (+2.3)	-8.5 (-1.8)	-5.1 (-0.6)	-14.3 (-1.2)	-3.4 (-1.2)	-14

Notes: CalSim Node = 'C_AMR006'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.13. Long-term Average Monthly Stream Flows at Delta outflow for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	6729	9198	22630	39806	50367	42569	27762	21916	13227	7969	5017	6708	21158
	+75 MGD	-10.4 (-0.2)	-25.7 (-0.2)	8.4 (+0.6)	-41.4 (-0.1)	-26.5 (-0.1)	-19.6 (-0.1)	-46.9 (-0.1)	-7.8 (0)	-7.4 (-0.1)	3.9 (+0.1)	-5.1 (-0.2)	-8.7 (-0.2)	-16
	+150 MGD	-8.9 (-0.1)	-40.8 (-0.3)	32.2 (+0.8)	-107.3 (-0.5)	-73.6 (-0.1)	-22.2 (-0.2)	-67.9 (-0.2)	-10.2 (-0.1)	-8.1 (-0.1)	-2.8 (0)	-8.4 (-0.3)	-21.0 (-0.5)	-28
	Projected Demand	-2.6 (+0)	-46.9 (-0.5)	48.7 (+0.9)	-77.8 (-0.3)	-53.0 (-0.1)	-38.2 (-0.2)	-60.3 (-0.2)	-10.4 (-0.1)	-9.7 (-0.1)	-2.1 (0)	-6.2 (-0.2)	-20.6 (-0.5)	-23
Wet	Baseline	8501	14690	46744	81025	97508	81260	53019	38401	22961	11023	6693	10875	39392
	+75 MGD	-7.4 (-0.1)	-48.4 (-0.4)	-65.9 (+0.4)	-133.5 (-0.2)	-22.7 (0)	4.5 (0)	-104.3 (-0.2)	-9.1 (0)	-5.8 (+0)	-4.4 (0)	5.2 (+0.1)	-8.6 (-0.1)	-33
	+150 MGD	-15.5 (-0.1)	-78.2 (-0.5)	-75.0 (+0.2)	-142.7 (-0.2)	-3.0 (+0.1)	-11.8 (-0.1)	-110.9 (-0.2)	-15.4 (0)	-8.2 (+0)	-7.6 (-0.1)	4.7 (+0.1)	-8.7 (-0.1)	-39
	Projected Demand	-6.2 (0)	-75.9 (-0.5)	-42.6 (+0.4)	-140.1 (-0.2)	-10.9 (+0)	-20.8 (-0.1)	-109.1 (-0.2)	-21.0 (-0.1)	-15.8 (+0)	-5.0 (0)	4.8 (+0.1)	-9.8 (-0.1)	-38
Above Normal	Baseline	6609	6669	15915	45975	55221	47374	26242	26511	15190	9355	6238	10247	22629
	+75 MGD	-5.2 (-0.1)	-30.2 (-0.3)	-20.1 (-0.1)	-3.2 (0)	-144.9 (-0.2)	-135.5 (-0.3)	-49.4 (-0.2)	-125.5 (-0.6)	-43.8 (-0.5)	28.9 (+0.3)	-23.9 (-0.4)	13.0 (+0.1)	-45
	+150 MGD	35.7 (+0.9)	-52.8 (-0.6)	288.5 (+2.9)	-112.5 (-0.2)	-388.0 (-0.5)	-100.0 (-0.2)	-68.4 (-0.3)	-123.3 (-0.7)	-32.0 (-0.4)	-21.1 (-0.2)	-11.7 (-0.2)	13.0 (+0.1)	-48
	Projected Demand	44.6 (+1.1)	-62.6 (-0.8)	316.3 (+3.2)	-95.5 (-0.1)	-361.3 (-0.4)	-282.9 (-0.6)	-67.2 (-0.3)	-120.7 (-0.7)	-38.5 (-0.5)	0.1 (0)	-12.8 (-0.2)	13.0 (+0.1)	-56
Below Normal	Baseline	6506	7665	13750	19230	27029	24352	17198	14869	7889	7514	4173	4043	12851
	+75 MGD	-26.3 (-0.5)	-22.9 (-0.2)	-9.9 (0)	0.7 (+0)	-33.9 (-0.2)	17.6 (0)	-42.9 (-0.2)	-0.4 (+0)	0.0 (+0)	1.5 (+0)	4.9 (+0.1)	-25.9 (-0.6)	-12
	+150 MGD	-26.6 (-0.5)	-25.3 (0)	-28.9 (-0.1)	-108.1 (-1.1)	-109.5 (-0.5)	53.5 (-0.1)	-84.6 (-0.5)	7.4 (+0.1)	-1.4 (0)	1.9 (+0)	-3.7 (-0.1)	-66.2 (-1.6)	-33
	Projected Demand	-25.6 (-0.5)	-35.4 (-0.3)	-16.4 (+0)	-87.5 (-0.9)	-47.7 (-0.3)	82.2 (0)	-68.3 (-0.4)	8.1 (+0.1)	0.8 (+0)	-8.5 (-0.1)	-2.0 (-0.1)	-64.8 (-1.6)	-22
Dry	Baseline	5664	6261	6711	12017	23254	18397	12487	10359	7191	5262	3885	3144	9553
	+75 MGD	-5.2 (-0.1)	30.8 (+0.6)	17.1 (-0.1)	-15.0 (-0.1)	51.5 (+0.3)	-36.1 (-0.2)	9.8 (+0.1)	91.1 (+0.9)	0.3 (+0)	2.5 (+0)	-10.5 (-0.3)	-7.2 (-0.2)	11
	+150 MGD	-7.9 (-0.2)	52.0 (+1)	-34.7 (-0.9)	15.6 (+0.3)	35.6 (+0.3)	-86.9 (-0.4)	7.5 (+0.1)	88.8 (+0.8)	-6.3 (-0.1)	3.3 (+0.1)	-14.4 (-0.4)	-23.4 (-0.7)	2
	Projected Demand	-6.8 (-0.2)	43.5 (+0.8)	-16.1 (-0.6)	-26.2 (-0.2)	62.8 (+0.4)	-69.0 (-0.4)	9.1 (+0.2)	88.5 (+0.8)	0.4 (+0)	2.7 (+0.1)	-10.5 (-0.3)	-20.9 (-0.6)	5
Critical	Baseline	4603	5360	8861	10284	12853	11792	8999	6938	5973	4043	3000	3005	7143
	+75 MGD	-2.4 (0)	-41.9 (-0.8)	211.0 (+3.6)	26.8 (-0.3)	-10.5 (-0.2)	-11.7 (-0.1)	6.9 (+0.1)	-28.7 (-0.5)	0.0 (0)	5.5 (+0.1)	-20.7 (-0.7)	-2.4 (-0.1)	11
	+150 MGD	-6.4 (-0.1)	-80.9 (-1.5)	214.5 (+3.7)	-166.1 (-1.4)	-23.6 (-0.4)	-23.2 (-0.2)	-35.3 (-0.4)	-43.0 (-0.9)	0.0 (0)	8.5 (+0.2)	-34.0 (-1.1)	-2.7 (-0.1)	-16
	Projected Demand	5.5 (+0.3)	-92.5 (-1.7)	191.4 (+3.3)	27.1 (+0.2)	-19.5 (-0.3)	-19.7 (-0.2)	-16.2 (-0.2)	-35.4 (-0.7)	0.0 (0)	7.0 (+0.2)	-26.0 (-0.9)	-2.5 (-0.1)	2

Notes: CalSim Node = 'NDOI'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.14. Long-term Average X2 Position for Existing Condition Proposed Project Modeling Scenarios Compared to Existing Baseline Conditions by Month and Water Year type (km).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	85	85	85	78	70	64	63	66	70	75	81	85	76
	+75 MGD	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0
	+150 MGD	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	0.0 (0)	0.0 (+0)	0.1 (+0.1)	0.0 (+0)	0.0 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0
	Projected Demand	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	-0.1 (-0.1)	0.0 (0)	0.0 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0
Wet	Baseline	84	83	80	66	56	53	54	57	60	67	75	80	68
	+75 MGD	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	0.0 (0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (0)	0
	+150 MGD	0.0 (+0)	0.0 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (0)	0
	Projected Demand	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (0)	0
Above Normal	Baseline	85	85	86	78	64	58	57	62	64	70	78	83	72
	+75 MGD	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	0.0 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (+0)	0
	+150 MGD	0.0 (+0)	0.0 (0)	0.0 (+0)	-0.3 (-0.3)	0.0 (-0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (+0)	0
	Projected Demand	0.0 (+0)	0.0 (0)	0.0 (+0)	-0.3 (-0.3)	0.0 (-0.1)	0.0 (+0)	0.0 (+0.1)	0.0 (+0.1)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (+0)	0
Below Normal	Baseline	85	85	85	81	74	67	65	68	72	78	83	86	78
	+75 MGD	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0
	+150 MGD	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.0 (+0)	0.1 (+0.1)	0.1 (+0.2)	0.0 (+0)	0.1 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (+0)	0
	Projected Demand	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.0 (+0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (+0)	0.0 (+0)	0
Dry	Baseline	86	86	88	88	82	70	68	73	78	82	85	89	81
	+75 MGD	0.0 (+0)	0.0 (+0)	0.0 (0)	-0.1 (-0.1)	0.0 (+0)	0.0 (+0.1)	0.0 (+0)	0.0 (+0)	-0.1 (-0.1)	-0.1 (-0.1)	0.0 (0)	0.0 (0)	0
	+150 MGD	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.0 (+0)	-0.1 (-0.1)	0.0 (-0.1)	0.0 (0)	0.0 (+0)	0
	Projected Demand	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (+0.1)	0.0 (+0)	0.0 (+0.1)	0.0 (+0)	-0.1 (-0.1)	-0.1 (-0.1)	0.0 (0)	0.0 (0)	0
Critical	Baseline	90	90	91	87	83	78	77	79	83	86	89	91	85
	+75 MGD	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	-0.2 (-0.2)	-0.3 (-0.4)	0.1 (+0.1)	0.0 (0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0
	+150 MGD	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	-0.1 (-0.1)	-0.1 (-0.1)	0.2 (+0.2)	0.0 (0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0
	Projected Demand	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	-0.1 (-0.1)	-0.3 (-0.3)	0.1 (+0.1)	0.0 (0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0

Notes: CalSim Node = 'X2_PRV'

Magnitude of existing conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from existing conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.15. Long-term Average End-of-Month Storage at Folsom Reservoir for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (TAF).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Total
All	Baseline	510		451		475		503		526		674		779		817		761		658		571		541		7267
	+75 MGD	-0.7	(-0.1)	0.8	(+0.3)	0.4	(+0.1)	0.2	(+0.1)	0.9	(+0.2)	3.4	(+0.6)	5.1	(+0.8)	2.3	(+0.3)	0.7	(+0.1)	0.2	(+0)	0.3	(+0.1)	-0.1	(0)	13
	+150 MGD	-0.8	(+0)	-0.2	(+0.2)	-1.1	(-0.1)	-0.8	(-0.1)	1.3	(+0.3)	3.6	(+0.6)	5.6	(+0.9)	2.5	(+0.4)	-0.6	(+0)	1.0	(+0.3)	0.7	(+0.7)	0.2	(+0.6)	0
	Projected Demand	-0.7	(+0)	0.0	(+0.3)	-0.1	(+0.2)	-0.3	(+0)	1.6	(+0.4)	3.8	(+0.7)	5.8	(+0.9)	2.8	(+0.5)	0.1	(+0.2)	1.2	(+0.4)	1.0	(+0.7)	0.3	(+0.7)	0
Wet	Baseline	539		478		528		567		567		749		891		951		916		802		698		665		8351
	+75 MGD	-0.1	(+0)	1.5	(+0.4)	0.9	(+0.3)	0.0	(0)	0.0	(0)	0.0	(0)	3.6	(+0.5)	1.8	(+0.2)	0.9	(+0.1)	1.4	(+0.2)	2.2	(+0.3)	1.7	(+0.2)	14
	+150 MGD	1.5	(+0.5)	3.0	(+1)	1.6	(+0.6)	-0.1	(0)	0.0	(+0)	0.0	(0)	3.6	(+0.5)	1.7	(+0.2)	-0.6	(0)	5.7	(+1)	6.3	(+1.2)	5.4	(+1.2)	28
	Projected Demand	0.1	(+0.2)	1.9	(+0.6)	1.9	(+0.7)	0.0	(0)	0.0	(+0)	0.0	(0)	3.6	(+0.5)	1.7	(+0.2)	-0.3	(0)	4.2	(+0.7)	4.8	(+0.9)	4.0	(+0.8)	22
Above Normal	Baseline	558		491		517		560		567		756		878		906		829		722		640		601		8027
	+75 MGD	-3.3	(-0.6)	-2.0	(-0.4)	-1.4	(-0.3)	0.1	(+0)	0.0	(+0)	0.0	(+0)	0.0	(0)	-0.3	(0)	-1.0	(-0.1)	-5.1	(-0.8)	-5.2	(-1)	-5.3	(-1.1)	-23
	+150 MGD	-5.5	(-1)	-3.7	(-0.8)	-1.8	(-0.4)	0.0	(+0)	0.0	(+0)	0.0	(0)	-0.1	(0)	-0.3	(0)	-2.1	(-0.3)	-2.9	(-0.4)	-3.3	(-0.6)	-3.3	(-0.6)	-23
	Projected Demand	-4.4	(-0.8)	-2.7	(-0.6)	-1.4	(-0.3)	-0.2	(0)	0.0	(+0)	0.0	(0)	0.0	(0)	-0.4	(0)	-1.5	(-0.2)	-1.9	(-0.3)	-2.2	(-0.4)	-2.3	(-0.4)	-17
Below Normal	Baseline	515		463		470		514		546		697		825		863		791		683		600		566		7533
	+75 MGD	0.2	(-0.3)	-1.0	(-0.4)	-0.9	(-0.3)	-1.1	(-0.3)	1.0	(+0.2)	4.6	(+0.8)	1.2	(+0.2)	1.3	(+0.2)	-0.2	(+0)	-0.4	(+0)	-0.6	(+0)	-0.8	(+0)	3
	+150 MGD	2.2	(+0.6)	-1.6	(-0.1)	-2.1	(-0.2)	-1.4	(-0.1)	1.8	(+0.5)	4.3	(+0.7)	1.0	(+0.2)	0.7	(+0.1)	-2.7	(-0.3)	-3.5	(-0.4)	-4.0	(-0.6)	-3.8	(-0.5)	-9
	Projected Demand	3.0	(+0.8)	-1.0	(+0.1)	-0.9	(+0.1)	-0.8	(+0)	1.9	(+0.5)	4.3	(+0.7)	1.0	(+0.2)	0.9	(+0.2)	-1.7	(-0.2)	-2.3	(-0.2)	-2.7	(-0.3)	-2.7	(-0.3)	-1
Dry	Baseline	499		428		442		440		492		592		656		689		612		522		439		413		6224
	+75 MGD	-2.9	(-0.7)	4.4	(+0.9)	4.7	(+1.4)	5.2	(+1.7)	6.8	(+1.6)	17.2	(+3.2)	20.9	(+3)	6.2	(+1)	1.8	(+0.3)	1.0	(+0.2)	0.5	(+0.1)	-0.6	(-0.3)	65
	+150 MGD	-7.8	(-1.7)	-0.2	(-0.2)	-1.0	(0)	0.9	(+0.5)	9.7	(+2.3)	20.2	(+4)	25.6	(+4.2)	10.6	(+2.3)	5.2	(+1.7)	4.0	(+2.3)	2.9	(+4.5)	0.7	(+4)	71
	Projected Demand	-7.2	(-1.6)	0.5	(-0.1)	0.4	(+0.3)	1.9	(+0.8)	10.2	(+2.4)	20.5	(+4.1)	26.0	(+4.3)	11.2	(+2.4)	5.8	(+1.8)	4.8	(+2.5)	4.1	(+4.8)	1.4	(+4.2)	80
Critical	Baseline	397		347		350		335		378		452		443		430		392		321		261		248		4356
	+75 MGD	-0.1	(+0.7)	0.5	(+1.2)	-1.7	(-0.6)	-2.5	(-0.8)	-2.9	(-1)	-3.3	(-0.9)	3.2	(+0.7)	3.5	(+0.5)	1.8	(+0.2)	1.4	(+0.2)	0.6	(+0.1)	0.7	(+0.1)	1
	+150 MGD	-1.8	(+0.2)	-3.1	(+0.3)	-6.1	(-1.5)	-4.4	(-1.2)	-4.7	(-1.4)	-4.9	(-1.2)	1.6	(+0.2)	1.1	(-0.3)	-1.3	(-0.7)	-2.9	(-1.3)	-4.0	(-1.7)	-3.4	(-1.3)	-34
	Projected Demand	-0.7	(+0.5)	-1.5	(+0.7)	-3.7	(-0.9)	-2.8	(-0.7)	-3.4	(-1)	-3.6	(-0.8)	2.9	(+0.5)	2.6	(+0.1)	0.0	(-0.4)	-1.6	(-0.9)	-2.9	(-1.3)	-2.5	(-1)	-17

Notes: CalSim Node = 'S_FOLSM'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

CalSim_3_Future_Surface_Hydro.xlsx, Sheet: Folsom detail; 1/17/2025, 10:03 AM

Table A.18. Long-term Average End-of-Month Storage at Lake Oroville for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (TAF).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Total
All	Baseline	1626		1671		1908		2148		2389		2619		2872		2876		2555		2044		1729		1685		26123
	+75 MGD	-5.2	(-0.5)	-5.1	(-0.5)	-4.2	(-0.3)	-3.8	(-0.2)	-3.1	(-0.2)	-2.0	(-0.1)	-1.5	(-0.1)	-1.6	(-0.1)	-3.0	(-0.2)	-3.9	(-0.3)	-5.3	(-0.5)	-5.5	(-0.5)	-44
	+150 MGD	-11.6	(-1.1)	-11.6	(-1.1)	-11.0	(-0.8)	-9.9	(-0.6)	-8.3	(-0.5)	-6.0	(-0.3)	-5.5	(-0.3)	-6.2	(-0.3)	-8.8	(-0.5)	-10.7	(-0.8)	-12.7	(-1.2)	-12.5	(-1.3)	-13
	Projected Demand	-8.9	(-0.9)	-8.7	(-0.8)	-7.7	(-0.6)	-6.9	(-0.4)	-5.6	(-0.3)	-4.1	(-0.2)	-3.7	(-0.2)	-3.9	(-0.2)	-6.0	(-0.4)	-7.4	(-0.6)	-9.2	(-0.9)	-9.2	(-0.9)	-9
Wet	Baseline	1722		1854		2317		2667		2863		2945		3284		3419		3201		2647		2251		2161		31331
	+75 MGD	-3.7	(-0.5)	-3.7	(-0.5)	-1.8	(-0.2)	-1.4	(-0.1)	-1.2	(0)	0.0	(0)	3.2	(+0.1)	3.0	(+0.1)	1.7	(+0.1)	0.2	(+0)	-1.2	(0)	-3.0	(-0.1)	-8
	+150 MGD	-9.3	(-1.1)	-8.5	(-1)	-6.0	(-0.5)	-3.5	(-0.2)	-2.7	(-0.1)	0.0	(0)	3.2	(+0.1)	2.6	(+0.1)	0.1	(+0)	-3.4	(-0.1)	-5.8	(-0.2)	-7.5	(-0.3)	-41
	Projected Demand	-6.9	(-0.9)	-6.5	(-0.8)	-4.2	(-0.4)	-2.8	(-0.1)	-2.3	(-0.1)	0.0	(0)	3.2	(+0.1)	2.8	(+0.1)	0.8	(+0)	-1.8	(0)	-3.8	(-0.1)	-5.8	(-0.3)	-27
Above Normal	Baseline	1829		1866		2115		2518		2709		2939		3266		3281		2890		2274		1899		1820		29404
	+75 MGD	-3.3	(-0.2)	-3.3	(-0.2)	-3.3	(-0.2)	-2.5	(-0.1)	-1.1	(0)	-0.2	(0)	-0.2	(0)	-0.4	(0)	-1.7	(-0.1)	-2.6	(-0.1)	-4.6	(-0.3)	-3.6	(-0.2)	-27
	+150 MGD	-6.7	(-0.4)	-6.7	(-0.4)	-6.8	(-0.3)	-5.2	(-0.2)	-2.3	(-0.1)	-0.9	(0)	-1.1	(0)	-0.9	(0)	-3.5	(-0.1)	-6.0	(-0.3)	-9.7	(-0.5)	-7.3	(-0.4)	-57
	Projected Demand	-5.5	(-0.3)	-5.5	(-0.3)	-5.6	(-0.3)	-4.3	(-0.2)	-2.0	(-0.1)	-0.6	(0)	-0.7	(0)	-0.6	(0)	-2.7	(-0.1)	-4.6	(-0.2)	-7.8	(-0.4)	-5.6	(-0.3)	-46
Below Normal	Baseline	1623		1647		1751		1961		2314		2663		2970		2913		2535		1966		1673		1665		25681
	+75 MGD	-6.4	(-0.6)	-6.9	(-0.6)	-5.9	(-0.4)	-6.1	(-0.4)	-5.6	(-0.3)	-2.2	(-0.1)	-4.9	(-0.2)	-4.3	(-0.2)	-5.7	(-0.2)	-4.7	(-0.2)	-4.5	(-0.3)	-3.3	(-0.2)	-61
	+150 MGD	-13.6	(-1.3)	-13.4	(-1.1)	-13.6	(-1)	-13.7	(-0.8)	-12.8	(-0.6)	-6.0	(-0.3)	-9.5	(-0.3)	-10.1	(-0.4)	-13.0	(-0.5)	-11.6	(-0.6)	-9.4	(-0.5)	-7.2	(-0.4)	-134
	Projected Demand	-10.3	(-1)	-10.4	(-0.9)	-9.1	(-0.7)	-9.2	(-0.6)	-8.2	(-0.4)	-4.2	(-0.2)	-7.1	(-0.2)	-7.0	(-0.2)	-9.3	(-0.4)	-8.0	(-0.4)	-6.9	(-0.4)	-5.2	(-0.3)	-95
Dry	Baseline	1463		1438		1561		1671		1924		2273		2389		2289		1861		1479		1273		1263		20881
	+75 MGD	-5.3	(-0.5)	-6.5	(-0.6)	-6.5	(-0.5)	-4.5	(-0.3)	-3.5	(-0.2)	-4.3	(-0.2)	-4.5	(-0.2)	-5.5	(-0.3)	-3.9	(-0.2)	-5.8	(-0.4)	-9.7	(-0.8)	-9.6	(-0.8)	-70
	+150 MGD	-11.5	(-1.1)	-13.6	(-1.3)	-13.6	(-1)	-12.4	(-0.8)	-10.6	(-0.6)	-12.5	(-0.6)	-13.2	(-0.6)	-13.5	(-0.6)	-10.5	(-0.6)	-12.6	(-0.9)	-19.3	(-1.6)	-19.1	(-1.6)	-162
	Projected Demand	-9.1	(-0.9)	-11.0	(-1)	-10.9	(-0.8)	-9.3	(-0.6)	-8.1	(-0.4)	-9.6	(-0.5)	-10.1	(-0.5)	-10.0	(-0.5)	-8.0	(-0.5)	-9.8	(-0.7)	-14.7	(-1.2)	-14.6	(-1.3)	-125
Critical	Baseline	1407		1348		1375		1405		1554		1788		1795		1681		1382		1044		821		809		16413
	+75 MGD	-8.3	(-0.7)	-4.5	(-0.3)	-4.8	(-0.3)	-5.3	(-0.4)	-4.0	(-0.3)	-5.4	(-0.4)	-4.4	(-0.3)	-4.9	(-0.4)	-9.7	(-0.8)	-12.2	(-1.4)	-13.9	(-2.4)	-13.8	(-2.3)	-91
	+150 MGD	-17.6	(-1.5)	-17.8	(-1.8)	-19.3	(-1.6)	-19.8	(-1.6)	-15.4	(-1.2)	-18.8	(-1.2)	-15.3	(-1)	-17.8	(-1.2)	-26.2	(-2.2)	-30.0	(-3.4)	-33.1	(-5.5)	-33.8	(-5.8)	-265
	Projected Demand	-13.4	(-1.1)	-11.1	(-0.9)	-11.8	(-1)	-12.3	(-1)	-9.0	(-0.7)	-11.6	(-0.7)	-10.0	(-0.6)	-10.8	(-0.8)	-17.6	(-1.4)	-21.1	(-2.4)	-23.7	(-3.9)	-23.6	(-3.8)	-176

Notes: CalSim Node = 'S_OROVL'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.16. Long-term Average End-of-Month Storage at Lake Shasta for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (TAF).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Total
All	Baseline	2637		2674		2866		3143		3372		3722		3996		3938		3626		3120		2824		2695		38613
	+75 MGD	-16.3	(-0.8)	-15.3	(-0.8)	-13.7	(-0.8)	-10.6	(-0.5)	-7.7	(-0.3)	-10.2	(-0.4)	-12.2	(-0.4)	-11.4	(-0.4)	-14.3	(-0.5)	-15.8	(-0.6)	-18.0	(-0.8)	-16.9	(-0.8)	-162
	+150 MGD	-35.9	(-2)	-32.6	(-2.1)	-28.8	(-1.7)	-25.5	(-1.3)	-23.5	(-1)	-22.2	(-0.8)	-26.3	(-0.9)	-26.5	(-0.9)	-30.7	(-1.2)	-37.0	(-1.6)	-42.0	(-2.1)	-39.2	(-2.1)	-39
	Projected Demand	-30.5	(-1.7)	-28.1	(-1.8)	-24.5	(-1.5)	-21.9	(-1.2)	-20.7	(-0.9)	-20.1	(-0.7)	-23.5	(-0.8)	-23.5	(-0.8)	-27.0	(-1)	-30.9	(-1.3)	-34.8	(-1.7)	-32.7	(-1.7)	-33
Wet	Baseline	2736		2815		3091		3411		3514		3800		4257		4373		4168		3615		3286		3066		42132
	+75 MGD	-5.2	(-0.2)	-2.3	(-0.1)	-3.8	(-0.2)	-2.1	(-0.1)	0.4	(+0)	-4.5	(-0.1)	-2.8	(-0.1)	-2.3	(-0.1)	-4.0	(-0.1)	-7.8	(-0.2)	-11.6	(-0.3)	-8.7	(-0.2)	-55
	+150 MGD	-24.7	(-1.4)	-17.2	(-1.2)	-14.0	(-0.8)	-8.3	(-0.3)	-4.8	(-0.2)	0.2	(+0)	-0.5	(0)	-1.8	(0)	-5.1	(-0.1)	-16.7	(-0.5)	-20.4	(-0.7)	-14.3	(-0.5)	-128
	Projected Demand	-17.6	(-1)	-12.5	(-1)	-12.0	(-0.7)	-7.5	(-0.3)	-4.4	(-0.1)	0.2	(+0)	-0.9	(0)	-1.9	(0)	-4.4	(-0.1)	-11.7	(-0.3)	-15.5	(-0.5)	-10.6	(-0.3)	-99
Above Normal	Baseline	2886		2975		3132		3405		3562		4044		4389		4265		3871		3283		2965		2776		41554
	+75 MGD	-28.6	(-1)	-21.9	(-0.7)	-18.5	(-0.6)	1.5	(+0)	-0.3	(0)	-0.2	(0)	-2.1	(0)	-0.7	(0)	-5.0	(-0.1)	-4.5	(-0.1)	-5.7	(-0.2)	-11.3	(-0.4)	-97
	+150 MGD	-15.7	(-0.6)	-7.2	(-0.3)	-7.9	(-0.3)	-8.0	(-0.2)	-3.3	(-0.1)	-2.6	(-0.1)	-4.2	(-0.1)	-1.6	(0)	-9.9	(-0.3)	-14.2	(-0.4)	-20.1	(-0.7)	-28.7	(-1.1)	-124
	Projected Demand	-12.9	(-0.5)	-7.8	(-0.3)	-4.6	(-0.2)	-3.7	(-0.1)	0.2	(0)	-1.3	(0)	-3.0	(-0.1)	-1.1	(0)	-7.7	(-0.2)	-12.3	(-0.4)	-17.1	(-0.6)	-25.9	(-1)	-97
Below Normal	Baseline	2712		2778		2903		3221		3563		3960		4220		4085		3724		3195		2925		2874		40160
	+75 MGD	-22.6	(-1.1)	-22.7	(-1.2)	-22.0	(-1.2)	-20.2	(-0.9)	-19.8	(-0.7)	-17.8	(-0.6)	-19.8	(-0.5)	-18.9	(-0.5)	-21.2	(-0.6)	-21.7	(-0.7)	-22.9	(-0.9)	-21.8	(-0.9)	-251
	+150 MGD	-38.7	(-1.7)	-37.6	(-1.8)	-33.4	(-1.7)	-30.2	(-1.3)	-28.9	(-1)	-26.0	(-0.8)	-32.0	(-0.8)	-31.3	(-0.8)	-35.2	(-1)	-40.7	(-1.4)	-44.7	(-1.7)	-41.3	(-1.6)	-420
	Projected Demand	-34.4	(-1.6)	-33.5	(-1.6)	-28.0	(-1.5)	-26.1	(-1.1)	-25.9	(-0.9)	-23.9	(-0.7)	-27.6	(-0.7)	-26.9	(-0.7)	-30.4	(-0.9)	-34.1	(-1.2)	-37.0	(-1.4)	-34.2	(-1.3)	-362
Dry	Baseline	2586		2536		2774		3006		3365		3759		3803		3625		3261		2870		2611		2550		36746
	+75 MGD	-10.1	(-0.5)	-15.5	(-0.7)	-7.5	(-0.3)	-6.6	(-0.3)	-6.9	(-0.3)	-16.2	(-0.6)	-23.2	(-0.8)	-19.7	(-0.7)	-21.8	(-0.8)	-19.6	(-0.8)	-23.6	(-1.1)	-24.8	(-1.2)	-196
	+150 MGD	-30.8	(-1.8)	-33.1	(-1.9)	-24.2	(-1.2)	-20.9	(-0.9)	-31.7	(-1.1)	-37.9	(-1.3)	-48.9	(-1.6)	-47.4	(-1.6)	-49.8	(-1.8)	-50.3	(-2)	-55.6	(-2.5)	-59.2	(-2.7)	-490
	Projected Demand	-25.8	(-1.6)	-28.2	(-1.7)	-19.5	(-1)	-17.0	(-0.7)	-29.0	(-1)	-35.7	(-1.3)	-45.8	(-1.5)	-43.5	(-1.4)	-44.6	(-1.6)	-43.2	(-1.7)	-47.1	(-2.1)	-50.7	(-2.4)	-430
Critical	Baseline	2072		1997		2076		2196		2431		2708		2725		2546		2162		1767		1476		1400		25555
	+75 MGD	-31.6	(-2.1)	-29.8	(-2.1)	-26.1	(-2.3)	-26.6	(-1.9)	-10.3	(-0.7)	-10.1	(-0.5)	-16.4	(-0.7)	-18.5	(-0.7)	-26.1	(-1.3)	-29.4	(-1.9)	-27.6	(-2)	-23.5	(-1.8)	-276
	+150 MGD	-81.8	(-5.7)	-82.9	(-6.5)	-80.7	(-6.1)	-80.8	(-5.4)	-68.4	(-3.8)	-71.8	(-3.1)	-75.2	(-3.1)	-78.1	(-3.4)	-84.6	(-4.3)	-86.2	(-5.5)	-96.3	(-7.7)	-87.5	(-7.4)	-974
	Projected Demand	-76.3	(-5.2)	-74.4	(-5.5)	-71.9	(-5.5)	-71.5	(-4.8)	-60.2	(-3.4)	-63.5	(-2.8)	-66.1	(-2.7)	-68.7	(-2.9)	-75.5	(-3.8)	-76.0	(-4.8)	-82.2	(-6.4)	-74.0	(-6.1)	-860

Notes: CalSim Node = 'S_SHSTA'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.17. Long-term Average End-of-Month Storage at Clair Engle Reservoir for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (TAF).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Total
All	Baseline	1286		1314		1405		1513		1645		1777		1902		1806		1703		1575		1431		1314		18670
	+75 MGD	-6.6	(-0.7)	-6.3	(-0.7)	-4.9	(-0.6)	-4.2	(-0.5)	-3.3	(-0.4)	-4.1	(-0.4)	-4.6	(-0.3)	-4.2	(-0.3)	-3.4	(-0.3)	-4.7	(-0.4)	-3.9	(-0.3)	-4.8	(-0.3)	-55
	+150 MGD	-17.0	(-1.9)	-16.9	(-1.9)	-14.7	(-1.6)	-13.3	(-1.4)	-12.0	(-1.2)	-11.9	(-1)	-11.1	(-0.9)	-11.1	(-0.9)	-10.4	(-0.9)	-13.0	(-1.2)	-13.5	(-1.3)	-16.0	(-1.6)	-16
	Projected Demand	-14.6	(-1.7)	-14.5	(-1.6)	-13.0	(-1.5)	-11.8	(-1.2)	-11.2	(-1.1)	-11.3	(-0.9)	-10.3	(-0.8)	-10.0	(-0.8)	-9.2	(-0.8)	-11.6	(-1.1)	-11.6	(-1.1)	-12.7	(-1.2)	-13
Wet	Baseline	1357		1415		1574		1742		1917		2062		2222		2156		2037		1924		1789		1661		21857
	+75 MGD	-2.6	(-0.1)	-2.1	(-0.1)	-0.1	(0)	1.7	(+0.1)	1.6	(+0.1)	-0.8	(0)	0.3	(+0.1)	0.8	(+0.1)	1.9	(+0.2)	2.5	(+0.2)	1.9	(+0.2)	-2.3	(0)	3
	+150 MGD	-12.2	(-1.1)	-11.3	(-1)	-8.7	(-0.8)	-5.7	(-0.4)	-2.6	(-0.2)	-4.0	(-0.2)	1.8	(+0.1)	2.3	(+0.1)	3.1	(+0.2)	1.9	(+0.2)	-1.1	(0)	-10.2	(-0.6)	-47
	Projected Demand	-9.4	(-0.9)	-8.5	(-0.8)	-6.1	(-0.6)	-3.3	(-0.3)	-1.7	(-0.1)	-3.5	(-0.2)	3.0	(+0.2)	3.6	(+0.2)	4.4	(+0.3)	2.9	(+0.2)	0.9	(+0.1)	-6.5	(-0.4)	-24
Above Normal	Baseline	1495		1528		1629		1777		1886		2009		2163		2011		1913		1790		1628		1464		21294
	+75 MGD	-8.7	(-0.5)	-10.4	(-0.6)	-8.2	(-0.5)	-5.9	(-0.3)	0.4	(+0)	0.4	(+0)	0.3	(+0)	0.3	(+0)	0.3	(+0)	-1.4	(-0.1)	-1.9	(-0.1)	-0.4	(0)	-35
	+150 MGD	-14.0	(-0.8)	-14.5	(-0.8)	-5.0	(-0.3)	-0.4	(0)	-0.1	(0)	-0.1	(0)	-0.2	(0)	-0.2	(0)	-0.2	(0)	-6.2	(-0.3)	-7.5	(-0.5)	-6.9	(-0.5)	-55
	Projected Demand	-11.4	(-0.7)	-11.9	(-0.7)	-8.0	(-0.5)	-4.4	(-0.3)	-4.3	(-0.2)	-4.4	(-0.2)	-4.5	(-0.2)	-4.4	(-0.2)	-4.4	(-0.2)	-7.9	(-0.4)	-8.5	(-0.5)	0.4	(+0.1)	-74
Below Normal	Baseline	1317		1341		1392		1493		1615		1739		1874		1755		1671		1540		1386		1275		18399
	+75 MGD	-13.6	(-1.9)	-12.1	(-1.6)	-10.6	(-1.2)	-10.4	(-1)	-9.0	(-0.8)	-8.9	(-0.7)	-10.2	(-0.7)	-10.2	(-0.7)	-10.1	(-0.8)	-13.2	(-1)	-11.8	(-1.1)	-11.1	(-1)	-131
	+150 MGD	-23.1	(-3.1)	-23.2	(-2.9)	-21.7	(-2.5)	-21.0	(-2.1)	-18.4	(-1.7)	-18.4	(-1.5)	-19.4	(-1.3)	-19.5	(-1.4)	-19.2	(-1.5)	-23.1	(-1.9)	-22.3	(-2)	-22.1	(-2.1)	-252
	Projected Demand	-21.1	(-2.9)	-21.2	(-2.6)	-20.1	(-2.3)	-19.7	(-2)	-17.4	(-1.6)	-17.3	(-1.4)	-18.4	(-1.2)	-18.5	(-1.3)	-17.8	(-1.4)	-21.9	(-1.8)	-20.9	(-1.9)	-20.7	(-2)	-235
Dry	Baseline	1234		1226		1285		1333		1444		1607		1688		1578		1486		1334		1178		1064		16457
	+75 MGD	-4.3	(-0.5)	-4.1	(-0.4)	-4.1	(-0.4)	-4.5	(-0.4)	-4.4	(-0.4)	-4.9	(-0.4)	-6.5	(-0.4)	-7.4	(-0.5)	-3.9	(-0.4)	-6.8	(-0.6)	-8.0	(-0.8)	-6.0	(-0.7)	-65
	+150 MGD	-14.6	(-1.3)	-14.2	(-1.3)	-14.4	(-1.2)	-15.1	(-1.2)	-18.4	(-1.3)	-17.9	(-1.2)	-19.5	(-1.2)	-20.4	(-1.3)	-18.0	(-1.4)	-23.6	(-2)	-26.6	(-2.5)	-21.4	(-2.3)	-224
	Projected Demand	-12.1	(-1.2)	-11.9	(-1.2)	-11.9	(-1.1)	-12.5	(-1.1)	-16.0	(-1.2)	-15.9	(-1.1)	-17.6	(-1.1)	-18.3	(-1.2)	-15.9	(-1.3)	-21.2	(-1.8)	-24.2	(-2.2)	-19.2	(-2.1)	-197
Critical	Baseline	930		920		942		940		1013		1100		1136		1061		947		812		691		619		11110
	+75 MGD	-3.4	(-0.3)	-4.9	(-0.6)	-4.4	(-1)	-5.6	(-1.1)	-5.8	(-1.1)	-5.4	(-0.8)	-7.2	(-0.8)	-4.9	(-0.6)	-5.7	(-0.6)	-6.2	(-0.7)	0.4	(+0.6)	0.4	(+0.7)	-53
	+150 MGD	-22.1	(-2.9)	-23.6	(-3.3)	-23.4	(-3.5)	-24.8	(-3.6)	-25.0	(-3.4)	-21.3	(-2.5)	-27.2	(-2.8)	-26.9	(-2.9)	-27.3	(-3.2)	-24.5	(-3.2)	-17.8	(-2.5)	-19.6	(-3.2)	-284
	Projected Demand	-20.1	(-2.5)	-21.6	(-2.9)	-21.4	(-3.2)	-23.0	(-3.3)	-23.3	(-3.1)	-19.6	(-2.3)	-25.6	(-2.6)	-23.2	(-2.5)	-23.7	(-2.7)	-20.9	(-2.6)	-13.4	(-1.6)	-14.8	(-2)	-251

Notes: CalSim Node = 'S_TRNTY'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.20. Long-term Average Monthly Stream Flows at Feather River at Mouth for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	2990		3391		7767		12607		15009		14701		8492		5515		6189		7361		5739		3104		7739
	+75 MGD	-1.2	(+0)	1.6	(+0.2)	0.2	(+0.1)	-13.6	(-0.2)	-7.1	(-0.1)	-22.0	(-0.2)	-16.9	(+0.2)	2.9	(+0.1)	17.7	(+0.3)	15.8	(+0.3)	18.7	(+0.4)	5.3	(+0.2)	0
	+150 MGD	-2.4	(+0.1)	9.7	(+0.5)	4.1	(+0.5)	-14.7	(0)	-14.9	(-0.1)	-46.9	(-0.5)	-34.2	(0)	14.5	(+0.4)	33.7	(+0.7)	32.3	(+0.5)	31.6	(+0.7)	3.4	(+0.2)	1
	Projected Demand	-1.7	(+0)	3.7	(+0.3)	-1.2	(+0.1)	-9.5	(0)	-10.8	(-0.1)	-32.7	(-0.3)	-35.9	(-0.1)	9.8	(+0.3)	25.7	(+0.5)	24.8	(+0.4)	25.9	(+0.6)	5.2	(+0.2)	0
Wet	Baseline	3361		4950		15196		25922		28237		27836		15412		7849		6678		8715		7897		4657		13059
	+75 MGD	14.2	(+0.5)	3.3	(+0.4)	1.8	(+0.1)	-7.3	(-0.1)	-5.5	(0)	-18.1	(-0.1)	-82.6	(-0.6)	-2.5	(-0.1)	20.0	(+0.3)	25.1	(+0.3)	21.8	(+0.3)	12.0	(+0.3)	-2
	+150 MGD	10.8	(+0.5)	-1.5	(+0.5)	-7.6	(+0.1)	-39.2	(-0.4)	-17.8	(-0.1)	-41.2	(-0.2)	-144.0	(-1.6)	10.6	(+0.3)	40.4	(+0.7)	57.5	(+0.7)	38.4	(+0.5)	12.5	(+0.4)	-7
	Projected Demand	12.4	(+0.5)	0.7	(+0.5)	-4.8	(+0.1)	-23.1	(-0.2)	-10.7	(0)	-33.4	(-0.2)	-142.9	(-1.6)	8.9	(+0.2)	30.5	(+0.5)	42.6	(+0.5)	32.2	(+0.5)	15.7	(+0.4)	-6
Above Normal	Baseline	3175		3053		5857		11926		18853		18014		7178		6681		7899		8985		6894		3818		8528
	+75 MGD	-9.0	(-0.4)	-0.4	(0)	-2.4	(0)	-116.7	(-1.7)	-25.9	(-0.1)	-16.5	(-0.1)	-1.2	(0)	0.2	(0)	21.2	(+0.3)	11.2	(+0.1)	34.5	(+0.5)	16.3	(+0.4)	-7
	+150 MGD	-10.3	(-0.4)	-2.4	(-0.1)	0.4	(+0)	-23.1	(-0.1)	-49.5	(-0.3)	-25.0	(-0.1)	-0.1	(+0)	-6.0	(-0.1)	41.3	(+0.6)	37.2	(+0.4)	63.3	(+1)	26.7	(+0.7)	4
	Projected Demand	-10.6	(-0.4)	-2.3	(-0.1)	0.2	(+0)	-20.2	(-0.1)	-38.8	(-0.2)	-23.7	(-0.1)	-0.5	(+0)	-3.6	(0)	32.1	(+0.4)	27.6	(+0.3)	54.9	(+0.9)	20.7	(+0.6)	3
Below Normal	Baseline	3028		2652		3928		5447		7686		7235		5220		4647		6225		7930		5149		2265		5118
	+75 MGD	-21.8	(-0.7)	4.2	(+0.2)	3.1	(+0.4)	-1.6	(0)	-9.1	(-0.1)	-50.5	(-0.6)	34.8	(+1.2)	-3.1	(-0.2)	21.8	(+0.2)	-11.5	(-0.2)	-14.4	(-0.5)	-5.3	(-0.1)	-5
	+150 MGD	-25.6	(-0.6)	1.4	(+0)	22.6	(+1.6)	-6.0	(-0.1)	-16.8	(-0.2)	-100.9	(-1.4)	42.5	(+1.4)	15.4	(+0.4)	46.2	(+0.7)	-13.1	(-0.3)	-28.7	(-0.8)	-25.6	(-0.7)	-7
	Projected Demand	-23.3	(-0.6)	-0.8	(+0)	2.7	(+0.4)	-3.3	(-0.1)	-16.4	(-0.1)	-61.5	(-0.7)	37.8	(+1.3)	3.9	(+0)	37.0	(+0.6)	-14.0	(-0.3)	-21.6	(-0.6)	-13.0	(-0.3)	-6
Dry	Baseline	2837		2329		3052		3459		5105		5367		4084		3788		5987		5185		3341		1807		3862
	+75 MGD	2.9	(+0.1)	6.6	(+0.2)	-0.8	(0)	-0.8	(0)	-0.6	(0)	-2.2	(0)	2.5	(+0.3)	18.7	(+0.5)	-17.8	(-0.2)	26.7	(+0.5)	53.7	(+1.9)	4.5	(+0.3)	8
	+150 MGD	6.0	(+0.3)	6.5	(+0.2)	-1.3	(-0.1)	-1.1	(0)	20.5	(+0.3)	-15.2	(-0.1)	8.3	(+0.4)	34.3	(+0.8)	-50.9	(-0.7)	27.6	(+0.7)	86.9	(+3)	8.0	(+0.5)	11
	Projected Demand	5.2	(+0.3)	8.7	(+0.3)	-0.9	(0)	-1.0	(0)	20.6	(+0.3)	-12.1	(-0.1)	7.1	(+0.3)	25.5	(+0.6)	-39.6	(-0.5)	24.6	(+0.5)	63.8	(+2.2)	5.8	(+0.3)	9
Critical	Baseline	1925		2200		2585		2693		3175		3162		2682		2119		3723		3728		3011		1630		2720
	+75 MGD	2.1	(+0.1)	-13.3	(-0.6)	-6.9	(-0.3)	5.3	(+0.2)	-0.5	(+0)	1.6	(+0.1)	17.5	(+0.3)	14.0	(+0.6)	41.6	(+1.1)	40.1	(+1)	29.3	(+1)	2.3	(+0.1)	11
	+150 MGD	7.4	(+0.3)	71.4	(+2.5)	5.1	(+0.2)	24.5	(+1)	-18.5	(-0.7)	0.9	(+0)	26.3	(+0.8)	15.3	(+0.5)	81.3	(+2.2)	63.1	(+1.6)	55.0	(+1.9)	18.3	(+1.2)	29
	Projected Demand	5.0	(+0.2)	20.2	(+0.6)	-1.2	(0)	12.2	(+0.5)	-14.8	(-0.6)	1.0	(+0)	22.4	(+0.5)	17.1	(+0.7)	59.7	(+1.6)	58.0	(+1.5)	45.6	(+1.5)	3.6	(+0.2)	19

Notes: CalSim Node = 'C_FTR003'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.19. Long-term Average Monthly Stream Flows at Trinity River below Clear Creek Tunnel for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	373		350		813		1075		1104		895		781		3757		2007		838		821		821		1136
	+75 MGD	0.0	(0)	-1.9	(-0.1)	-13.8	(-0.4)	-12.2	(-0.9)	-13.2	(+1.1)	13.6	(+1.2)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(0)	-2
	+150 MGD	0.0	(0)	-4.0	(-0.2)	-27.2	(-0.8)	-21.7	(-1.6)	-22.8	(+0.2)	7.7	(+0.8)	-3.9	(-0.1)	0.0	(0)	0.0	(+0)	0.0	(0)	0.0	(+0)	0.0	(0)	-6
	Projected Demand	0.0	(0)	-3.1	(-0.1)	-18.0	(-0.5)	-20.4	(-1.6)	-13.7	(+0.6)	10.6	(+1)	-5.9	(-0.2)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(0)	-4
Wet	Baseline	373		442		1661		2215		1820		1638		1202		4647		3214		1102		730		730		1648
	+75 MGD	0.0	(0)	-5.3	(-0.2)	-33.5	(-0.8)	-22.2	(-1.4)	2.1	(+4.2)	38.8	(+3.6)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(+0)	0.0	(0)	-2
	+150 MGD	0.0	(0)	-11.5	(-0.4)	-45.7	(-1.1)	-39.6	(-2.4)	-54.8	(+0.9)	22.3	(+2.4)	-11.2	(-0.4)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(0)	-12
	Projected Demand	0.0	(0)	-9.0	(-0.3)	-41.0	(-1)	-37.2	(-2.3)	-29.5	(+2.1)	30.4	(+2.9)	-16.7	(-0.6)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(0)	-9
Above Normal	Baseline	373		300		665		1073		2383		1098		661		4453		2287		1030		870		870		1338
	+75 MGD	0.0	(0)	0.0	(0)	-19.6	(-0.5)	-43.7	(-4.5)	-144.4	(-3.5)	0.0	(+0)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	-17
	+150 MGD	0.0	(0)	0.0	(0)	-114.6	(-3.2)	-74.7	(-7.7)	-34.8	(-0.8)	0.0	(0)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	-19
	Projected Demand	0.0	(0)	0.0	(0)	-35.6	(-1)	-74.7	(-7.7)	-33.3	(-0.8)	0.0	(+0)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	-12
Below Normal	Baseline	373		300		301		402		558		475		513		3617		1498		776		870		870		879
	+75 MGD	0.0	(0)	0.0	(0)	-0.7	(-0.2)	-0.7	(0)	-0.2	(0)	-0.2	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(0)	0.0	(0)	0
	+150 MGD	0.0	(0)	0.0	(0)	-0.7	(-0.2)	-2.3	(-0.1)	-0.9	(0)	-0.5	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(0)	0.0	(0)	0
	Projected Demand	0.0	(0)	0.0	(0)	-0.7	(-0.2)	-0.7	(0)	-0.6	(0)	-0.4	(0)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(0)	0.0	(0)	0
Dry	Baseline	373		300		300		300		300		300		542		2901		974		543		870		870		714
	+75 MGD	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0
	+150 MGD	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0
	Projected Demand	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0
Critical	Baseline	373		300		300		300		300		300		575		2092		783		450		870		870		626
	+75 MGD	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0
	+150 MGD	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(+0)	0.0	(0)	0.0	(0)	0.0	(0)	0
	Projected Demand	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0.0	(0)	0

Notes: CalSim Node = 'C_TRN111'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.21. Long-term Average Monthly Stream Flows at Sacramento River above American River for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	8778	10758	19823	26995	32235	29157	19576	12943	11294	13610	11163	11013	17279
	+75 MGD	-13.7 (-0.2)	-25.7 (-0.1)	-12.3 (-0.2)	-27.4 (-0.1)	-40.7 (-0.3)	30.0 (+0.2)	-9.1 (+0.2)	-7.6 (-0.1)	45.3 (+0.4)	66.6 (+0.6)	55.5 (+0.5)	18.7 (+0.1)	7
	+150 MGD	-57.5 (-0.8)	-38.4 (-0.2)	-32.6 (-0.1)	-25.4 (-0.1)	-52.2 (-0.3)	-39.3 (-0.1)	-12.9 (+0.3)	24.2 (+0.3)	91.4 (+0.9)	183.6 (+1.3)	127.7 (+1.2)	36.8 (+0.3)	17
	Projected Demand	-46.2 (-0.6)	-37.3 (-0.2)	-36.0 (-0.2)	-16.1 (-0.1)	-38.9 (-0.2)	-27.9 (0)	-20.5 (+0.2)	13.2 (+0.1)	67.1 (+0.6)	136.0 (+1)	98.6 (+0.9)	30.5 (+0.2)	10
Wet	Baseline	9919	14264	31394	43547	47818	43303	30713	17226	11900	16079	14427	14825	24618
	+75 MGD	-0.2 (-0.1)	-27.5 (+0)	66.9 (+0.4)	8.6 (0)	-4.2 (0)	83.6 (+0.2)	-190.9 (-0.8)	-30.6 (-0.3)	34.4 (+0.3)	71.0 (+0.4)	90.8 (+0.7)	43.9 (+0.3)	12
	+150 MGD	-5.4 (-0.1)	-71.4 (-0.2)	11.4 (+0.3)	-26.2 (-0.1)	-77.1 (-0.2)	-45.7 (-0.2)	-277.6 (-1.3)	9.6 (+0.1)	77.1 (+0.7)	250.2 (+1.5)	146.0 (+1)	90.4 (+0.6)	7
	Projected Demand	-4.5 (-0.1)	-50.0 (-0.1)	42.3 (+0.4)	-10.8 (-0.1)	-74.2 (-0.2)	-50.9 (-0.2)	-270.1 (-1.3)	5.7 (+0)	57.3 (+0.5)	178.2 (+1.1)	121.5 (+0.9)	76.7 (+0.5)	2
Above Normal	Baseline	9558	11018	19453	32229	40349	38209	17248	14630	13291	16025	12990	13382	19865
	+75 MGD	22.1 (+0.2)	-75.1 (-0.6)	-32.9 (-0.2)	-240.6 (-1.1)	2.0 (0)	-5.9 (0)	26.8 (+0.2)	-23.6 (-0.1)	79.9 (+0.6)	12.6 (+0.1)	66.2 (+0.5)	90.9 (+0.7)	-7
	+150 MGD	24.7 (+0.2)	-123.3 (-1)	6.4 (-0.1)	-5.0 (0)	-12.8 (0)	-8.5 (0)	25.8 (+0.2)	-42.5 (-0.1)	155.4 (+1.2)	183.9 (+1.2)	177.6 (+1.4)	175.8 (+1.3)	47
	Projected Demand	15.2 (+0.1)	-76.3 (-0.6)	-28.6 (-0.2)	-5.0 (0)	-8.5 (0)	-3.7 (0)	27.8 (+0.2)	-33.7 (-0.1)	123.7 (+0.9)	142.2 (+0.9)	144.3 (+1.1)	133.7 (+1)	36
Below Normal	Baseline	8526	9508	14008	18147	24510	21063	15074	11340	11029	14064	9990	9040	13858
	+75 MGD	-37.5 (-0.5)	-30.3 (-0.4)	-33.8 (-0.1)	-28.2 (-0.1)	-23.8 (0)	-59.1 (-0.2)	79.0 (+0.7)	2.5 (+0)	69.7 (+0.6)	58.6 (+0.4)	-0.4 (-0.1)	-21.0 (-0.2)	-2
	+150 MGD	-174.7 (-2.2)	-33.4 (-0.4)	-59.4 (+0.2)	-53.5 (-0.3)	-58.2 (-0.2)	-119.0 (-0.5)	122.2 (+1.1)	38.5 (+0.4)	124.8 (+1.1)	143.9 (+1)	41.3 (+0.4)	-57.3 (-0.5)	-7
	Projected Demand	-132.8 (-1.7)	-31.0 (-0.3)	-93.6 (-0.4)	-39.2 (-0.2)	-41.6 (-0.1)	-75.5 (-0.3)	99.7 (+0.9)	15.9 (+0.2)	104.1 (+1)	113.3 (+0.8)	26.2 (+0.2)	-39.2 (-0.4)	-8
Dry	Baseline	7791	7903	11466	14473	20435	19277	12153	9795	10902	9813	7701	7436	11596
	+75 MGD	-39.1 (-0.5)	78.4 (+1.1)	-108.8 (-1.3)	-16.2 (-0.1)	-4.8 (0)	128.6 (+1.2)	124.5 (+0.9)	-2.6 (-0.1)	-37.5 (-0.3)	101.5 (+1)	126.2 (+1.7)	-2.3 (0)	29
	+150 MGD	-74.1 (-1.1)	27.6 (+0.4)	-121.7 (-1.5)	-44.3 (-0.2)	117.7 (+0.5)	83.4 (+0.9)	195.9 (+1.5)	51.2 (+0.4)	-32.8 (-0.3)	193.5 (+2.1)	221.7 (+3)	4.8 (+0.1)	52
	Projected Demand	-73.3 (-1.1)	29.6 (+0.4)	-120.0 (-1.4)	-34.4 (-0.2)	145.5 (+0.6)	89.2 (+0.9)	186.0 (+1.4)	28.4 (+0.2)	-42.4 (-0.4)	156.4 (+1.7)	176.5 (+2.3)	0.7 (+0)	45
Critical	Baseline	6751	6960	10626	11330	13800	12531	9109	7045	9160	8455	7393	7199	9197
	+75 MGD	3.6 (+0)	-94.9 (-1.3)	-55.2 (-0.6)	22.3 (+0.3)	-252.0 (-2.1)	-12.5 (-0.1)	117.3 (+1.3)	40.2 (+0.5)	93.3 (+1.2)	71.9 (+1.1)	-10.7 (-0.1)	5.3 (+0.1)	-6
	+150 MGD	10.8 (+0.1)	28.3 (+0.4)	-20.9 (-0.3)	44.2 (+0.5)	-198.4 (-1.6)	-15.4 (-0.1)	149.4 (+1.6)	52.0 (+0.6)	155.5 (+1.8)	74.5 (+1.1)	117.6 (+1.6)	26.6 (+0.4)	35
	Projected Demand	12.2 (+0.2)	-64.8 (-0.9)	-34.2 (-0.4)	32.8 (+0.4)	-173.4 (-1.4)	-16.7 (-0.1)	128.4 (+1.4)	45.1 (+0.6)	99.6 (+1.2)	40.5 (+0.6)	67.0 (+0.9)	12.1 (+0.2)	12

Notes: CalSim Node = 'C_SAC064'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.22. Long-term Average Monthly Stream Flows at Sacramento River between American River and SRWTP Intakes for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	10178		13293		23846		32308		38104		33408		23290		16251		13751		15430		12880		12624		20447
	+75 MGD	-10.1	(-0.1)	-61.8	(-0.5)	-29.5	(-0.2)	-57.2	(-0.2)	-91.5	(-0.4)	-32.5	(-0.2)	-46.4	(0)	26.6	(+0.3)	67.6	(+0.6)	66.0	(+0.5)	49.8	(+0.4)	19.9	(+0.1)	-8
	+150 MGD	-53.9	(-0.6)	-67.3	(-0.5)	-57.1	(-0.2)	-70.3	(-0.2)	-109.7	(-0.5)	-121.4	(-0.4)	-63.9	(0)	53.7	(+0.5)	121.0	(+1)	138.4	(+1)	117.2	(+1)	33.5	(+0.2)	-7
	Projected Demand	-42.2	(-0.5)	-64.1	(-0.5)	-62.7	(-0.3)	-51.5	(-0.2)	-91.2	(-0.4)	-105.7	(-0.4)	-68.9	(-0.1)	44.2	(+0.4)	95.0	(+0.8)	104.6	(+0.7)	92.1	(+0.8)	29.4	(+0.2)	-10
Wet	Baseline	11479		17891		38988		53982		57585		50694		36858		22786		15028		18342		16541		16754		29744
	+75 MGD	0.7	(0)	-71.5	(-0.4)	36.0	(+0.3)	-26.1	(-0.1)	-55.5	(-0.1)	49.1	(+0.1)	-263.3	(-1)	-16.6	(0)	39.1	(+0.3)	52.9	(+0.3)	67.7	(+0.4)	45.0	(+0.3)	-12
	+150 MGD	-10.6	(0)	-124.3	(-0.6)	-19.2	(+0.2)	-60.3	(-0.2)	-76.6	(-0.2)	-137.4	(-0.3)	-365.5	(-1.5)	10.0	(+0.2)	73.7	(+0.6)	125.1	(+0.7)	111.4	(+0.7)	88.2	(+0.6)	-32
	Projected Demand	-6.8	(0)	-102.8	(-0.6)	-3.8	(+0.2)	-36.3	(-0.1)	-68.3	(-0.1)	-136.6	(-0.3)	-351.9	(-1.4)	11.2	(+0.2)	57.0	(+0.5)	87.8	(+0.5)	94.5	(+0.6)	73.9	(+0.5)	-32
Above Normal	Baseline	11112		13446		22884		38335		47469		43443		20781		18154		15955		17768		14708		15136		23266
	+75 MGD	18.3	(+0.1)	-107.1	(-0.8)	-65.9	(-0.3)	-304.7	(-1.1)	-44.4	(-0.1)	-41.8	(-0.1)	16.1	(+0.1)	-26.7	(-0.1)	94.8	(+0.6)	74.4	(+0.4)	63.8	(+0.4)	89.4	(+0.6)	-20
	+150 MGD	15.4	(+0.1)	-173.3	(-1.2)	-62.1	(-0.4)	-86.5	(-0.3)	-65.6	(-0.2)	-55.5	(-0.1)	4.4	(+0.1)	-53.7	(-0.2)	185.9	(+1.2)	178.2	(+1)	171.4	(+1.2)	171.6	(+1.1)	19
	Projected Demand	8.2	(+0)	-119.7	(-0.8)	-80.5	(-0.4)	-71.2	(-0.2)	-64.0	(-0.2)	-45.9	(-0.1)	11.0	(+0.1)	-41.2	(-0.1)	145.2	(+0.9)	137.9	(+0.8)	139.7	(+1)	130.6	(+0.9)	13
Below Normal	Baseline	9877		11612		16396		20551		29058		23586		17835		13835		13404		15773		11639		10628		16183
	+75 MGD	-31.3	(-0.3)	-22.0	(-0.1)	-50.2	(-0.2)	-56.7	(-0.3)	-95.6	(-0.3)	-132.0	(-0.5)	122.6	(+0.9)	-6.5	(-0.1)	91.3	(+0.7)	55.9	(+0.3)	-1.7	(0)	-23.2	(-0.2)	-12
	+150 MGD	-157.5	(-1.8)	12.7	(0)	-87.4	(0)	-100.2	(-0.5)	-145.2	(-0.5)	-180.7	(-0.8)	160.6	(+1.1)	26.7	(+0.2)	169.9	(+1.3)	137.6	(+0.8)	35.6	(+0.3)	-67.0	(-0.6)	-16
	Projected Demand	-116.5	(-1.3)	22.5	(+0)	-116.3	(-0.5)	-76.1	(-0.4)	-123.2	(-0.4)	-133.3	(-0.6)	136.3	(+1)	4.3	(+0)	138.4	(+1)	108.5	(+0.7)	24.1	(+0.2)	-45.4	(-0.4)	-15
Dry	Baseline	9059		9717		12932		16252		22724		21439		13814		11143		12896		11359		9188		8821		13279
	+75 MGD	-25.6	(-0.3)	-49.1	(-0.6)	-120.5	(-1.2)	-43.2	(-0.2)	-59.9	(-0.3)	-48.4	(-0.2)	59.2	(+0.4)	219.8	(+1.8)	30.1	(+0.3)	108.7	(+1)	130.8	(+1.5)	7.2	(+0.1)	17
	+150 MGD	-67.1	(-0.8)	-111.7	(-1.3)	-134.5	(-1.3)	-91.3	(-0.5)	-68.2	(-0.3)	-99.9	(-0.5)	95.1	(+0.7)	273.7	(+2.3)	45.5	(+0.5)	194.9	(+1.8)	223.0	(+2.5)	23.7	(+0.3)	24
	Projected Demand	-66.3	(-0.8)	-107.3	(-1.2)	-132.6	(-1.3)	-78.1	(-0.4)	-27.9	(-0.2)	-91.6	(-0.5)	87.2	(+0.6)	250.2	(+2.1)	37.3	(+0.4)	161.0	(+1.5)	179.1	(+2)	21.5	(+0.3)	19
Critical	Baseline	7858		8344		11800		12385		15051		13588		10736		8044		10338		9673		8434		8147		10366
	+75 MGD	3.1	(0)	-102.3	(-1.3)	-31.6	(-0.3)	25.7	(+0.2)	-253.9	(-2.1)	-15.6	(-0.1)	13.5	(+0.1)	31.3	(+0.4)	118.3	(+1.2)	67.5	(+0.8)	7.3	(+0.1)	7.0	(+0.1)	-11
	+150 MGD	14.7	(+0.1)	47.3	(+0.6)	-2.0	(0)	3.4	(+0.3)	-205.5	(-1.6)	-23.0	(-0.2)	42.4	(+0.4)	55.9	(+0.6)	184.4	(+1.9)	80.9	(+1)	146.1	(+1.8)	9.0	(+0.1)	30
	Projected Demand	11.6	(+0.1)	-53.3	(-0.7)	-13.9	(-0.1)	6.2	(+0.2)	-178.7	(-1.3)	-22.4	(-0.2)	22.6	(+0.2)	44.7	(+0.5)	135.1	(+1.4)	51.5	(+0.7)	95.6	(+1.2)	2.8	(+0)	9

Notes: CalSim Node = 'C_SAC063'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.23. Long-term Average Monthly Stream Flows at Sacramento River below SRWTP Intakes for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	10017	13214	23791	32261	38057	33356	23210	16117	13575	15218	12683	12431	20328
	+75 MGD	-126.8 (-1.5)	-132.5 (-1.2)	-84.0 (-0.6)	-96.2 (-0.5)	-125.7 (-0.6)	-87.0 (-0.5)	-116.2 (-0.5)	-63.4 (-0.5)	-69.7 (-0.5)	-93.4 (-0.7)	-100.6 (-0.9)	-116.2 (-1.1)	-101
	+150 MGD	-285.7 (-3.3)	-206.3 (-1.9)	-166.1 (-1.1)	-153.6 (-0.8)	-182.8 (-0.8)	-231.4 (-1)	-201.5 (-1)	-129.0 (-1.1)	-153.6 (-1.2)	-193.3 (-1.4)	-185.1 (-1.6)	-237.0 (-2.3)	-194
	Projected Demand	-222.0 (-2.6)	-172.1 (-1.6)	-147.3 (-1)	-114.1 (-0.6)	-146.9 (-0.7)	-191.1 (-0.8)	-175.8 (-0.9)	-96.8 (-0.8)	-117.6 (-0.9)	-150.9 (-1.1)	-140.3 (-1.2)	-180.7 (-1.7)	-155
Wet	Baseline	11323	17819	38938	53935	57537	50640	36783	22676	14864	18148	16365	16577	29634
	+75 MGD	-108.9 (-1.2)	-129.3 (-0.9)	4.7 (+0.2)	-46.7 (-0.1)	-74.8 (-0.2)	15.2 (0)	-308.5 (-1.2)	-75.0 (-0.4)	-73.4 (-0.5)	-95.5 (-0.6)	-60.3 (-0.4)	-69.3 (-0.4)	-85
	+150 MGD	-228.3 (-2.4)	-237.7 (-1.6)	-81.7 (-0.1)	-102.2 (-0.3)	-115.6 (-0.2)	-206.0 (-0.5)	-455.0 (-1.9)	-107.6 (-0.6)	-151.2 (-1.1)	-194.7 (-1.1)	-149.0 (-0.9)	-139.1 (-0.9)	-181
	Projected Demand	-175.6 (-1.9)	-191.0 (-1.3)	-52.3 (0)	-68.6 (-0.2)	-98.4 (-0.2)	-189.8 (-0.5)	-421.3 (-1.7)	-79.8 (-0.4)	-117.1 (-0.9)	-155.4 (-0.9)	-100.9 (-0.6)	-102.7 (-0.6)	-146
Above Normal	Baseline	10942	13361	22829	38287	47420	43390	20701	18006	15772	17538	14493	14927	23139
	+75 MGD	-105.3 (-1)	-184.2 (-1.4)	-116.8 (-0.7)	-334.8 (-1.2)	-68.5 (-0.2)	-69.4 (-0.2)	-40.7 (-0.2)	-133.8 (-0.9)	-46.9 (-0.3)	-68.4 (-0.4)	-98.8 (-0.7)	-58.5 (-0.4)	-111
	+150 MGD	-230.1 (-2.2)	-326.0 (-2.4)	-164.0 (-1.1)	-149.1 (-0.5)	-115.5 (-0.3)	-111.3 (-0.3)	-109.3 (-0.6)	-269.2 (-1.8)	-97.6 (-0.6)	-160.0 (-0.9)	-153.9 (-1.1)	-122.5 (-0.8)	-167
	Projected Demand	-182.2 (-1.7)	-238.1 (-1.8)	-159.6 (-0.9)	-119.1 (-0.4)	-102.2 (-0.3)	-89.3 (-0.2)	-77.0 (-0.4)	-208.0 (-1.4)	-74.2 (-0.5)	-124.5 (-0.7)	-112.9 (-0.8)	-97.8 (-0.7)	-132
Below Normal	Baseline	9713	11534	16340	20505	29011	23535	17753	13698	13217	15549	11430	10423	16059
	+75 MGD	-151.3 (-1.7)	-90.4 (-0.8)	-113.4 (-0.7)	-100.4 (-0.5)	-129.6 (-0.5)	-198.3 (-0.9)	50.4 (+0.4)	-105.3 (-0.9)	-63.2 (-0.5)	-113.1 (-0.8)	-164.2 (-1.5)	-171.0 (-1.6)	-113
	+150 MGD	-395.8 (-4.5)	-122.8 (-1.4)	-213.7 (-1.1)	-196.8 (-1.1)	-216.9 (-0.9)	-314.5 (-1.5)	16.3 (+0.1)	-172.1 (-1.4)	-139.2 (-1.1)	-200.4 (-1.4)	-289.5 (-2.6)	-360.9 (-3.5)	-217
	Projected Demand	-301.3 (-3.4)	-82.6 (-1)	-214.4 (-1.3)	-146.5 (-0.8)	-177.9 (-0.7)	-237.1 (-1.1)	24.6 (+0.2)	-149.5 (-1.2)	-100.9 (-0.8)	-153.6 (-1.1)	-228.3 (-2.1)	-273.7 (-2.6)	-170
Dry	Baseline	8892	9633	12873	16206	22677	21389	13728	10985	12718	11139	8983	8620	13154
	+75 MGD	-149.2 (-1.9)	-134.0 (-1.5)	-196.9 (-1.8)	-101.0 (-0.7)	-110.7 (-0.5)	-122.5 (-0.6)	-42.4 (-0.3)	116.0 (+0.9)	-116.3 (-0.9)	-60.5 (-0.6)	-31.8 (-0.3)	-140.7 (-1.6)	-91
	+150 MGD	-312.6 (-3.9)	-277.7 (-3.1)	-287.4 (-2.6)	-214.5 (-1.4)	-183.8 (-0.9)	-249.5 (-1.4)	-103.7 (-0.9)	54.0 (+0.3)	-246.9 (-1.9)	-143.0 (-1.3)	-101.9 (-1.1)	-270.1 (-3.1)	-195
	Projected Demand	-256.7 (-3.2)	-236.6 (-2.7)	-251.3 (-2.3)	-171.7 (-1.1)	-115.7 (-0.6)	-207.7 (-1.1)	-67.5 (-0.6)	82.6 (+0.6)	-189.0 (-1.5)	-101.0 (-0.9)	-73.1 (-0.8)	-206.6 (-2.4)	-150
Critical	Baseline	7702	8261	11742	12341	15006	13538	10655	7890	10159	9458	8234	7950	10245
	+75 MGD	-112.7 (-1.8)	-191.8 (-2.5)	-108.1 (-1.1)	-38.5 (-0.3)	-318.0 (-2.5)	-98.5 (-0.8)	-91.2 (-0.9)	-97.2 (-1.3)	-36.3 (-0.3)	-101.7 (-1)	-155.4 (-1.8)	-140.9 (-1.8)	-124
	+150 MGD	-215.4 (-3.4)	-127.3 (-1.6)	-154.8 (-1.6)	-133.9 (-1)	-343.2 (-2.6)	-190.5 (-1.5)	-159.7 (-1.5)	-202.7 (-2.7)	-124.8 (-1.2)	-257.4 (-2.6)	-179.1 (-2.2)	-285.1 (-3.6)	-198
	Projected Demand	-166.9 (-2.6)	-189.2 (-2.5)	-132.6 (-1.4)	-98.0 (-0.7)	-283.1 (-2.1)	-152.4 (-1.2)	-135.4 (-1.3)	-155.4 (-2.1)	-104.4 (-1)	-210.8 (-2.1)	-157.0 (-1.9)	-225.6 (-2.8)	-168

Notes: CalSim Node = 'C_SAC062'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.24. Long-term Average Monthly Stream Flows at Sacramento River at Freeport for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	9948	13238	24083	32525	38490	33905	23172	16069	13521	15134	12604	12353	20420
	+75 MGD	-126.7 (-1.5)	-132.4 (-1.2)	-84.0 (-0.6)	-96.2 (-0.4)	-125.7 (-0.6)	-86.9 (-0.5)	-116.2 (-0.5)	-63.3 (-0.5)	-69.6 (-0.5)	-93.3 (-0.7)	-100.6 (-0.9)	-116.1 (-1.1)	-101
	+150 MGD	-285.5 (-3.4)	-206.0 (-1.8)	-164.5 (-1)	-152.4 (-0.8)	-182.7 (-0.8)	-231.4 (-1)	-201.4 (-1)	-128.8 (-1.1)	-153.4 (-1.2)	-193.0 (-1.4)	-184.9 (-1.6)	-236.8 (-2.3)	-193
	Projected Demand	-221.8 (-2.6)	-171.8 (-1.6)	-145.7 (-1)	-112.9 (-0.6)	-146.8 (-0.7)	-191.1 (-0.8)	-175.7 (-0.9)	-96.7 (-0.8)	-117.4 (-0.9)	-150.7 (-1.1)	-140.1 (-1.2)	-180.5 (-1.7)	-154
Wet	Baseline	11259	17862	39311	54143	58248	51363	36749	22630	14809	18086	16307	16521	29774
	+75 MGD	-108.8 (-1.2)	-129.3 (-0.9)	4.7 (+0.2)	-46.7 (-0.1)	-74.8 (-0.2)	15.2 (0)	-308.5 (-1.2)	-75.0 (-0.4)	-73.4 (-0.5)	-95.5 (-0.6)	-60.3 (-0.4)	-69.3 (-0.4)	-85
	+150 MGD	-228.2 (-2.5)	-237.7 (-1.6)	-81.7 (-0.1)	-102.1 (-0.3)	-115.5 (-0.2)	-205.9 (-0.5)	-455.0 (-1.9)	-107.5 (-0.6)	-151.1 (-1.1)	-194.7 (-1.1)	-148.9 (-0.9)	-139.1 (-0.9)	-181
	Projected Demand	-175.5 (-1.9)	-191.0 (-1.3)	-52.3 (0)	-68.5 (-0.2)	-98.3 (-0.2)	-189.7 (-0.5)	-421.3 (-1.7)	-79.8 (-0.4)	-117.1 (-0.9)	-155.4 (-0.9)	-100.9 (-0.6)	-102.6 (-0.6)	-146
Above Normal	Baseline	10900	13560	23390	38631	47599	43971	20667	17961	15717	17478	14437	14873	23265
	+75 MGD	-105.3 (-1)	-184.1 (-1.4)	-116.8 (-0.7)	-334.8 (-1.2)	-68.5 (-0.2)	-69.4 (-0.2)	-40.7 (-0.2)	-133.8 (-0.9)	-46.9 (-0.3)	-68.4 (-0.4)	-98.8 (-0.7)	-58.5 (-0.4)	-111
	+150 MGD	-230.1 (-2.2)	-325.9 (-2.4)	-164.0 (-1)	-149.1 (-0.5)	-115.5 (-0.3)	-111.3 (-0.3)	-109.3 (-0.6)	-269.2 (-1.8)	-97.6 (-0.6)	-160.0 (-0.9)	-153.9 (-1.1)	-122.5 (-0.8)	-167
	Projected Demand	-182.1 (-1.7)	-238.0 (-1.7)	-159.6 (-0.9)	-119.1 (-0.4)	-102.2 (-0.3)	-89.3 (-0.2)	-77.0 (-0.4)	-207.9 (-1.4)	-74.2 (-0.5)	-124.4 (-0.7)	-112.8 (-0.8)	-97.7 (-0.7)	-132
Below Normal	Baseline	9648	11565	16568	20902	29388	23933	17727	13660	13172	15477	11362	10357	16147
	+75 MGD	-151.3 (-1.7)	-90.4 (-0.8)	-113.3 (-0.7)	-100.4 (-0.5)	-129.6 (-0.5)	-198.3 (-0.8)	50.4 (+0.4)	-105.1 (-0.9)	-63.0 (-0.5)	-112.9 (-0.8)	-164.1 (-1.5)	-170.9 (-1.7)	-112
	+150 MGD	-395.5 (-4.6)	-122.0 (-1.4)	-208.2 (-1.1)	-192.5 (-1)	-216.8 (-0.9)	-314.4 (-1.4)	16.4 (+0.1)	-171.8 (-1.4)	-138.8 (-1.1)	-200.0 (-1.4)	-289.1 (-2.6)	-360.5 (-3.5)	-216
	Projected Demand	-301.0 (-3.4)	-81.8 (-1)	-208.8 (-1.3)	-142.3 (-0.8)	-177.7 (-0.7)	-237.1 (-1.1)	24.7 (+0.2)	-149.2 (-1.3)	-100.6 (-0.8)	-153.3 (-1.1)	-227.9 (-2.1)	-273.4 (-2.6)	-169
Dry	Baseline	8806	9570	13094	16473	22990	21923	13684	10934	12660	11017	8864	8502	13210
	+75 MGD	-149.2 (-1.9)	-134.0 (-1.5)	-196.9 (-1.9)	-100.9 (-0.7)	-110.7 (-0.5)	-122.4 (-0.6)	-42.4 (-0.3)	116.0 (+0.9)	-116.3 (-0.9)	-60.5 (-0.6)	-31.8 (-0.3)	-140.7 (-1.7)	-91
	+150 MGD	-312.5 (-3.9)	-277.6 (-3.1)	-287.3 (-2.6)	-214.5 (-1.4)	-183.7 (-0.8)	-249.3 (-1.3)	-103.3 (-0.9)	54.5 (+0.3)	-246.2 (-1.9)	-142.3 (-1.3)	-101.2 (-1.1)	-269.5 (-3.2)	-194
	Projected Demand	-256.6 (-3.2)	-236.5 (-2.7)	-251.2 (-2.3)	-171.6 (-1.1)	-115.6 (-0.6)	-207.5 (-1.1)	-67.1 (-0.6)	83.1 (+0.6)	-188.4 (-1.5)	-100.3 (-0.9)	-72.5 (-0.8)	-206.0 (-2.4)	-149
Critical	Baseline	7614	8181	11833	12408	15128	13933	10579	7814	10095	9321	8100	7817	10235
	+75 MGD	-112.7 (-1.8)	-191.8 (-2.6)	-108.0 (-1.2)	-38.4 (-0.3)	-318.0 (-2.5)	-98.5 (-0.8)	-91.2 (-0.9)	-97.2 (-1.3)	-36.3 (-0.3)	-101.7 (-1)	-155.4 (-1.9)	-140.9 (-1.8)	-124
	+150 MGD	-215.3 (-3.4)	-127.2 (-1.6)	-154.7 (-1.7)	-133.8 (-1)	-343.1 (-2.7)	-190.5 (-1.5)	-159.7 (-1.5)	-202.7 (-2.7)	-124.8 (-1.2)	-257.3 (-2.6)	-179.1 (-2.2)	-285.1 (-3.6)	-198
	Projected Demand	-166.7 (-2.6)	-189.1 (-2.5)	-132.5 (-1.4)	-98.0 (-0.7)	-283.0 (-2.1)	-152.4 (-1.2)	-135.4 (-1.3)	-155.4 (-2.1)	-104.4 (-1)	-210.8 (-2.1)	-157.0 (-1.9)	-225.6 (-2.9)	-168

Notes: CalSim Node = 'C_SAC049'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.25. Long-term Average Monthly Stream Flows at American River below Nimbus Dam (above FWTP Intake) for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	1498		2627		4100		5401		5950		4359		3813		3416		2602		1983		1875		1737		3280
	+75 MGD	5.6	(+0.4)	-28.5	(-0.8)	0.9	(+0.4)	1.0	(+0.1)	-16.1	(-0.3)	-45.5	(-1)	-34.5	(-0.5)	37.4	(+1.6)	25.1	(+2)	1.9	(+0.2)	-3.5	(-0.1)	3.3	(+0.2)	-4
	+150 MGD	9.1	(+1.6)	-18.7	(+0.1)	-3.6	(+0.3)	-11.4	(-0.4)	-19.6	(-1)	-61.6	(-1.2)	-44.6	(-1.2)	36.3	(+1.8)	35.9	(+2.5)	-39.4	(-1.2)	-5.3	(-0.1)	1.3	(+0.1)	-10
	Projected Demand	8.6	(+1.5)	-17.6	(0)	-6.9	(+0.2)	-2.7	(-0.1)	-15.8	(-0.9)	-58.7	(-1.1)	-43.6	(-1.1)	36.3	(+1.7)	32.6	(+2.4)	-27.0	(-0.8)	-2.4	(+0)	2.5	(+0.2)	-8
Wet	Baseline	1656		3713		7672		10511		9837		7485		6228		5650		3241		2412		2263		2055		5227
	+75 MGD	3.3	(+0.4)	-32.3	(-1.3)	5.1	(+0.5)	9.6	(+0.3)	-5.9	(-0.1)	-6.3	(-0.1)	-66.9	(-1.7)	17.7	(+1.4)	8.6	(+0.4)	-14.4	(-0.6)	-19.8	(-0.8)	4.2	(+0.3)	-8
	+150 MGD	0.0	(+0.4)	-38.1	(-1.4)	8.9	(+0.9)	14.2	(+0.4)	50.7	(0)	-58.7	(-0.6)	-77.9	(-2)	8.8	(+1.3)	5.3	(+0.4)	-117.0	(-3.8)	-27.6	(-1.2)	4.4	(+0.4)	-19
	Projected Demand	1.9	(+0.4)	-39.3	(-1.5)	-7.9	(+0.3)	21.2	(+0.5)	54.1	(+0)	-54.4	(-0.5)	-73.7	(-1.9)	11.9	(+1.3)	6.3	(+0.4)	-84.2	(-2.8)	-21.3	(-0.9)	2.6	(+0.2)	-15
Above Normal	Baseline	1645		2518		3514		6195		7193		5365		3617		3621		2805		1903		1866		1869		3509
	+75 MGD	-2.1	(-0.1)	-25.8	(-0.9)	-12.4	(-0.4)	-27.8	(-0.6)	-3.6	(0)	-4.5	(-0.1)	-4.7	(-0.2)	-0.7	(0)	17.7	(+0.8)	64.3	(+3.4)	-0.7	(0)	0.0	(0)	0
	+150 MGD	-5.1	(-0.3)	-41.4	(-1.4)	-45.0	(-1.5)	-41.2	(-1)	-6.6	(-0.1)	-12.1	(-0.3)	-11.6	(-0.4)	-5.2	(-0.2)	37.0	(+1.8)	0.0	(+0)	-1.5	(-0.1)	0.0	(0)	-11
	Projected Demand	-3.9	(-0.3)	-35.7	(-1.2)	-29.8	(-1)	-27.2	(-0.7)	-10.8	(-0.3)	-8.8	(-0.2)	-8.7	(-0.3)	-3.0	(-0.1)	26.3	(+1.3)	0.0	(+0)	-1.2	(-0.1)	0.0	(0)	-9
Below Normal	Baseline	1449		2198		2463		2493		4637		2637		2870		2617		2535		1884		1810		1712		2442
	+75 MGD	8.0	(+0.4)	17.4	(+0.6)	-4.7	(-0.3)	-1.0	(+0)	-36.9	(-1.3)	-62.3	(-1.4)	48.4	(+1.3)	-6.8	(-0.2)	24.0	(+1.1)	-0.5	(0)	0.5	(+0)	-0.5	(0)	-1
	+150 MGD	25.4	(+4.6)	57.9	(+1.9)	-13.9	(-0.6)	-17.7	(-0.6)	-48.7	(-1.7)	-47.9	(-1.4)	46.7	(+1.2)	-6.2	(-0.2)	50.7	(+2.3)	-1.2	(-0.1)	-1.3	(-0.1)	-5.8	(-0.3)	3
	Projected Demand	23.4	(+4.5)	64.2	(+2.2)	-9.8	(-0.5)	-7.7	(-0.2)	-44.7	(-1.5)	-45.4	(-1.3)	43.4	(+1.1)	-7.4	(-0.2)	38.6	(+1.7)	-1.0	(-0.1)	1.2	(+0.1)	-3.3	(-0.2)	4
Dry	Baseline	1371		1912		1541		1881		2380		2280		1763		1466		2157		1711		1651		1518		1803
	+75 MGD	15.1	(+1.3)	-125.3	(-3.5)	-10.6	(-1.2)	-9.7	(-0.4)	-32.2	(-1.3)	-170.5	(-3.2)	-67.3	(+0.7)	229.1	(+8.6)	69.4	(+9.7)	9.0	(+0.6)	6.5	(+0.6)	10.6	(+0.6)	-6
	+150 MGD	10.7	(+1.3)	-135.2	(-4.5)	-9.6	(-0.8)	-27.6	(-1)	-162.4	(-5.2)	-174.7	(-3.5)	-100.5	(-2.9)	231.5	(+8.8)	82.5	(+9.7)	5.7	(+0.4)	5.5	(+0.5)	21.9	(+1.3)	-21
	Projected Demand	10.0	(+1.1)	-133.5	(-4.3)	-10.2	(-1)	-25.0	(-0.9)	-150.8	(-4.7)	-173.1	(-3.4)	-99.4	(-2.7)	229.8	(+8.7)	83.0	(+9.9)	8.0	(+0.6)	5.9	(+0.5)	23.0	(+1.4)	-19
Critical	Baseline	1207		1487		1252		1161		1340		1164		1754		1122		1353		1393		1216		1074		1294
	+75 MGD	1.6	(-0.1)	-6.6	(+0.9)	25.0	(+3.6)	15.7	(+0.6)	10.5	(+2)	-1.7	(-0.2)	-109.4	(-2.7)	-7.7	(-0.6)	26.4	(+0.4)	-3.2	(-0.3)	18.9	(+1.1)	3.0	(+0.2)	-2
	+150 MGD	7.7	(+0.2)	21.8	(+7)	22.3	(+3.4)	-26.6	(-1)	7.1	(+1.7)	-4.4	(-0.4)	-110.6	(-2.9)	7.1	(+0.6)	32.4	(+0.7)	9.4	(+0.5)	31.6	(+1.9)	-14.7	(-1)	-1
	Projected Demand	2.7	(-0.1)	13.7	(+5.2)	22.8	(+3.4)	-13.1	(-0.4)	8.1	(+1.8)	-3.2	(-0.3)	-110.2	(-2.8)	2.0	(+0.2)	38.1	(+1.3)	13.2	(+0.7)	30.9	(+1.9)	-7.1	(-0.5)	0

Notes: CalSim Node = 'C_AMR009'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

CalSim_3_Future_Surface_Hydro.xlsx, Sheet: AMR 9 R Detail; 1/17/2025, 10:03 AM

Table A.26. Long-term Average Monthly Stream Flows at American River below FWTP Intake for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	1403		2533		4034		5332		5877		4258		3690		3285		2448		1829		1721		1617		3169
	+75 MGD	5.6	(+0.5)	-34.1	(-0.9)	-15.2	(+0.1)	-27.9	(-0.8)	-48.5	(-1.1)	-60.4	(-1.3)	-35.1	(-0.5)	36.7	(+1.7)	25.1	(+2.4)	1.9	(+0.2)	-3.5	(-0.1)	3.3	(+0.2)	-13
	+150 MGD	8.1	(+1.4)	-24.2	(+0.2)	-19.8	(+0)	-39.9	(-1.2)	-51.7	(-1.8)	-76.5	(-1.5)	-45.2	(-1.3)	35.5	(+1.9)	35.9	(+2.9)	-39.4	(-1.3)	-5.3	(-0.1)	1.3	(+0.1)	-18
	Projected Demand	7.6	(+1.3)	-23.1	(0)	-23.1	(-0.1)	-31.6	(-1)	-47.9	(-1.7)	-73.6	(-1.4)	-44.2	(-1.2)	35.6	(+1.8)	32.6	(+2.8)	-27.0	(-0.8)	-2.4	(+0)	2.5	(+0.2)	-16
Wet	Baseline	1561		3624		7622		10468		9774		7394		6104		5507		3087		2259		2109		1925		5120
	+75 MGD	3.3	(+0.4)	-41.6	(-1.6)	-28.1	(-0.1)	-32.3	(-0.2)	-48.7	(-0.7)	-32.0	(-0.5)	-70.4	(-1.9)	17.7	(+1.6)	8.6	(+0.5)	-14.4	(-0.6)	-19.8	(-0.9)	4.2	(+0.3)	-21
	+150 MGD	0.1	(+0.5)	-47.4	(-1.7)	-24.4	(+0.3)	-27.7	(-0.1)	7.9	(-0.6)	-84.3	(-1)	-81.4	(-2.1)	8.8	(+1.4)	5.3	(+0.4)	-117.0	(-4)	-27.6	(-1.2)	4.4	(+0.4)	-32
	Projected Demand	2.0	(+0.5)	-48.5	(-1.8)	-41.2	(-0.3)	-20.7	(0)	11.3	(-0.5)	-80.1	(-0.9)	-77.2	(-2)	11.9	(+1.4)	6.3	(+0.4)	-84.2	(-2.9)	-21.3	(-0.9)	2.6	(+0.3)	-28
Above Normal	Baseline	1552		2424		3442		6135		7134		5258		3483		3495		2651		1750		1713		1750		3399
	+75 MGD	-2.1	(-0.2)	-30.3	(-1.1)	-31.2	(-0.8)	-63.0	(-1.5)	-43.7	(-0.7)	-33.5	(-0.7)	-8.0	(-0.2)	-0.7	(0)	17.7	(+0.9)	64.3	(+3.7)	-0.7	(0)	0.0	(0)	-11
	+150 MGD	-5.1	(-0.4)	-45.9	(-1.5)	-63.7	(-2)	-76.4	(-1.9)	-46.7	(-0.7)	-41.0	(-0.9)	-15.0	(-0.5)	-5.2	(-0.2)	37.0	(+1.9)	0.0	(+0)	-1.5	(-0.1)	0.0	(0)	-22
	Projected Demand	-3.9	(-0.3)	-40.2	(-1.4)	-48.5	(-1.5)	-62.4	(-1.5)	-50.9	(-1)	-37.8	(-0.8)	-12.1	(-0.4)	-3.0	(-0.1)	26.3	(+1.4)	0.0	(+0)	-1.2	(-0.1)	0.0	(0)	-20
Below Normal	Baseline	1354		2100		2388		2412		4558		2531		2749		2488		2381		1730		1656		1595		2329
	+75 MGD	8.0	(+0.5)	10.4	(+0.5)	-14.5	(-0.5)	-26.6	(-1.1)	-69.5	(-2.2)	-71.0	(-1.7)	46.3	(+1.2)	-6.8	(-0.2)	24.0	(+1.2)	-0.5	(0)	0.5	(+0)	-0.5	(0)	-8
	+150 MGD	21.6	(+3.6)	50.9	(+1.7)	-23.6	(-0.9)	-41.9	(-1.7)	-81.3	(-2.6)	-56.6	(-1.6)	44.6	(+1.2)	-6.2	(-0.2)	50.7	(+2.4)	-1.2	(-0.1)	-1.3	(-0.1)	-5.8	(-0.3)	-4
	Projected Demand	19.6	(+3.6)	57.2	(+2)	-19.5	(-0.7)	-33.3	(-1.4)	-77.3	(-2.4)	-54.1	(-1.5)	41.3	(+1.1)	-7.4	(-0.2)	38.6	(+1.9)	-1.0	(-0.1)	1.2	(+0.1)	-3.3	(-0.2)	-3
Dry	Baseline	1273		1812		1465		1788		2297		2172		1647		1347		2003		1557		1497		1399		1688
	+75 MGD	15.1	(+1.4)	-125.7	(-3.7)	-10.6	(-1.2)	-25.4	(-1.2)	-53.2	(-2.2)	-175.0	(-3.4)	-63.2	(+1.2)	224.1	(+8.8)	69.4	(+12.1)	9.0	(+0.7)	6.5	(+0.7)	10.6	(+0.6)	-10
	+150 MGD	10.7	(+1.5)	-135.7	(-4.8)	-9.6	(-0.9)	-43.3	(-1.8)	-180.9	(-6.1)	-179.3	(-3.7)	-96.4	(-2.9)	226.5	(+9)	82.5	(+11.9)	5.7	(+0.5)	5.5	(+0.5)	21.9	(+1.4)	-24
	Projected Demand	10.0	(+1.3)	-133.9	(-4.5)	-10.2	(-1)	-40.6	(-1.7)	-169.3	(-5.6)	-177.6	(-3.6)	-95.3	(-2.8)	224.8	(+8.9)	83.0	(+12.2)	8.0	(+0.7)	5.9	(+0.6)	23.0	(+1.5)	-23
Critical	Baseline	1114		1390		1175		1063		1252		1059		1630		1005		1200		1239		1062		970		1180
	+75 MGD	1.7	(-0.2)	-5.9	(+1.3)	25.0	(+4.2)	4.7	(-0.6)	-0.8	(+1.3)	-1.7	(-0.2)	-102.2	(-2.6)	-7.7	(-0.7)	26.4	(+0.3)	-3.2	(-0.3)	18.9	(+1.2)	2.9	(+0.2)	-4
	+150 MGD	7.7	(+0.2)	23.5	(+9)	22.3	(+4)	-37.7	(-2.2)	-4.2	(+1)	-4.4	(-0.5)	-103.4	(-2.8)	7.1	(+0.6)	32.4	(+0.7)	9.4	(+0.5)	31.6	(+2.1)	-14.8	(-1.2)	-3
	Projected Demand	2.8	(-0.1)	14.6	(+6.6)	22.8	(+4)	-24.2	(-1.7)	-3.2	(+1)	-3.2	(-0.4)	-103.0	(-2.7)	2.0	(+0.2)	38.1	(+1.3)	13.2	(+0.8)	30.9	(+2.1)	-7.2	(-0.6)	-1

Notes: CalSim Node = 'C_AMR006'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.27. Long-term Average Monthly Stream Flows at Delta outflow for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (cfs).

Water Year Type	Modeling Scenario	Oct		Nov		Dec		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Annual Average
All	Baseline	788		4914		24017		43239		43019		33055		15143		5675		1280		640		378		218		14364
	+75 MGD	1.9	(0)	-52.2	(-0.5)	-6.8	(+0.3)	-85.4	(-0.4)	-94.3	(-0.4)	-29.6	(-0.1)	-56.0	(-0.1)	20.9	(+0.1)	7.5	(+0.1)	-2.7	(0)	4.6	(+0.1)	-6.7	(-0.1)	-25
	+150 MGD	-11.5	(-0.2)	-39.0	(-0.3)	-45.9	(+0)	-86.2	(-0.3)	-96.1	(-0.5)	-138.9	(-0.4)	-82.3	(-0.2)	16.4	(+0)	8.7	(+0.1)	0.2	(0)	3.9	(+0.1)	-13.0	(-0.3)	-40
	Projected Demand	-8.1	(-0.2)	-41.0	(-0.4)	-56.5	(-0.2)	-62.6	(-0.2)	-81.7	(-0.5)	-115.0	(-0.3)	-83.6	(-0.2)	16.9	(+0.1)	8.7	(+0.1)	-0.3	(0)	4.3	(+0.1)	-9.7	(-0.2)	-36
Wet	Baseline	8115		14678		56549		98293		104553		90430		53461		27787		12837		9360		6183		12335		41215
	+75 MGD	-1.1	(-0.1)	-64.8	(-0.4)	21.0	(+0.5)	-33.5	(0)	-54.0	(-0.1)	53.6	(+0.1)	-251.9	(-0.9)	33.9	(+0.2)	1.2	(+0)	-7.3	(-0.1)	5.1	(+0.1)	-4.8	(0)	-25
	+150 MGD	-21.7	(-0.4)	-102.7	(-0.5)	-32.0	(+0.4)	-97.4	(-0.1)	10.5	(0)	-186.6	(-0.3)	-321.1	(-1.2)	41.1	(+0.2)	-4.7	(0)	1.4	(0)	1.0	(+0)	1.5	(+0)	-59
	Projected Demand	-12.6	(-0.3)	-88.0	(-0.4)	-20.7	(+0.4)	-74.5	(-0.1)	3.3	(0)	-180.5	(-0.3)	-326.4	(-1.2)	39.6	(+0.2)	-3.2	(0)	-1.1	(0)	2.4	(+0)	0.0	(0)	-55
Above Normal	Baseline	8457		6565		23899		50480		74549		59322		25446		19935		11353		8515		6769		12587		25656
	+75 MGD	13.7	(+0.1)	-68.4	(-0.8)	-62.5	(-0.1)	-335.7	(-0.9)	6.7	(-0.1)	5.3	(+0)	39.1	(+0.2)	-66.0	(-0.4)	23.2	(+0.2)	-4.0	(0)	0.0	(0)	0.0	(0)	-37
	+150 MGD	-11.4	(-0.2)	-107.9	(-1.2)	-36.0	(-0.2)	-118.5	(-0.2)	-82.3	(-0.1)	-1.5	(+0)	45.3	(+0.2)	-127.3	(-0.8)	41.6	(+0.4)	-0.4	(0)	7.8	(+0.1)	-17.4	(-0.1)	-34
	Projected Demand	-7.9	(-0.1)	-81.5	(-0.9)	-78.1	(-0.2)	-81.9	(-0.1)	-78.6	(-0.1)	7.0	(+0)	44.3	(+0.2)	-100.9	(-0.7)	33.6	(+0.3)	-0.5	(0)	7.8	(+0.1)	-17.4	(-0.1)	-30
Below Normal	Baseline	6513		7095		13855		21396		34894		26485		20415		14351		7813		6655		4300		3499		13939
	+75 MGD	-4.3	(-0.1)	-13.8	(-0.1)	-41.1	(-0.2)	-49.8	(-0.2)	-64.8	(-0.2)	-136.7	(-0.4)	110.4	(+0.8)	-25.2	(-0.2)	10.9	(+0.1)	3.5	(+0.1)	8.7	(+0.2)	-19.0	(-0.5)	-18
	+150 MGD	-9.2	(-0.2)	38.5	(+0.2)	-85.1	(-0.1)	-79.1	(-0.3)	-75.7	(-0.2)	-192.1	(-0.7)	95.4	(+0.7)	-13.7	(-0.1)	6.0	(+0.1)	7.2	(+0.1)	10.3	(+0.3)	-43.2	(-1.1)	-28
	Projected Demand	-8.3	(-0.2)	43.2	(+0.2)	-115.3	(-0.7)	-51.3	(-0.2)	-48.0	(-0.2)	-126.1	(-0.5)	91.9	(+0.7)	-24.8	(-0.2)	11.5	(+0.1)	5.7	(+0.1)	9.3	(+0.2)	-29.9	(-0.8)	-20
Dry	Baseline	6023		5650		8624		15165		24230		23445		14540		10826		7424		5466		4527		3001		10743
	+75 MGD	-3.3	(-0.1)	-25.7	(-0.4)	-57.4	(-0.7)	-19.3	(0)	-31.6	(-0.1)	-58.2	(-0.2)	-4.5	(0)	172.0	(+1.5)	-0.1	(0)	-2.2	(0)	-8.5	(-0.3)	1.8	(+0.1)	-3
	+150 MGD	-6.2	(-0.1)	-39.0	(-0.6)	-88.3	(-1.1)	-90.5	(-0.8)	-7.1	(0)	-102.2	(-0.4)	12.9	(+0.1)	170.4	(+1.5)	1.7	(+0)	-10.3	(-0.2)	-2.9	(-0.1)	0.6	(+0)	-13
	Projected Demand	-4.9	(-0.1)	-35.5	(-0.6)	-84.8	(-1.1)	-78.1	(-0.7)	20.0	(+0)	-91.7	(-0.4)	17.4	(+0.1)	168.9	(+1.5)	1.5	(+0)	-6.5	(-0.1)	-4.3	(-0.2)	1.7	(+0.1)	-8
Critical	Baseline	4897		5573		8955		10235		14839		13479		10603		6721		6296		4006		3624		3000		7686
	+75 MGD	20.8	(+0.4)	-119.9	(-1.8)	92.0	(+2.5)	-194.3	(-1.7)	-417.9	(-2.4)	-19.1	(-0.1)	-9.5	(-0.1)	-26.2	(-0.5)	14.2	(+0.3)	-3.2	(-0.1)	13.4	(+0.3)	0.0	(0)	-54
	+150 MGD	5.5	(+0.1)	20.2	(+0)	43.2	(+0.8)	-41.6	(-0.2)	-547.7	(-3.7)	-38.1	(-0.2)	-17.5	(-0.1)	-57.9	(-1.1)	34.8	(+0.8)	-5.2	(-0.1)	3.0	(+0.1)	0.0	(0)	-50
	Projected Demand	0.7	(0)	-70.0	(-1.1)	21.3	(+0.5)	-21.8	(-0.1)	-509.3	(-3.3)	-29.2	(-0.2)	-9.8	(-0.1)	-44.2	(-0.8)	25.3	(+0.5)	-4.0	(-0.1)	5.9	(+0.1)	0.0	(0)	-53

Notes: CalSim Node = 'NDOI'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Table A.28. Long-term Average X2 Position for Future Condition Proposed Project Modeling Scenarios Compared to Future Baseline Conditions by Month and Water Year type (km).

Water Year Type	Modeling Scenario	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual Average
All	Baseline	87	87	87	79	71	65	65	68	73	79	84	87	78
	+75 MGD	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	0.0 (+0)	0.0 (+0.1)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0
	+150 MGD	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	0.1 (+0.1)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0
	Projected Demand	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0
Wet	Baseline	86	85	83	68	59	57	58	61	66	74	80	84	72
	+75 MGD	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.0 (0)	0.0 (+0)	0.0 (+0)	0.0 (0)	0.1 (+0.2)	0.1 (+0.1)	0.0 (0)	0.0 (+0)	0.0 (+0)	0
	+150 MGD	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.0 (0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.1 (+0.2)	0.1 (+0.1)	0.0 (0)	0.0 (0)	0.0 (0)	0
	Projected Demand	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.0 (0)	0.0 (0)	0.0 (+0)	0.0 (+0)	0.1 (+0.2)	0.1 (+0.1)	0.0 (0)	0.0 (+0)	0.0 (0)	0
Above Normal	Baseline	85	84	86	76	64	60	60	65	71	77	82	85	75
	+75 MGD	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.0 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (+0.1)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (0)	0
	+150 MGD	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.0 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (0)	0
	Projected Demand	0.0 (+0)	0.0 (+0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	0
Below Normal	Baseline	86	87	88	84	75	67	67	70	74	81	86	89	79
	+75 MGD	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0)	0.0 (+0.1)	0.0 (+0)	0.0 (+0)	-0.1 (-0.1)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0
	+150 MGD	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (+0)	0.1 (+0.1)	0.0 (+0)	0.1 (+0.1)	0.0 (-0.1)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0
	Projected Demand	0.0 (+0)	0.0 (+0)	0.0 (0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0.1)	0.0 (+0.1)	-0.1 (-0.1)	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0
Dry	Baseline	87	88	90	88	81	71	68	73	78	83	87	90	82
	+75 MGD	0.0 (0)	0.0 (0)	0.0 (+0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (+0)	-0.2 (-0.2)	-0.1 (-0.1)	0.0 (0)	0.0 (0)	0
	+150 MGD	0.0 (0)	0.0 (0)	0.0 (+0)	0.1 (+0.1)	0.1 (+0.2)	0.1 (+0.1)	0.0 (+0.1)	0.0 (+0)	-0.2 (-0.2)	-0.1 (-0.1)	0.0 (0)	0.0 (0)	0
	Projected Demand	0.0 (0)	0.0 (0)	0.0 (+0)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0.1)	0.0 (+0.1)	0.0 (+0)	-0.2 (-0.2)	-0.1 (-0.1)	0.0 (0)	0.0 (0)	0
Critical	Baseline	91	91	92	89	85	79	77	79	84	87	90	92	86
	+75 MGD	0.0 (0)	0.0 (0)	0.1 (+0.1)	0.0 (+0)	0.2 (+0.2)	0.5 (+0.7)	0.5 (+0.7)	0.1 (+0.1)	0.0 (+0)	0.0 (+0)	0.0 (0)	0.0 (0)	0
	+150 MGD	0.0 (0)	0.0 (+0)	0.0 (0)	0.0 (0)	0.0 (+0)	0.6 (+0.7)	0.5 (+0.8)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (+0)	0
	Projected Demand	0.0 (0)	0.0 (+0)	0.1 (+0.1)	0.0 (+0.1)	0.0 (+0)	0.5 (+0.7)	0.5 (+0.7)	0.1 (+0.1)	0.1 (+0.1)	0.0 (+0)	0.0 (0)	0.0 (+0)	0

Notes: CalSim Node = 'X2_PRV'

Magnitude of future conditions baseline results shown in blue in the uppermost set of results for each water year type.

Magnitude change followed by percent change from future conditions baseline in parentheses shown in subsequent rows for each water year type.

Exhibit B

Exceedance Plots by Water Year

This Exhibit presents exceedance probability plots of simulated model parameters stratified by water year types (e.g., wet, above normal, below normal, dry, and critically dry) for each model scenario. The exceedance probability plots show the percentage of time simulated parameters from each model scenario equal or exceed different values and illustrate the overall similarity or dissimilarity in simulated values between model scenarios. Where proposed project scenario values plot below Existing Baseline values, this indicates a reduction in the frequency that parameter value of the same magnitude will occur under proposed project conditions, and visa-versa when proposed project parameter values plot above Existing Baseline parameter values. In cases where plots diverge but then overlap again, this indicates that changes in parameter value frequency are for a limited range. The first set of plots presents results from the existing conditions simulations (Figure B.1 – B.18) followed by plots presenting results from the future conditions simulations (Figure B.19 – B.36).

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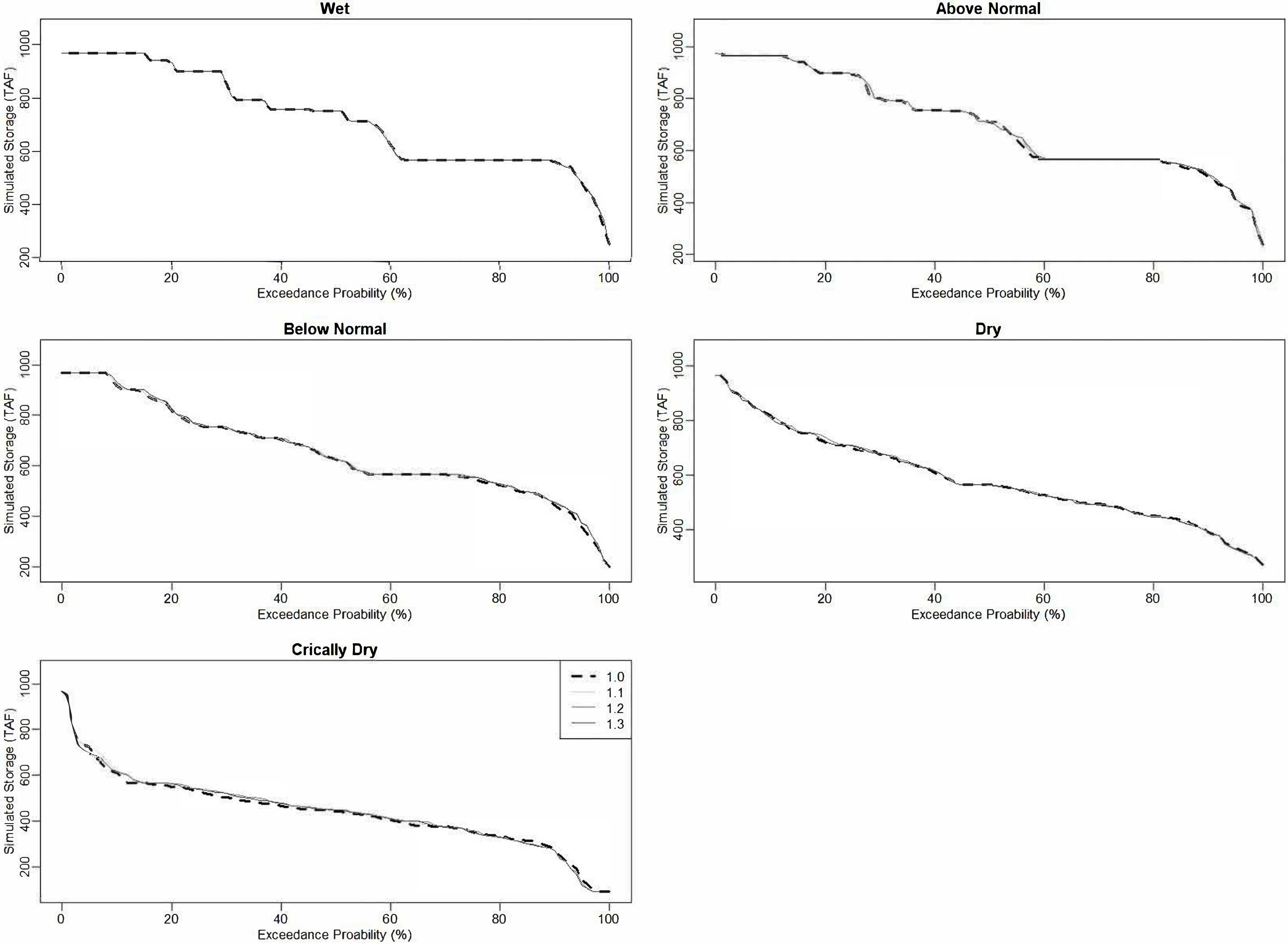
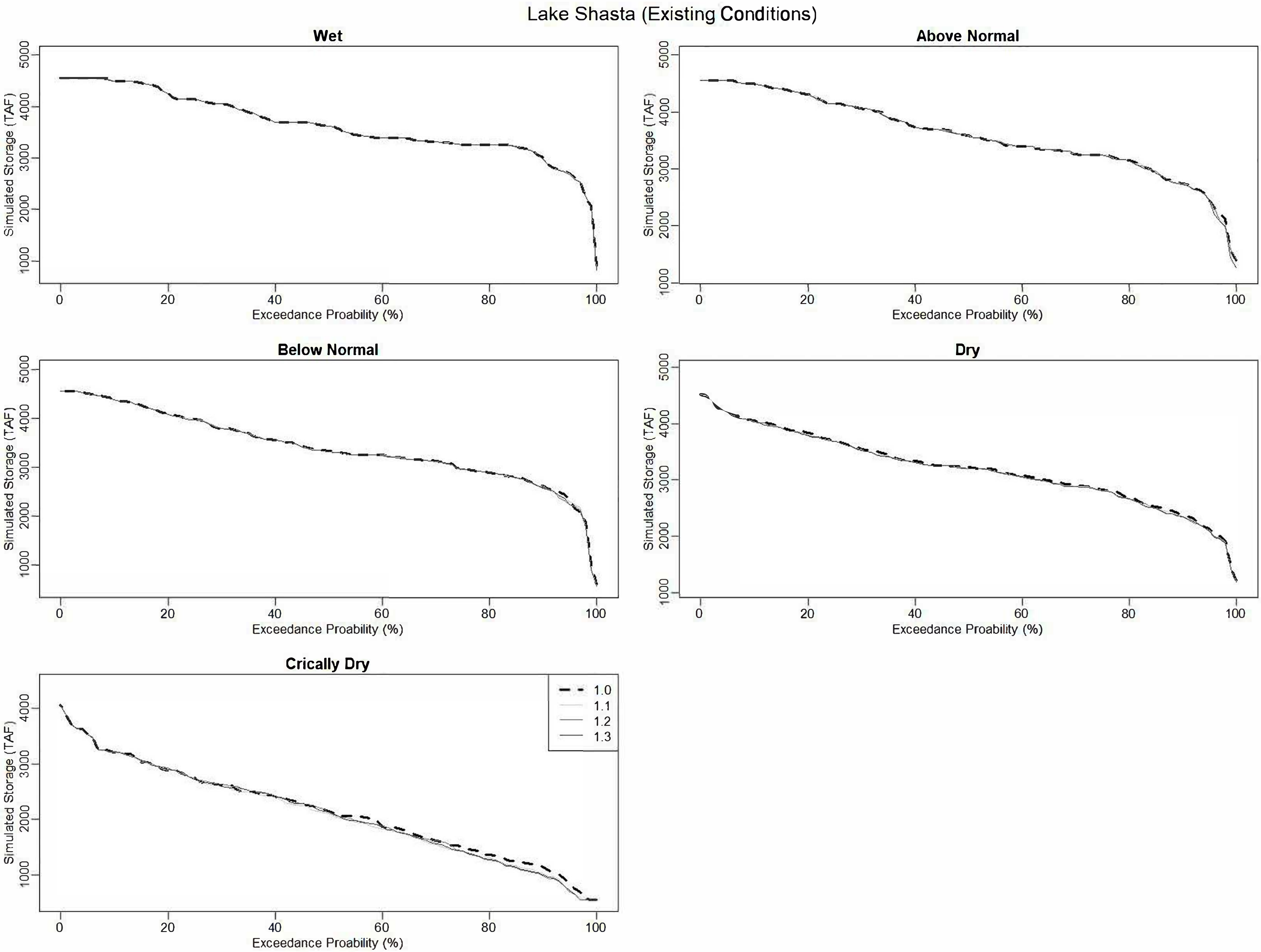
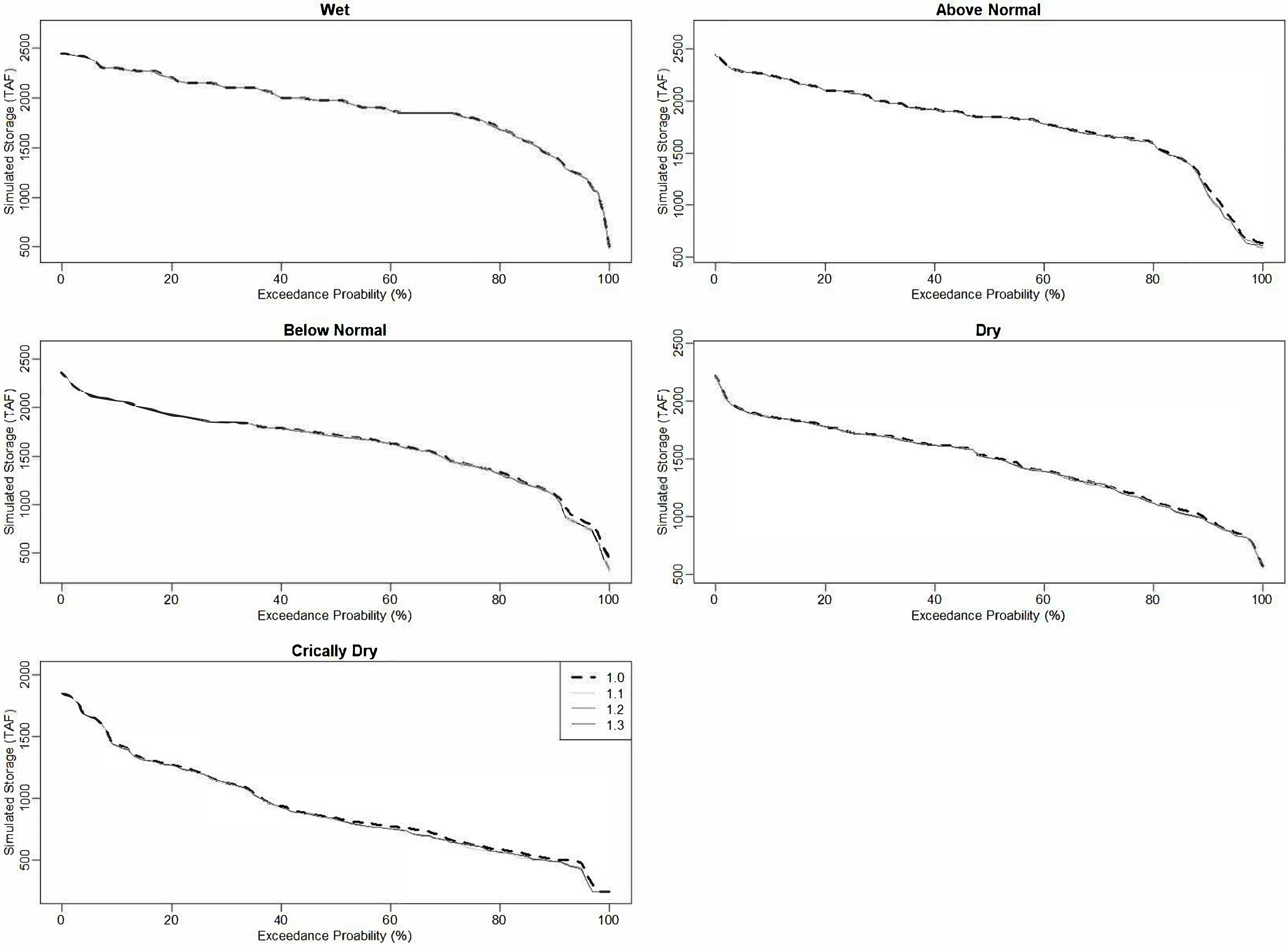
Folsom Reservoir (Existing Conditions)

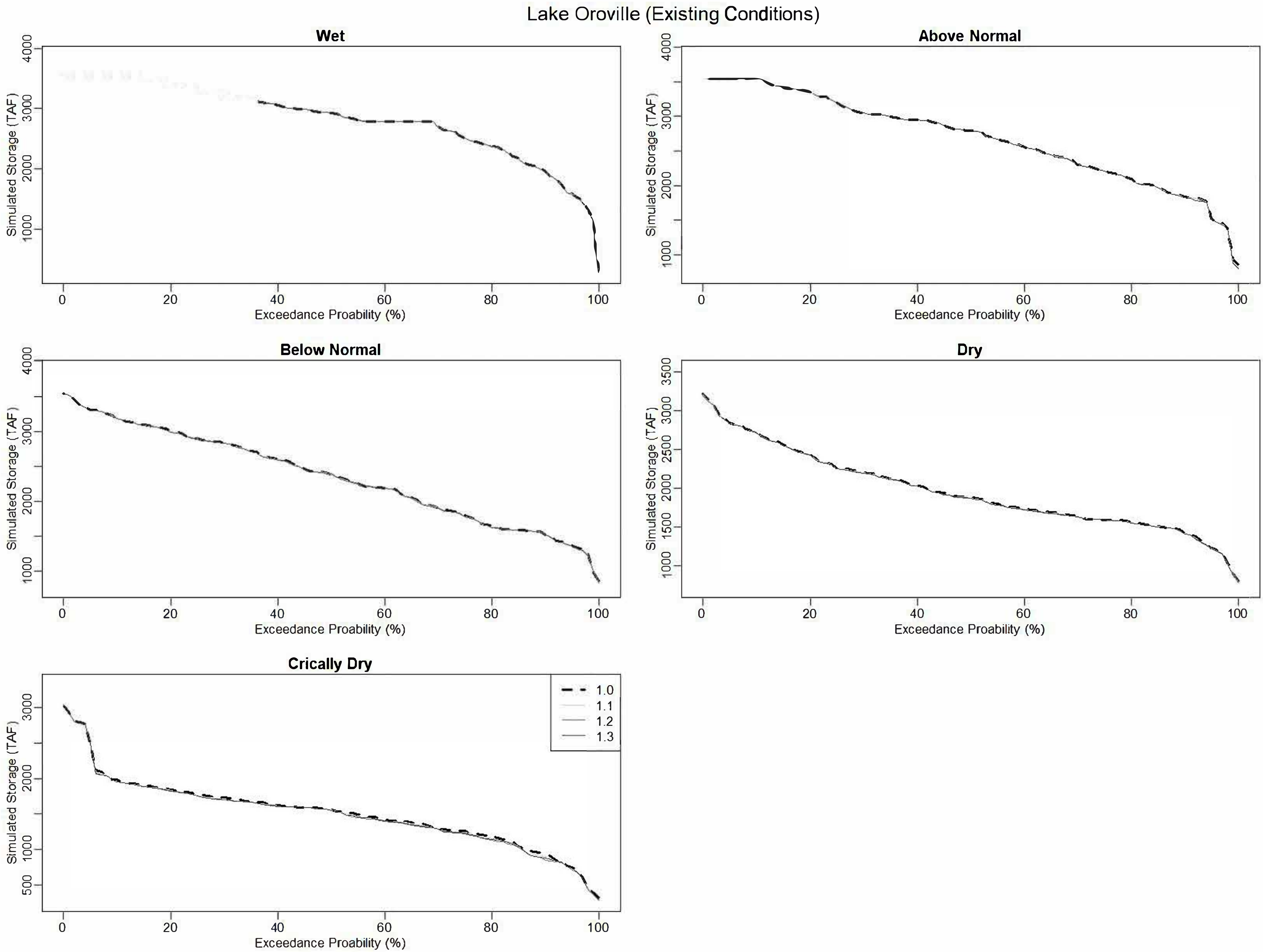




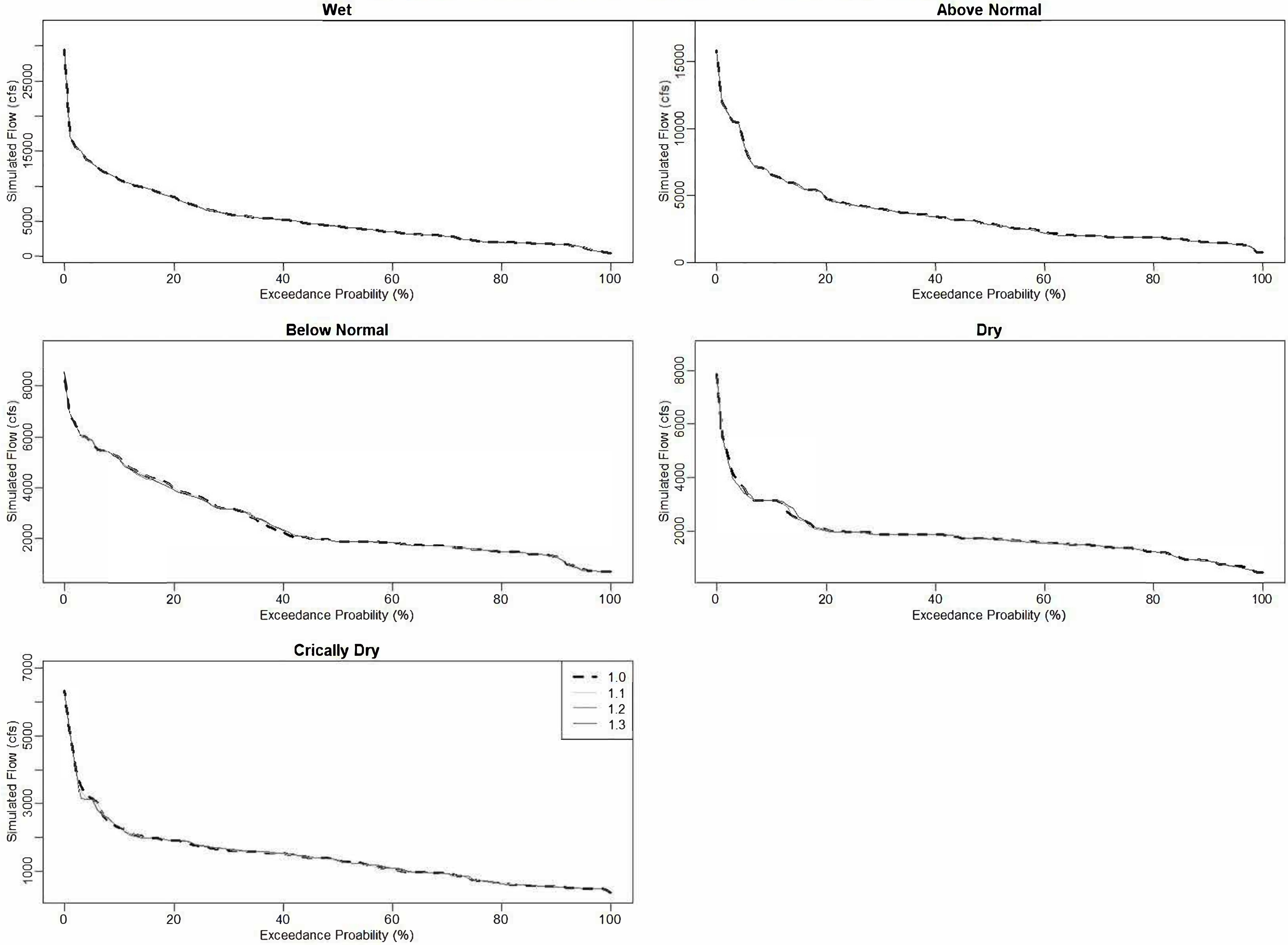
Lake Shasta (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Storage (TAF)
Exceedance Proability (%)
1000
2000
3000
4000
5000
0
20
40
60
80
100
1.0
1.1
1.2
1.3

Clair Engle Reservoir (Existing Conditions)

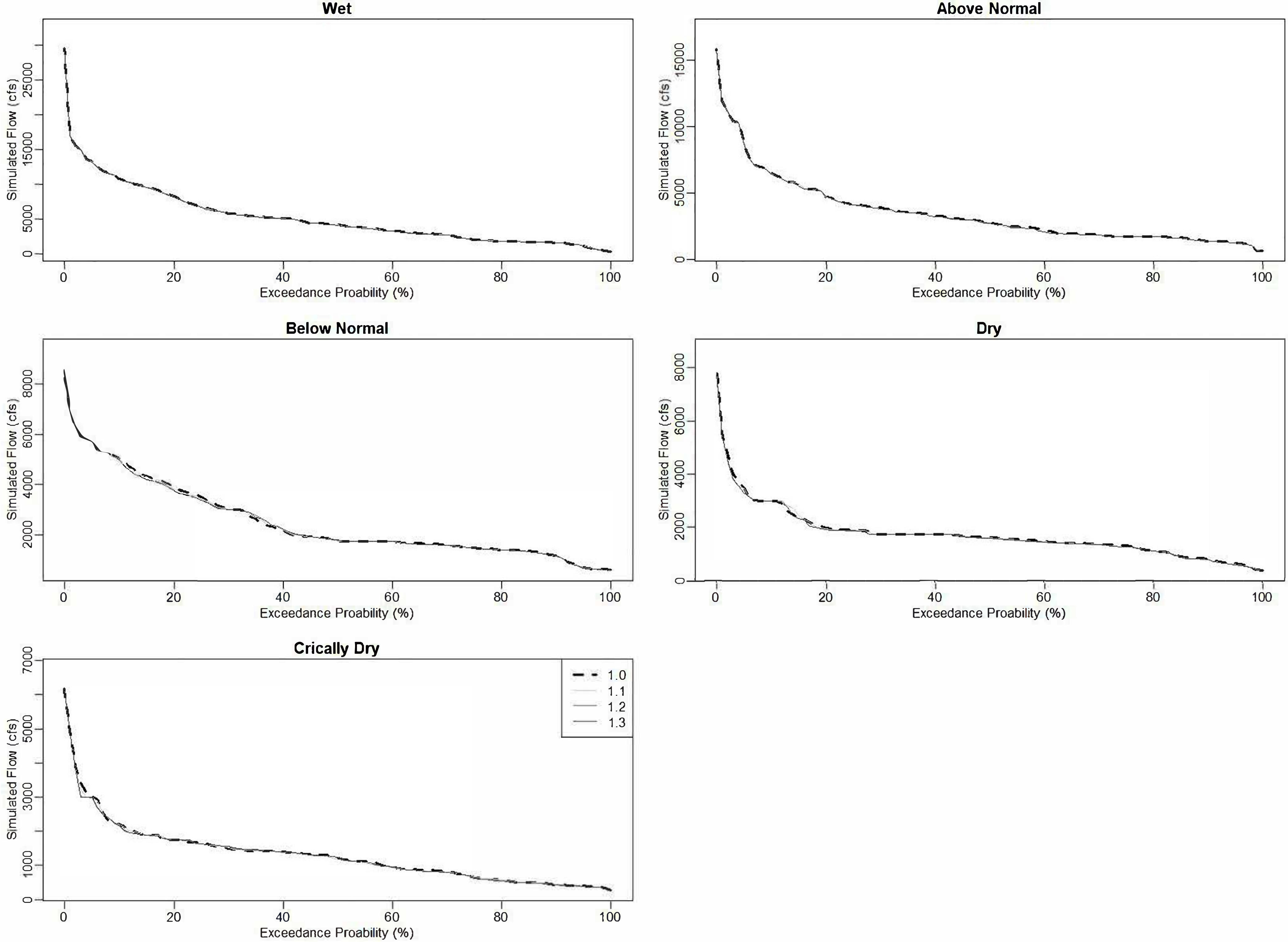


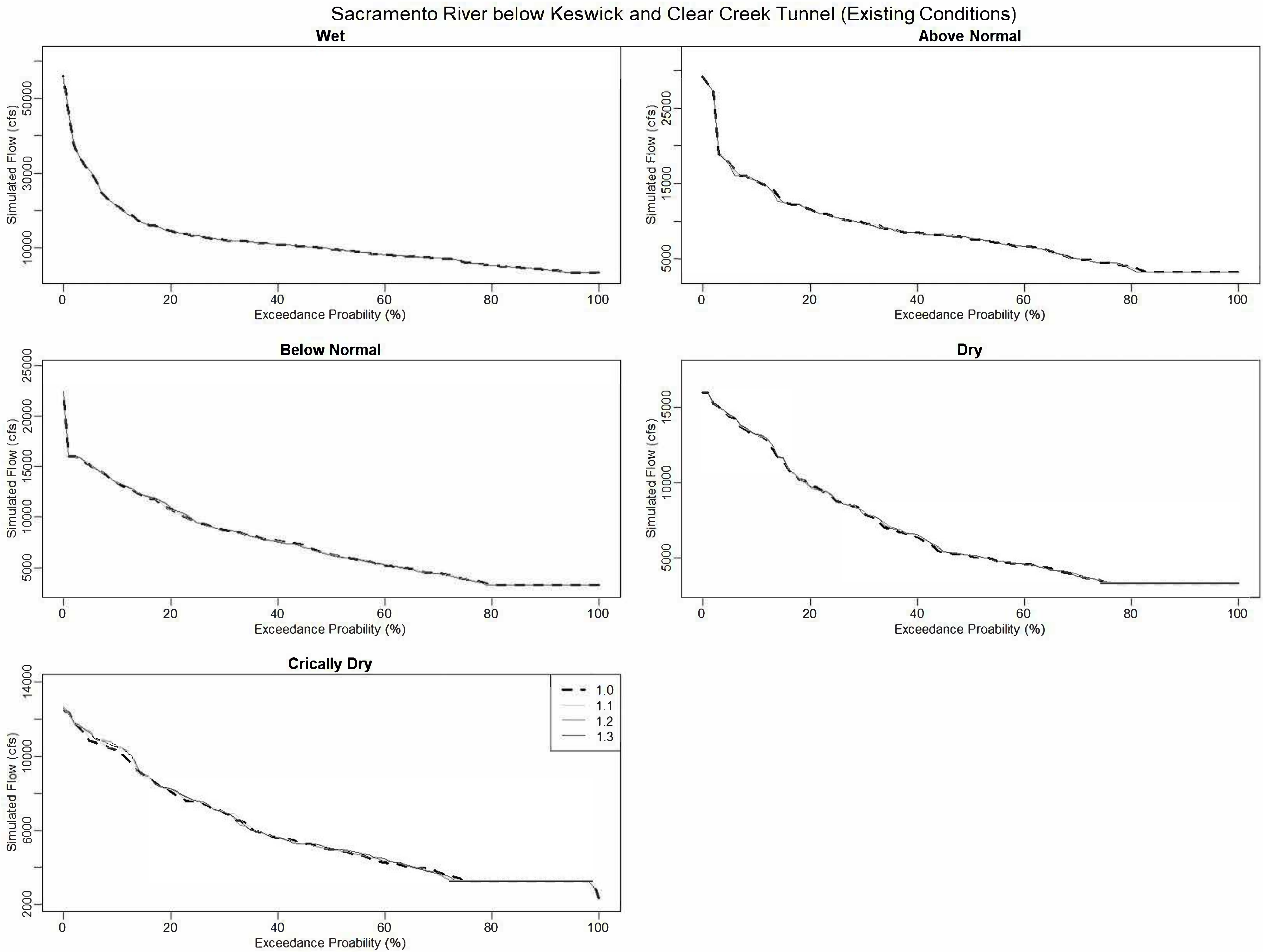

Lake Oroville (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Storage (TAF)
Exceedance Proability (%)
0
20
40
60
80
100
500
1000
1500
2000
2500
3000
3500
4000
1.0
1.1
1.2
1.3

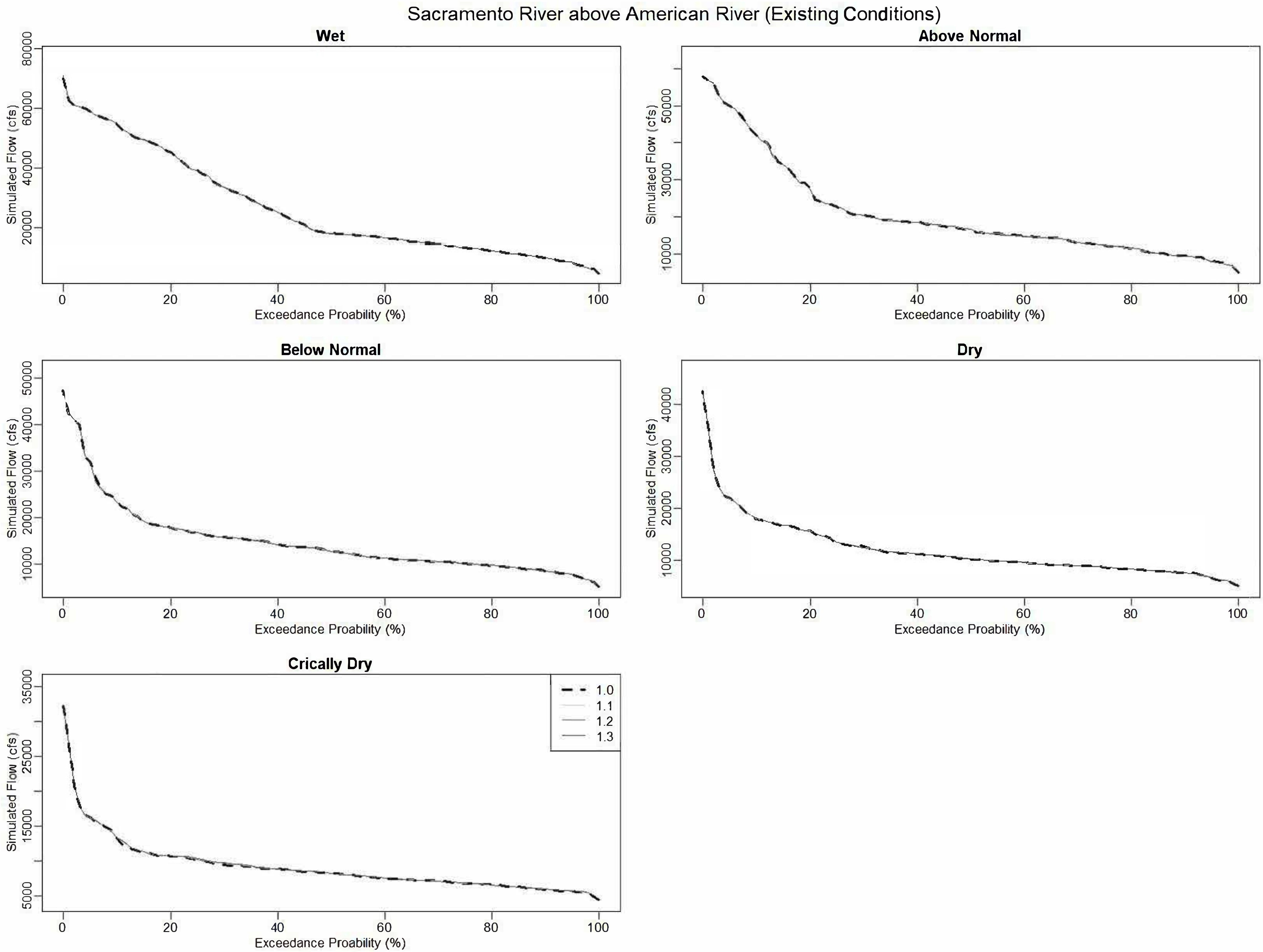
American River below Nimbus Dam (above FWTP Intake) (Existing Conditions)



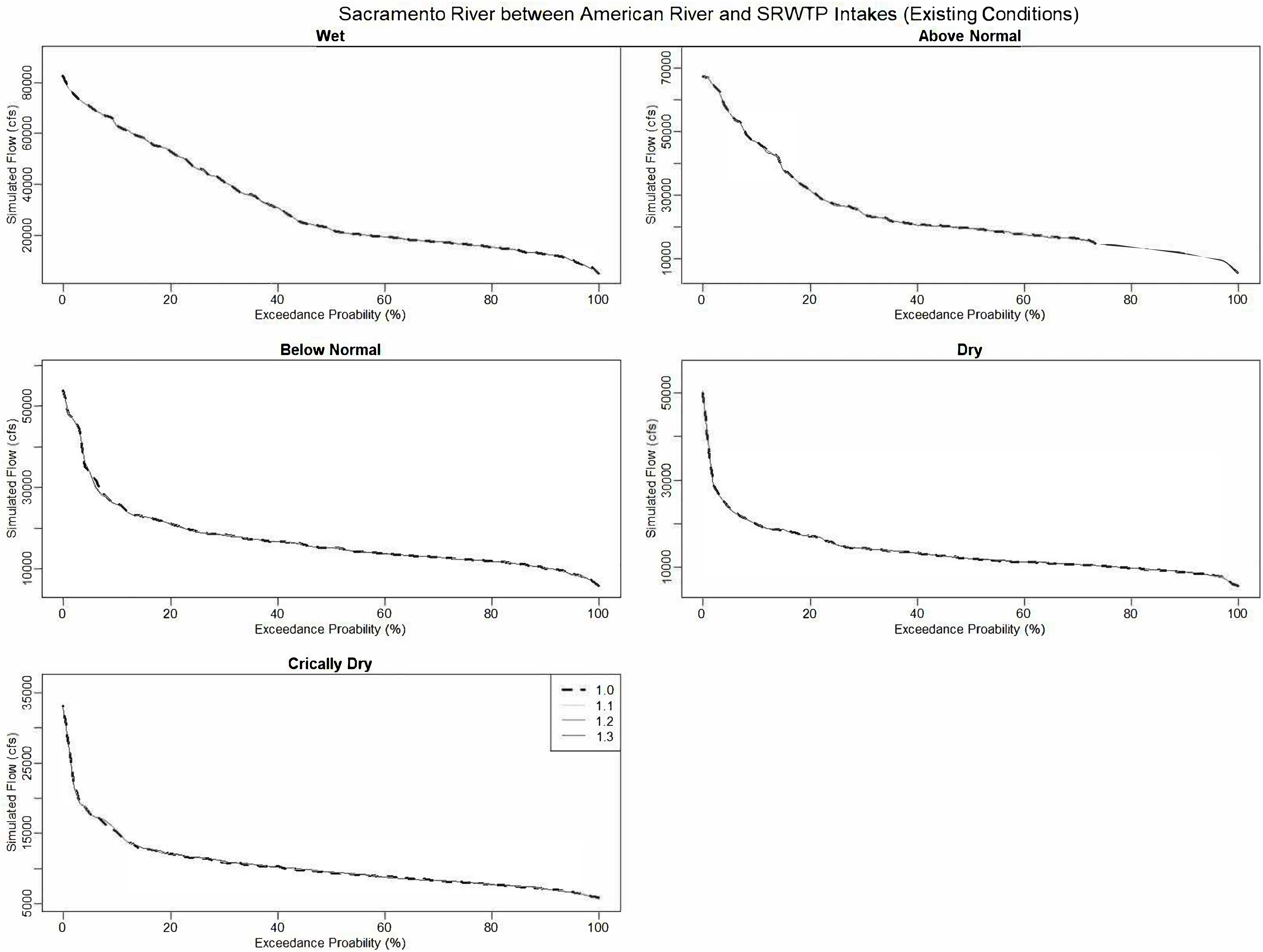
American River below FWTP Intake (Existing Conditions)

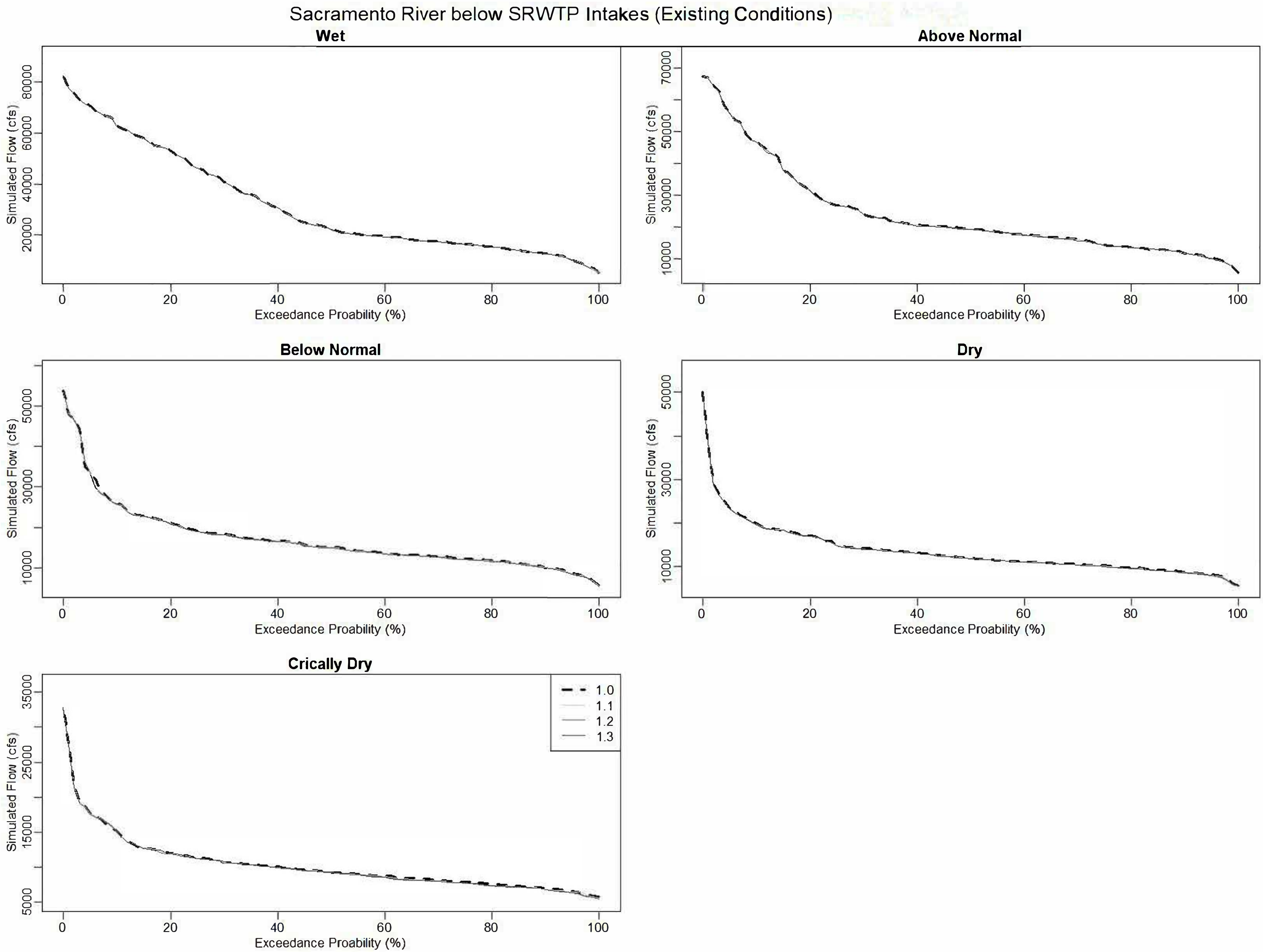



Sacramento River below Keswick and Clear Creek Tunnel (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
1.0
1.1
1.2
1.3

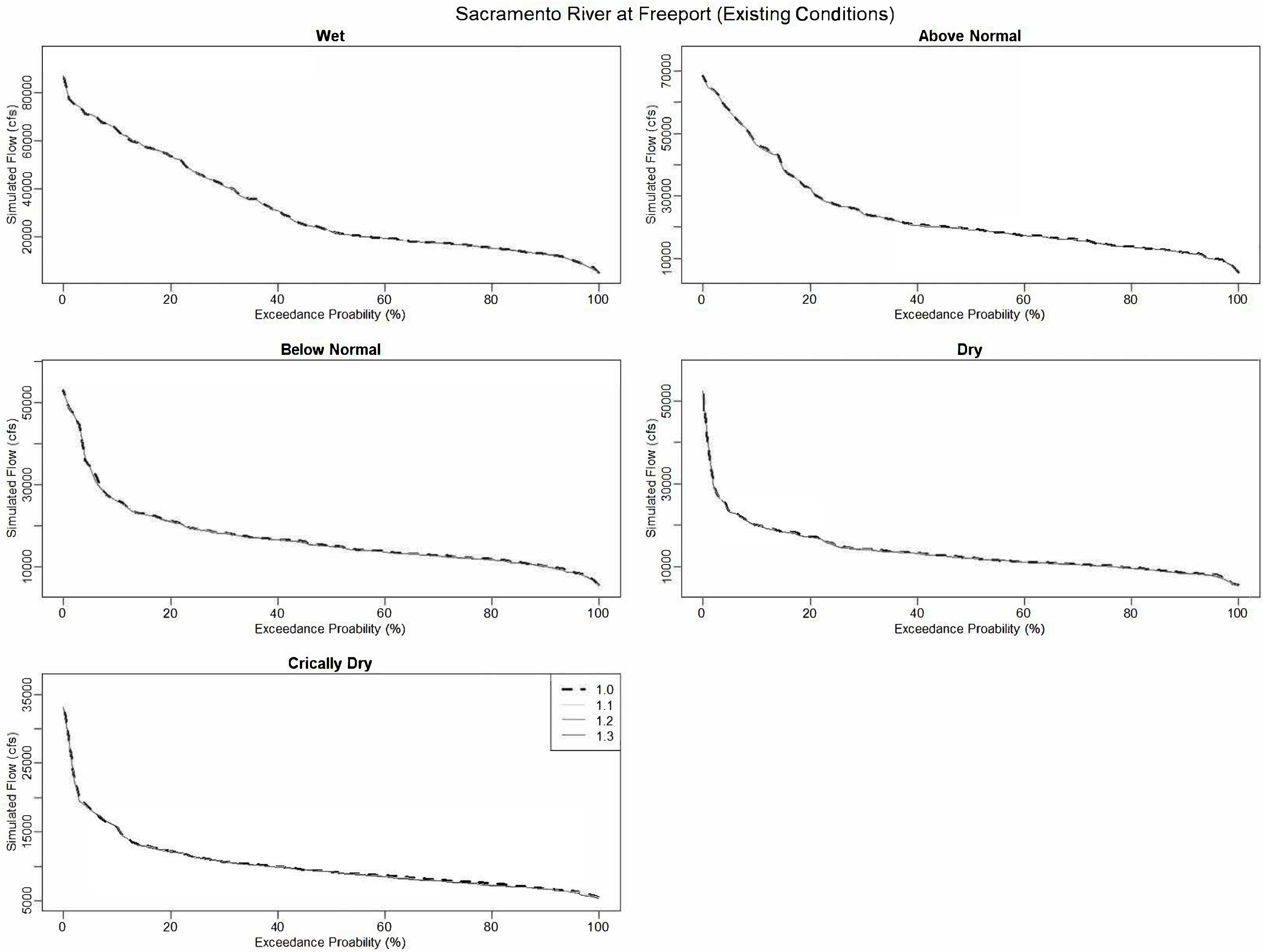


Sacramento River above American River (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Probability (%)
1.0
1.1
1.2
1.3

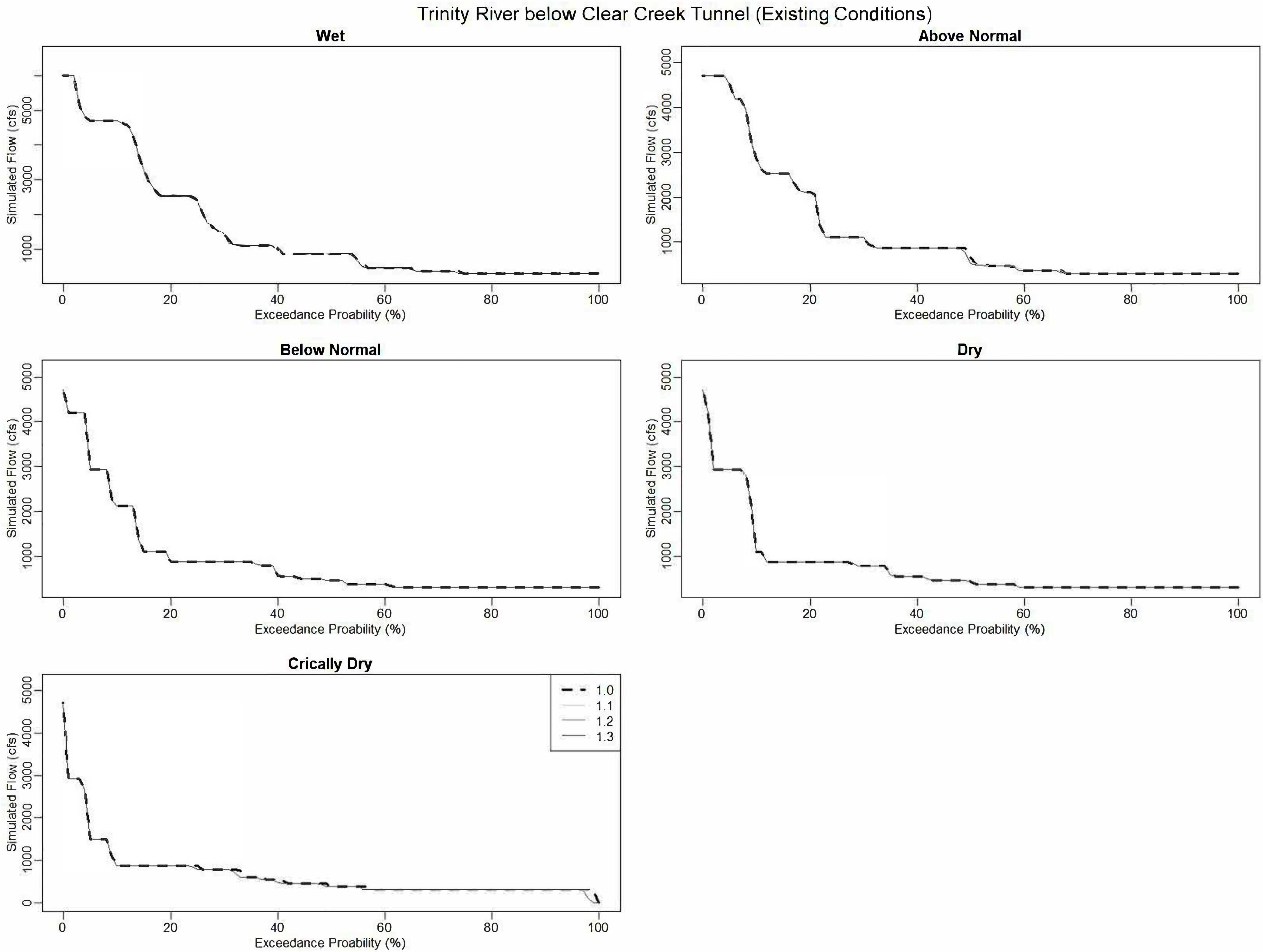

Sacramento River between American River and SRWTP Intakes (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
0
20
40
60
80
100
1.0
1.1
1.2
1.3



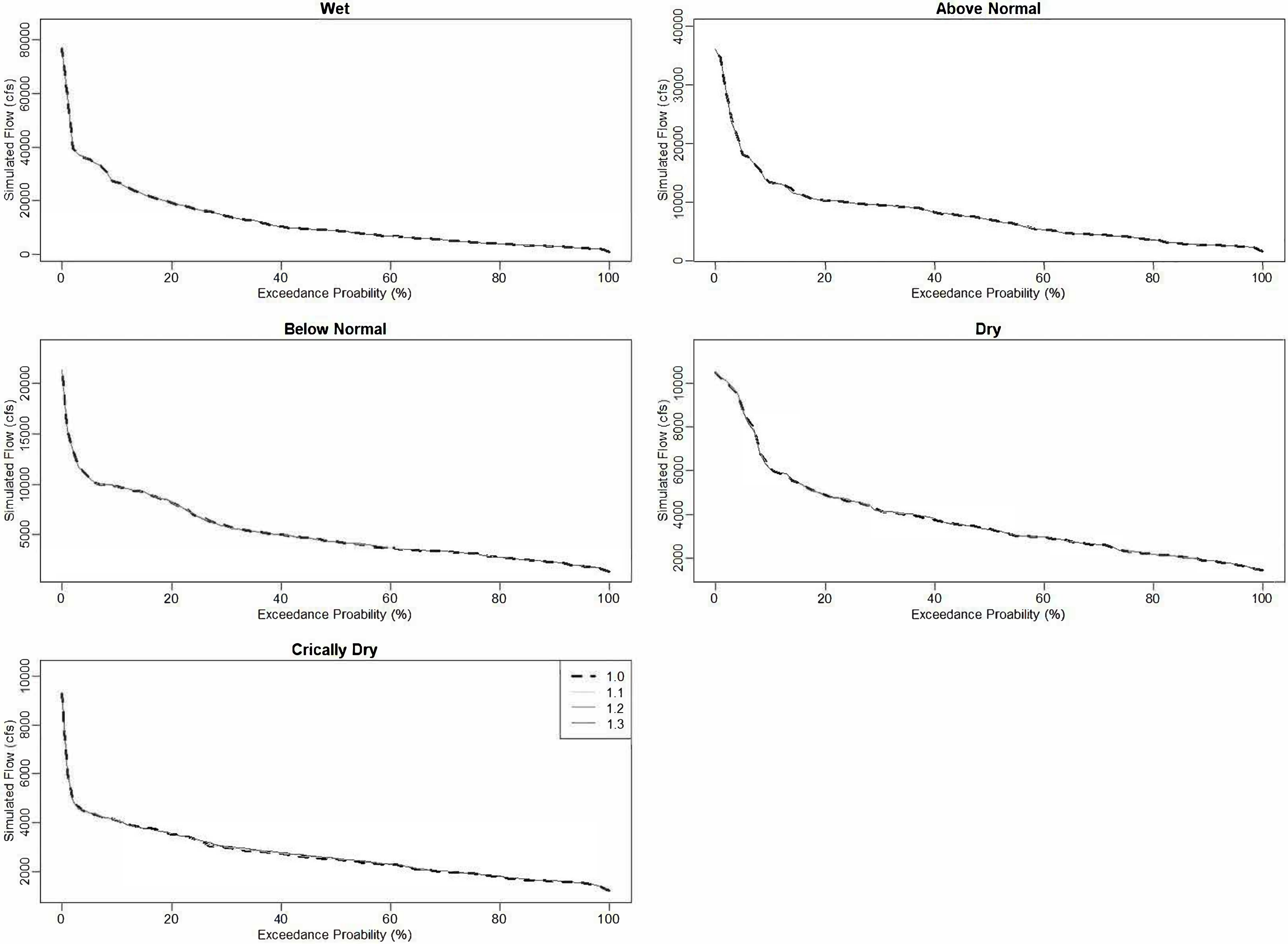
Sacramento River below SRWTP Intakes (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Cricaly Dry
Simulated Flow (cfs)
Exceedance Proability (%)
1.0
1.1
1.2
1.3

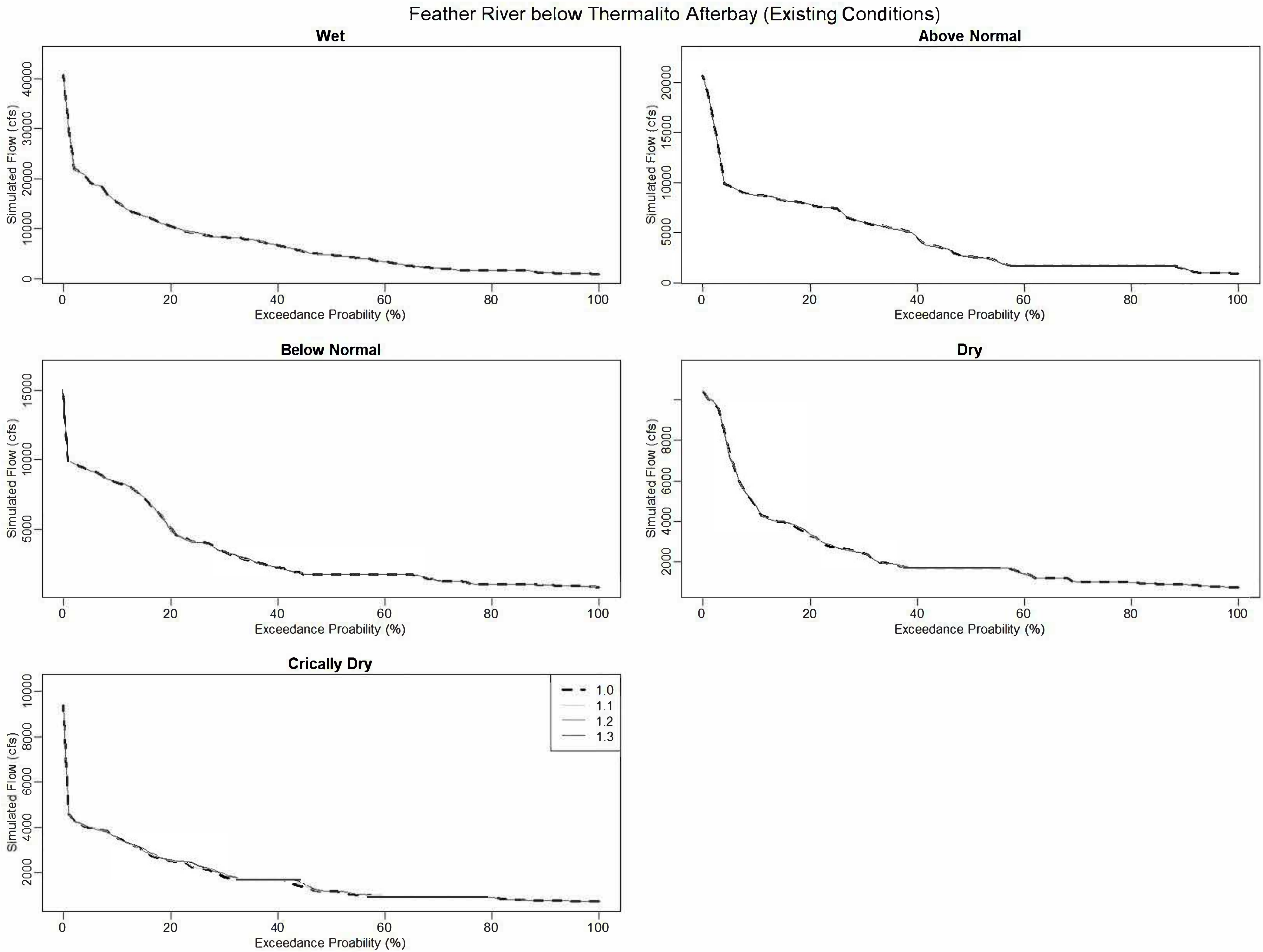


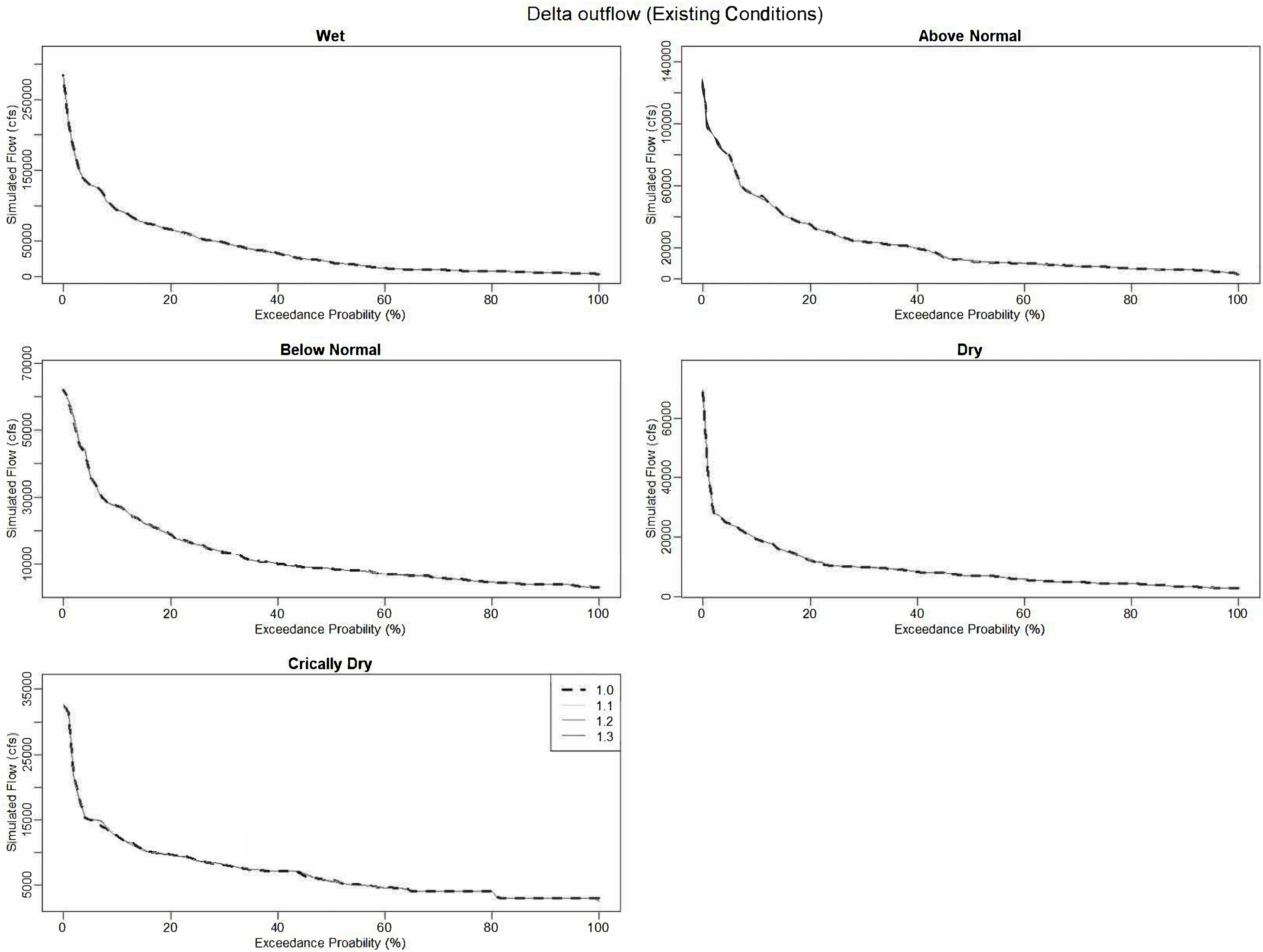
Sacramento River at Freeport (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
0
20
40
60
80
100
20000
40000
60000
80000
10000
30000
50000
70000
5000
15000
25000
35000
1.0
1.1
1.2
1.3


Trinity River below Clear Creek Tunnel (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Probability (%)
0
20
40
60
80
100
1000
2000
3000
4000
5000
1.0
1.1
1.2
1.3

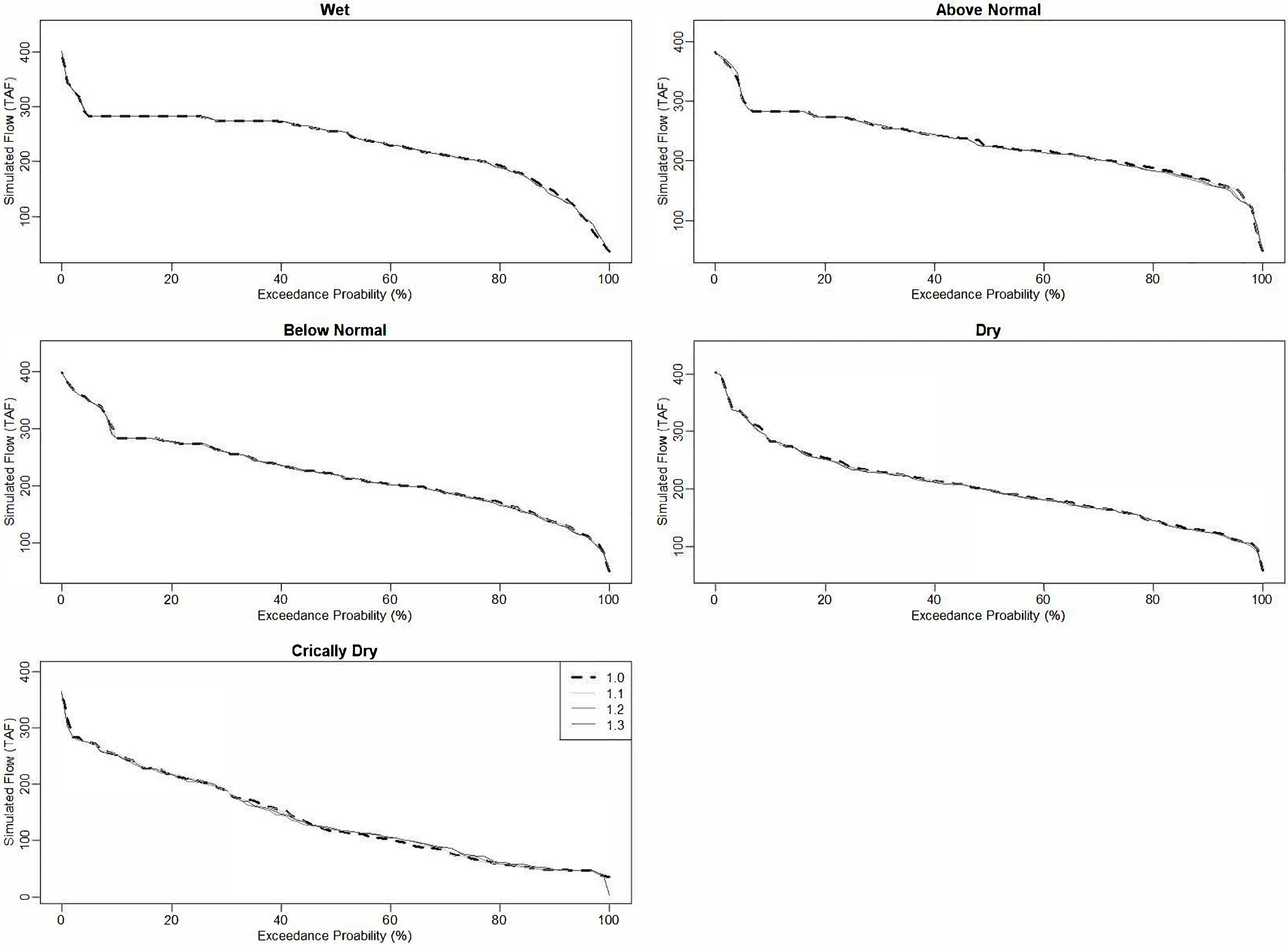
Feather River at Mouth (Existing Conditions)

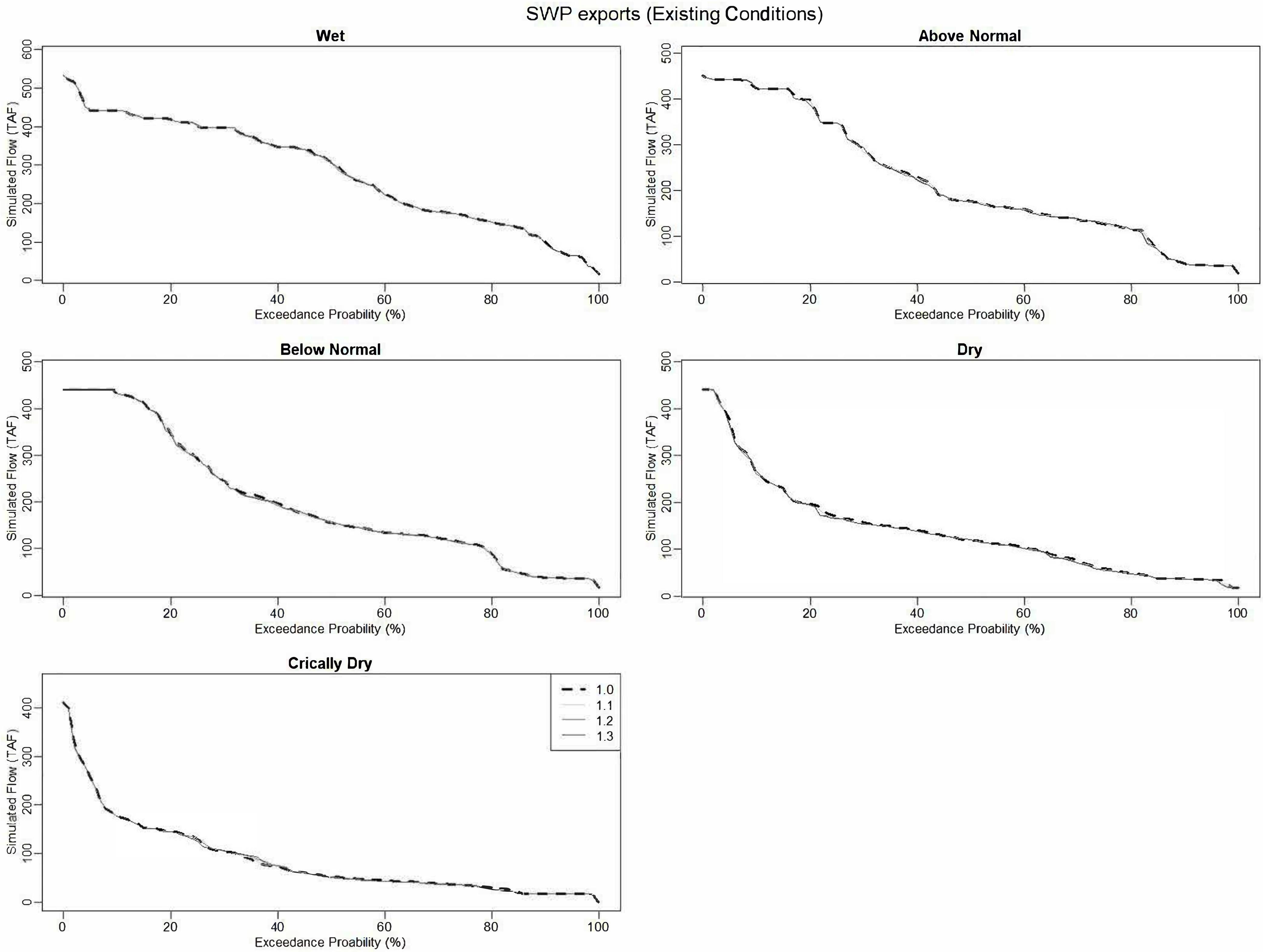


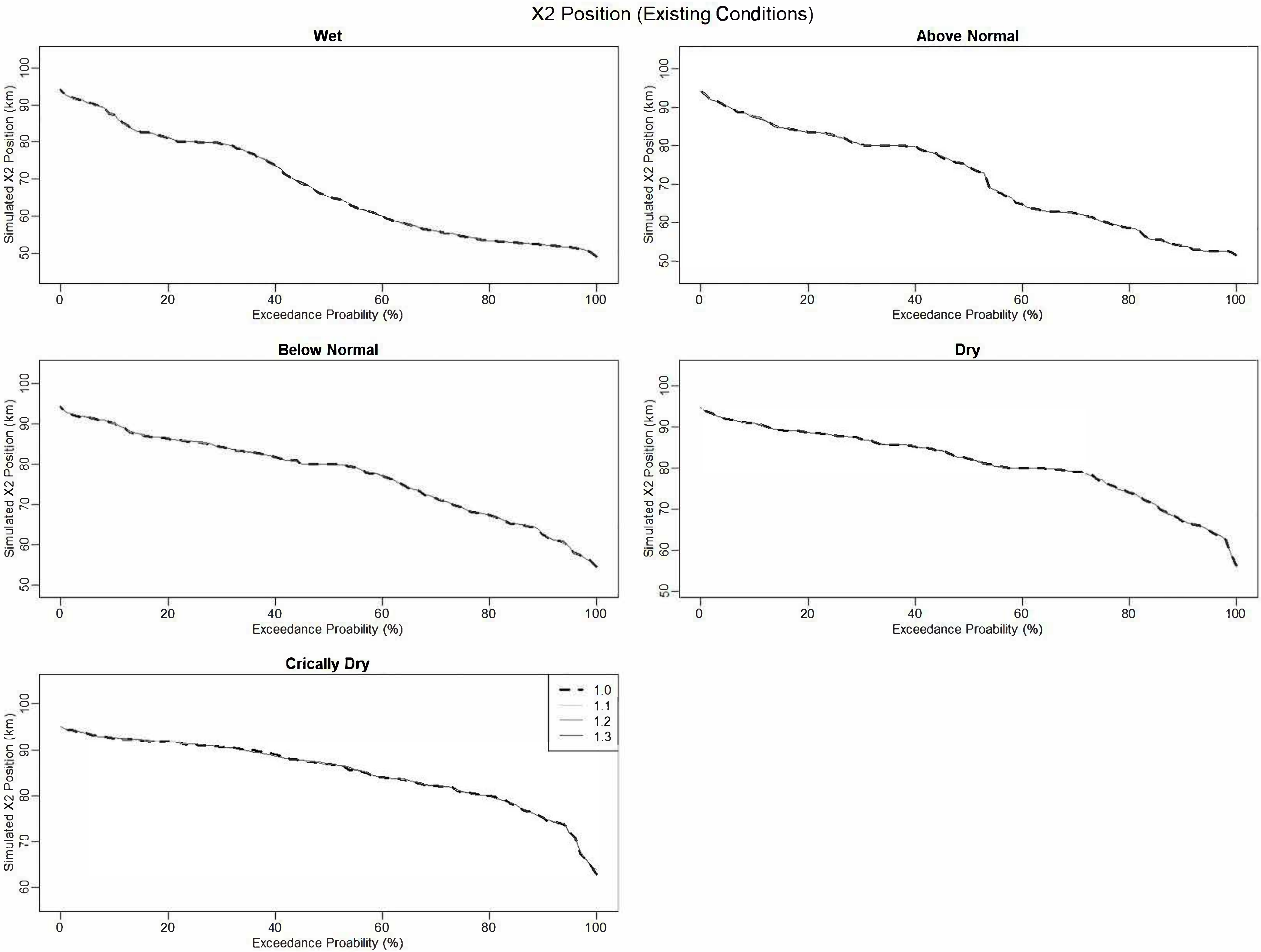

Feather River below Thermalito Afterbay (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
0
20
40
60
80
100
0
10000
20000
30000
40000
5000
15000
2000
4000
6000
8000
1.0
1.1
1.2
1.3

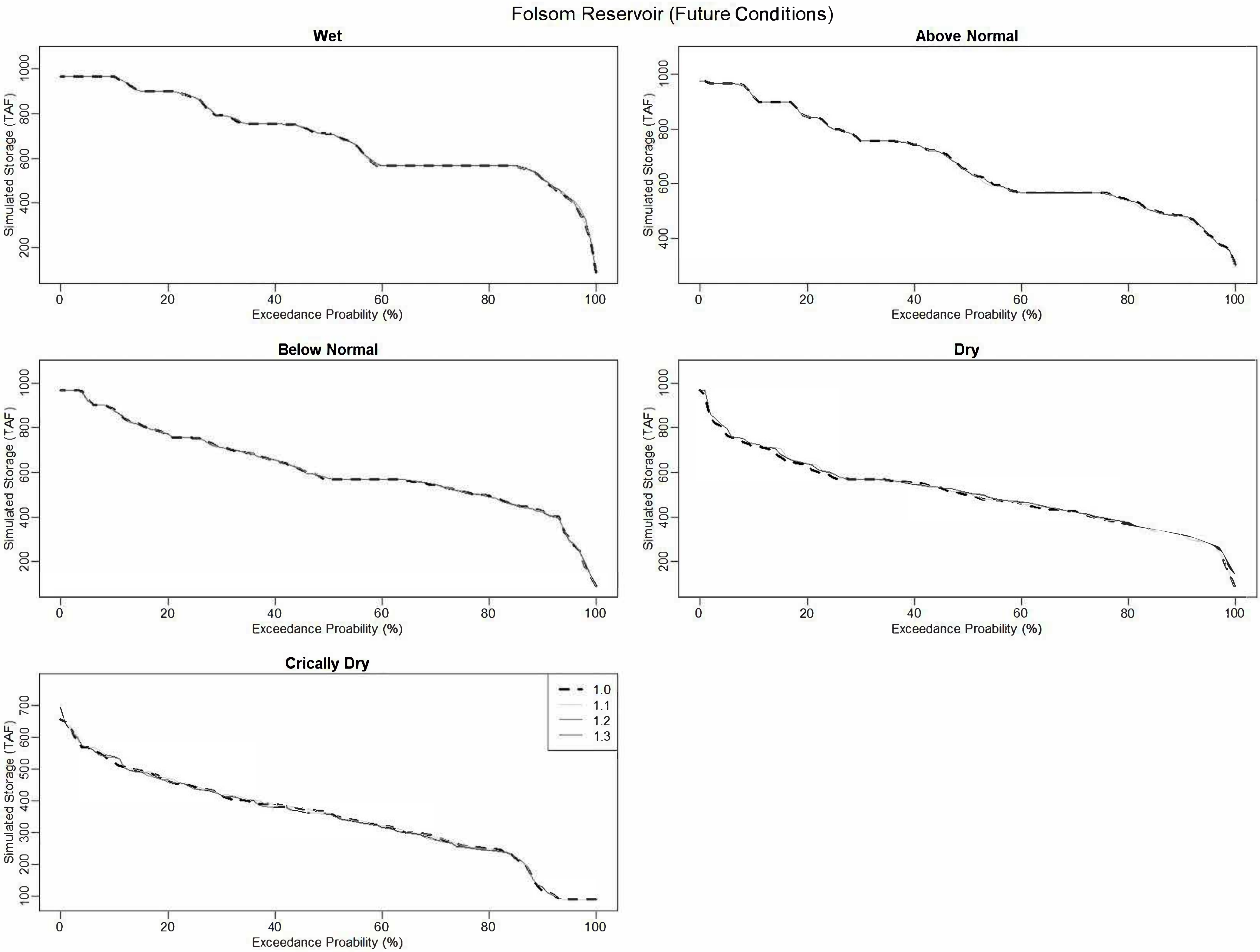

Delta outflow (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
0
20
40
60
80
100
0
50000
150000
250000
20000
60000
100000
140000
10000
30000
50000
70000
40000
5000
15000
25000
35000
1.0
1.1
1.2
1.3

CVP exports (Existing Conditions)

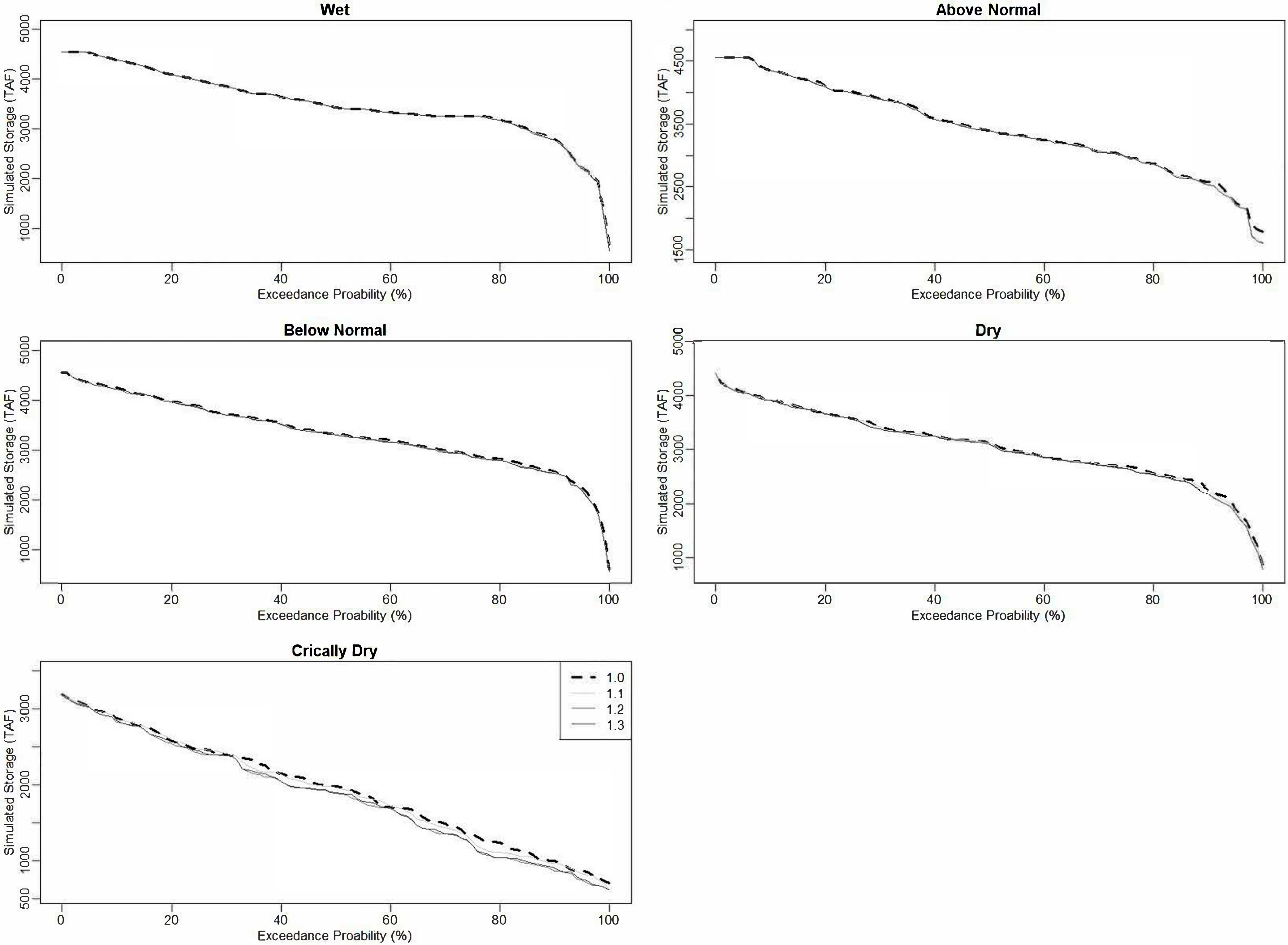



SWP exports (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (TAF)
Exceedance Proability (%)
0
20
40
60
80
100
100
200
300
400
500
600
1.0
1.1
1.2
1.3

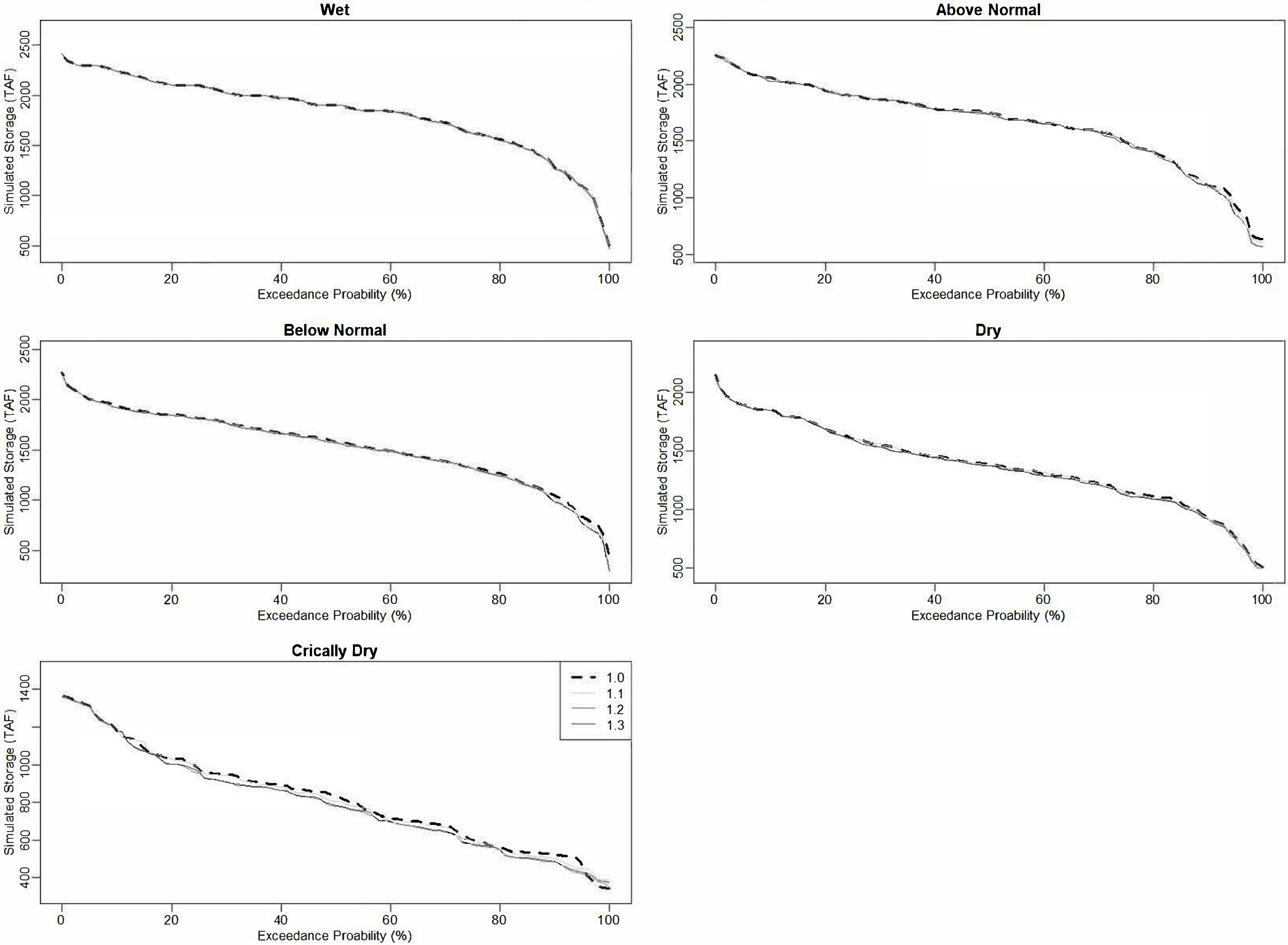

X2 Position (Existing Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated X2 Position (km)
Exceedance Proability (%)
0
20
40
60
80
100
50
60
70
80
90
100
1.0
1.1
1.2
1.3

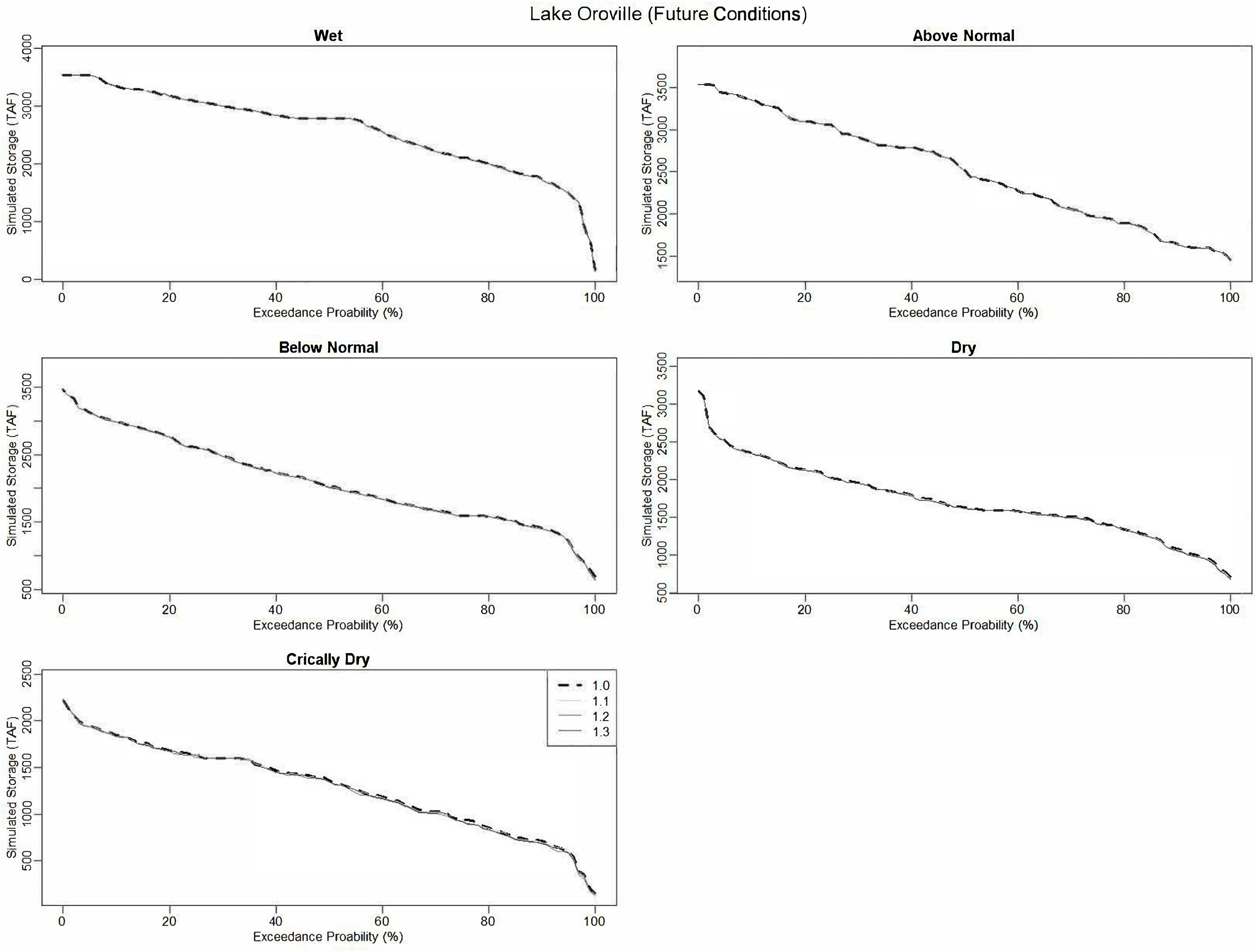

Folsom Reservoir (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Storage (TAF)
Exceedance Proability (%)
0
20
40
60
80
100
200
300
400
500
600
700
800
1000
1.0
1.1
1.2
1.3

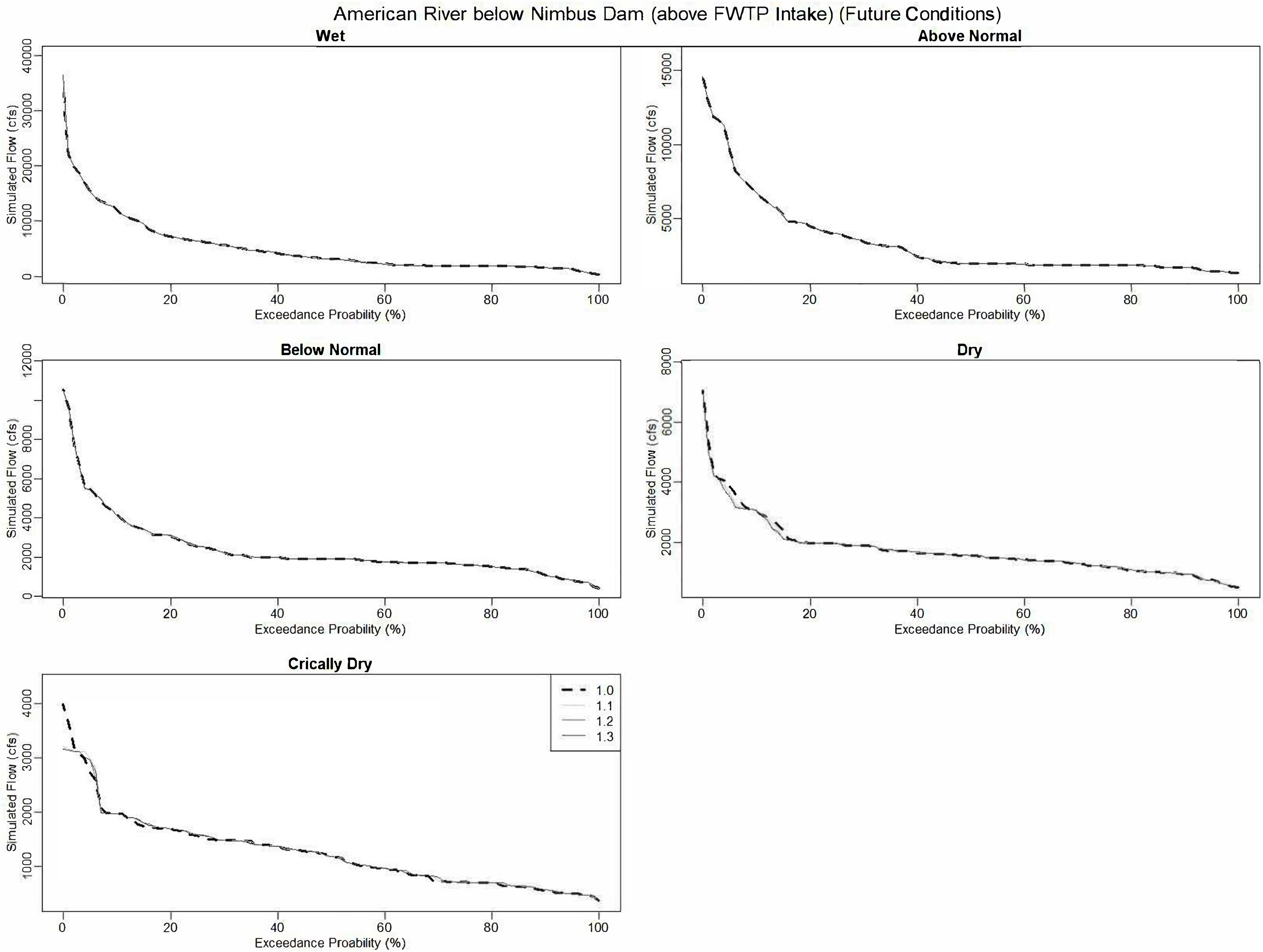
Lake Shasta (Future Conditions)

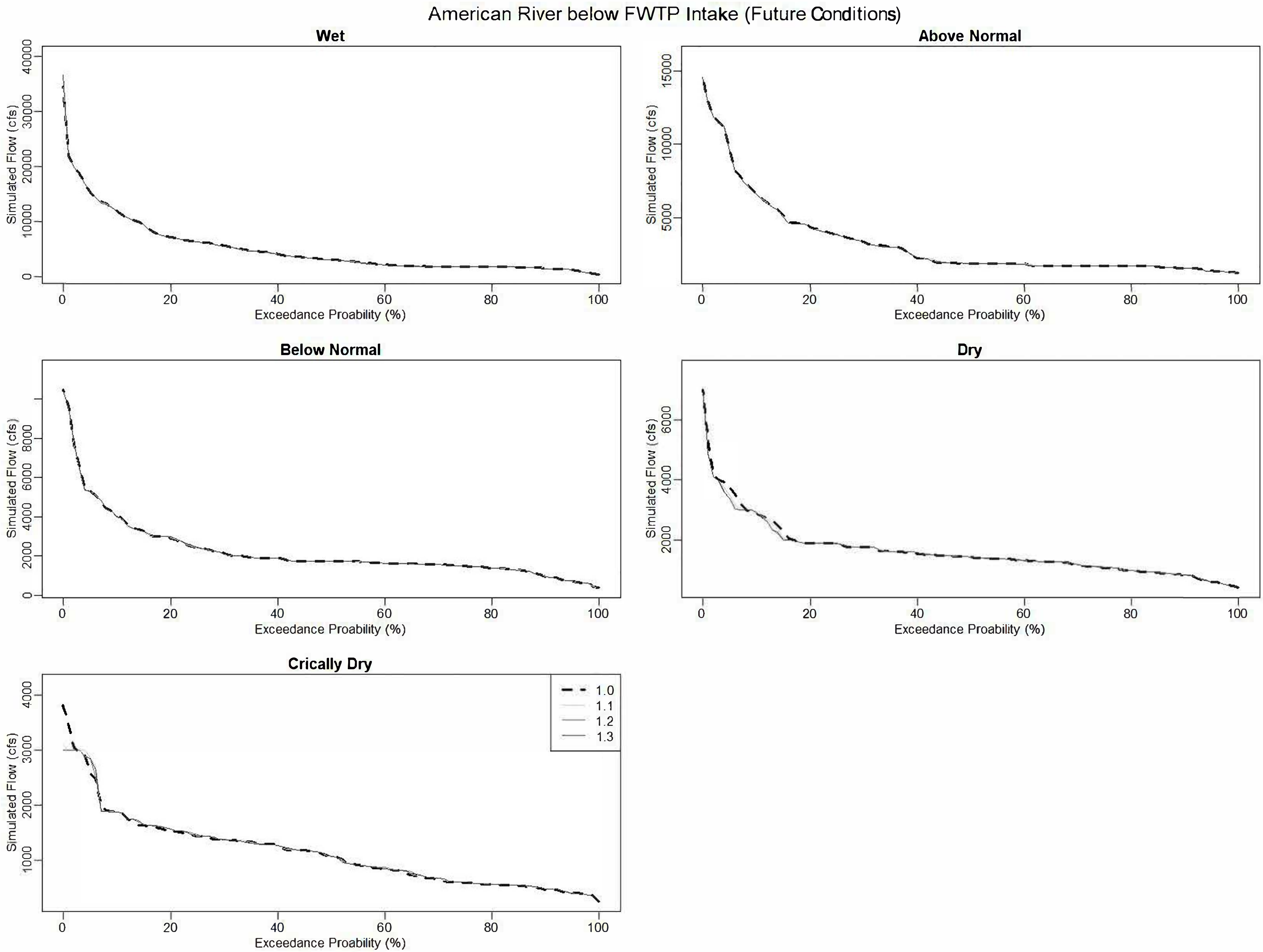


Clair Engle Reservoir (Future Conditions)



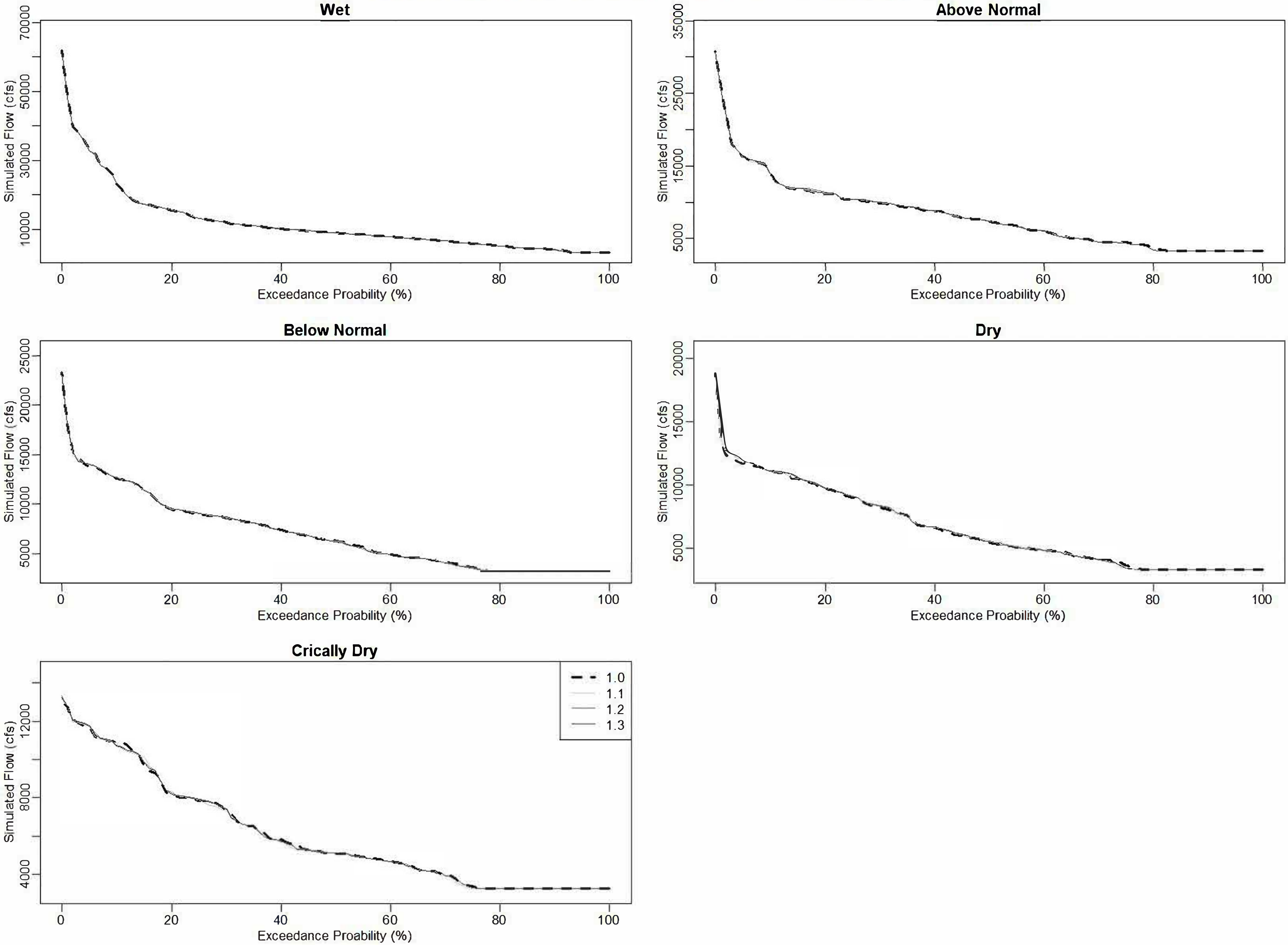

Lake Oroville (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Cricaly Dry
Simulated Storage (TAF)
Exceedance Proability (%)
1.0
1.1
1.2
1.3

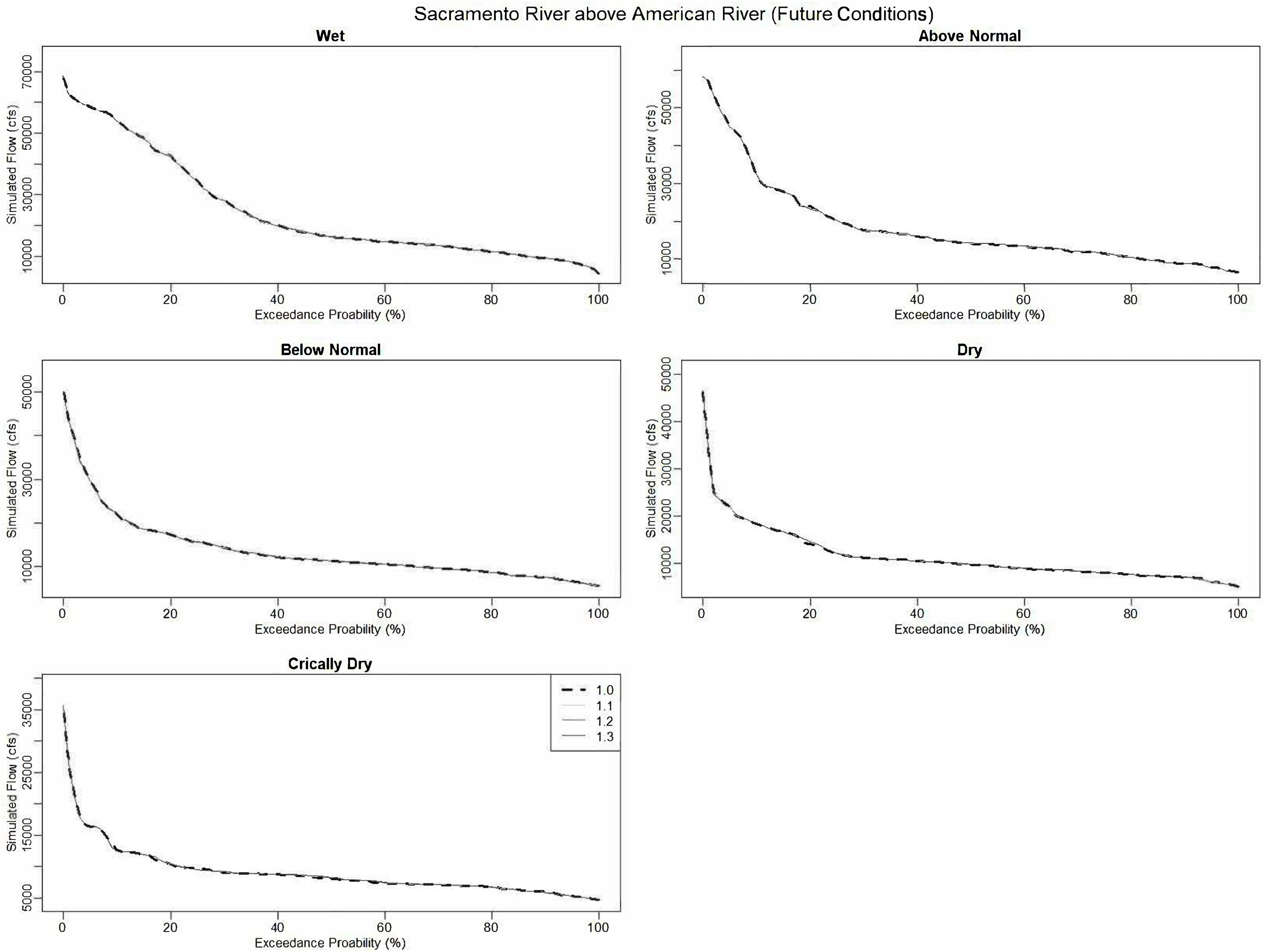

American River below Nimbus Dam (above FWTP Intake) (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
1.0
1.1
1.2
1.3

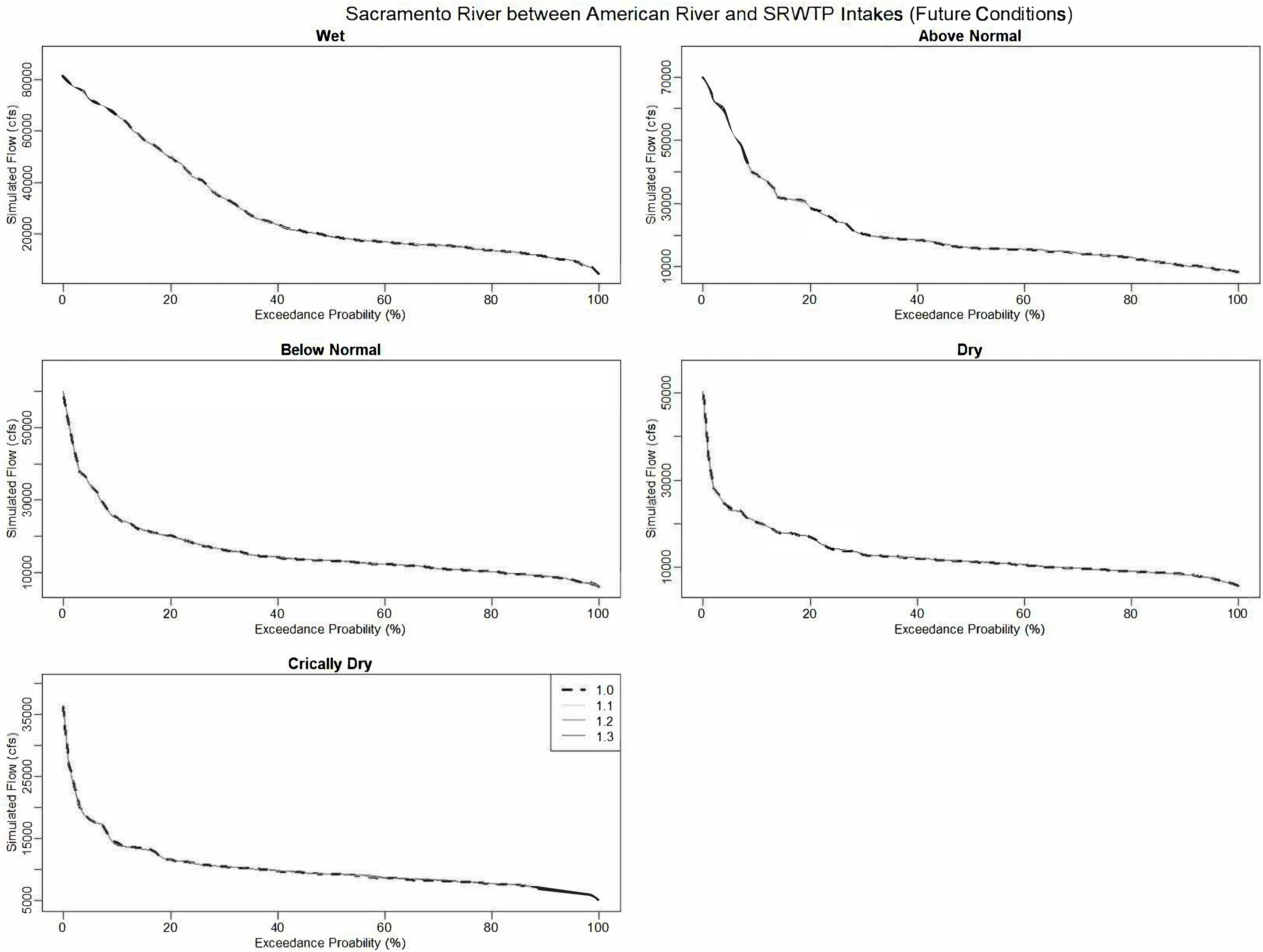


American River below FWTP Intake (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
1.0
1.1
1.2
1.3

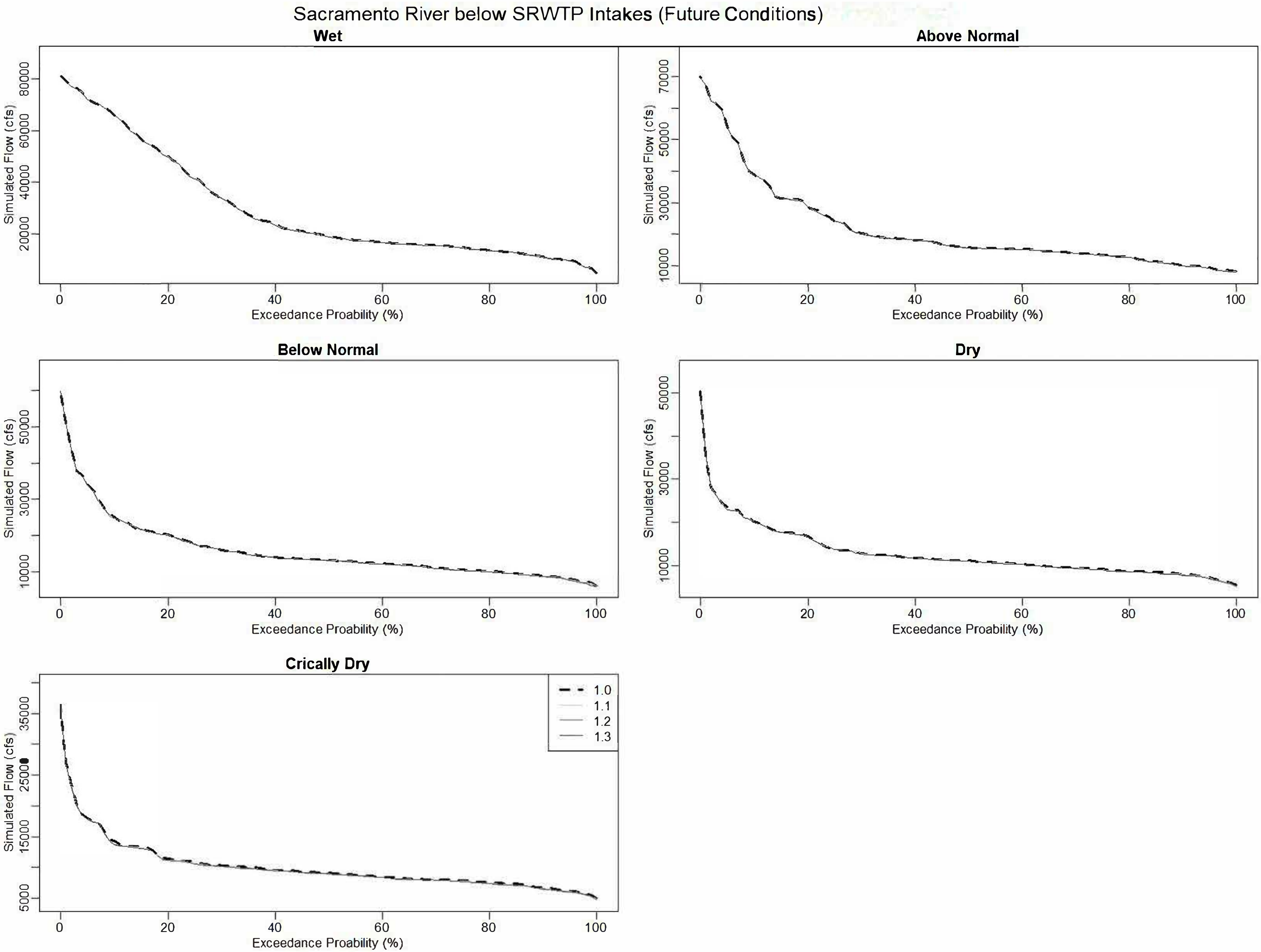
Sacramento River below Keswick and Clear Creek Tunnel (Future Conditions)

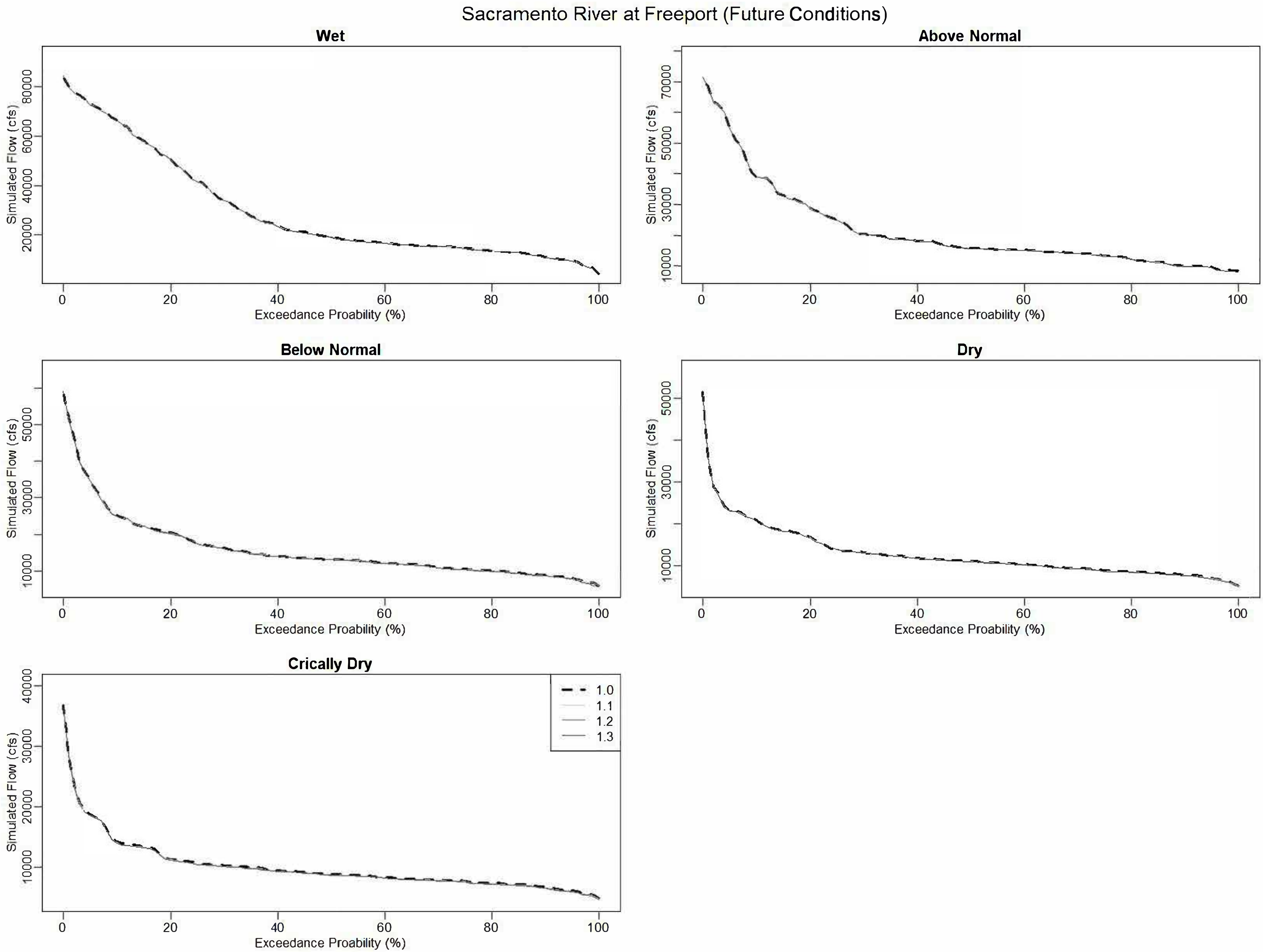



Sacramento River above American River (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
10000
30000
50000
70000
5000
15000
25000
35000
20000
40000
0
20
40
60
80
100
1.0
1.1
1.2
1.3

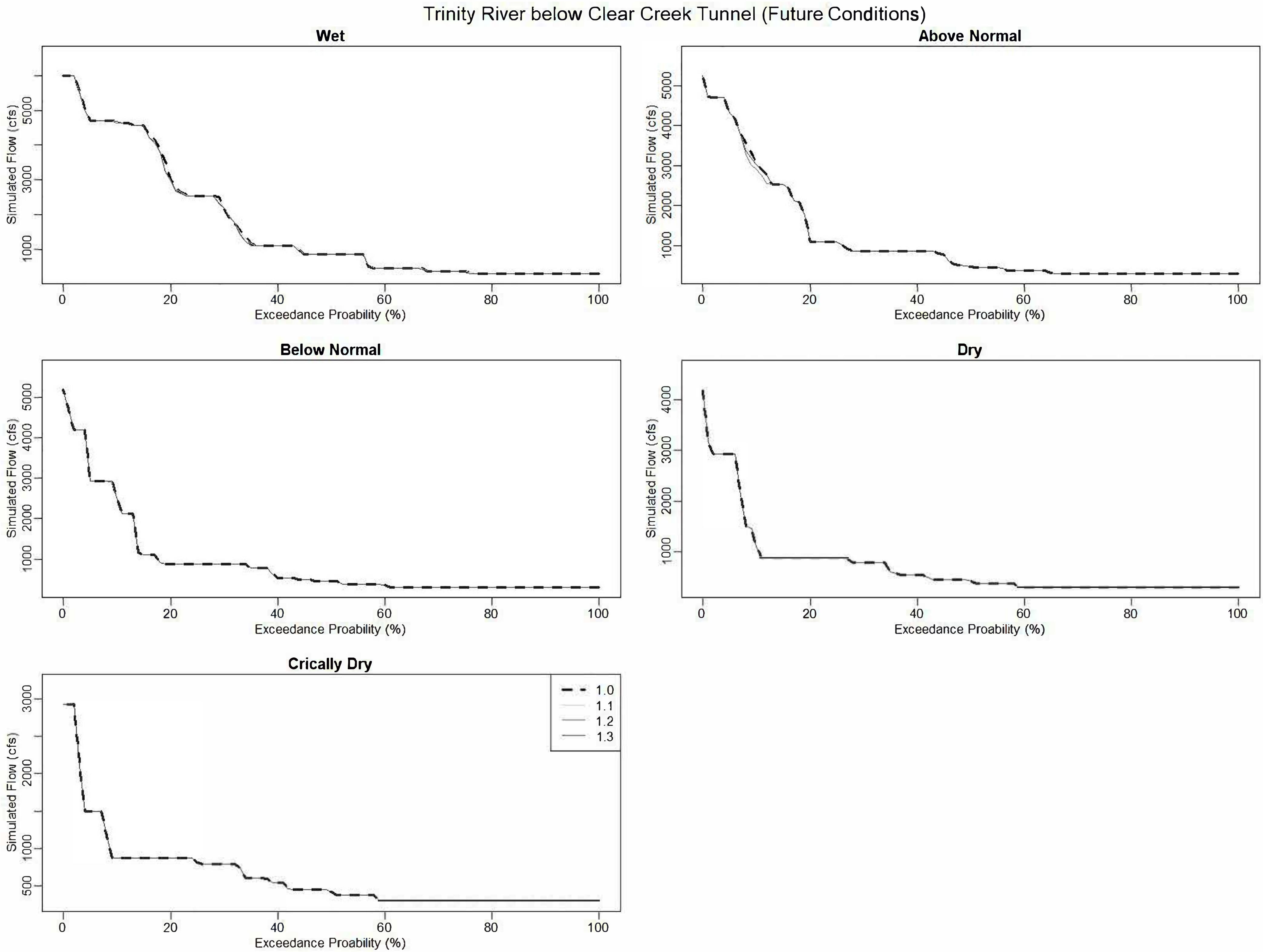


Sacramento River between American River and SRWTP Intakes (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
1.0
1.1
1.2
1.3


Sacramento River below SRWTP Intakes (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Probability (%)
0
20
40
60
80
100
20000
40000
60000
80000
10000
30000
50000
70000
5000
15000
25000
35000
1.0
1.1
1.2
1.3

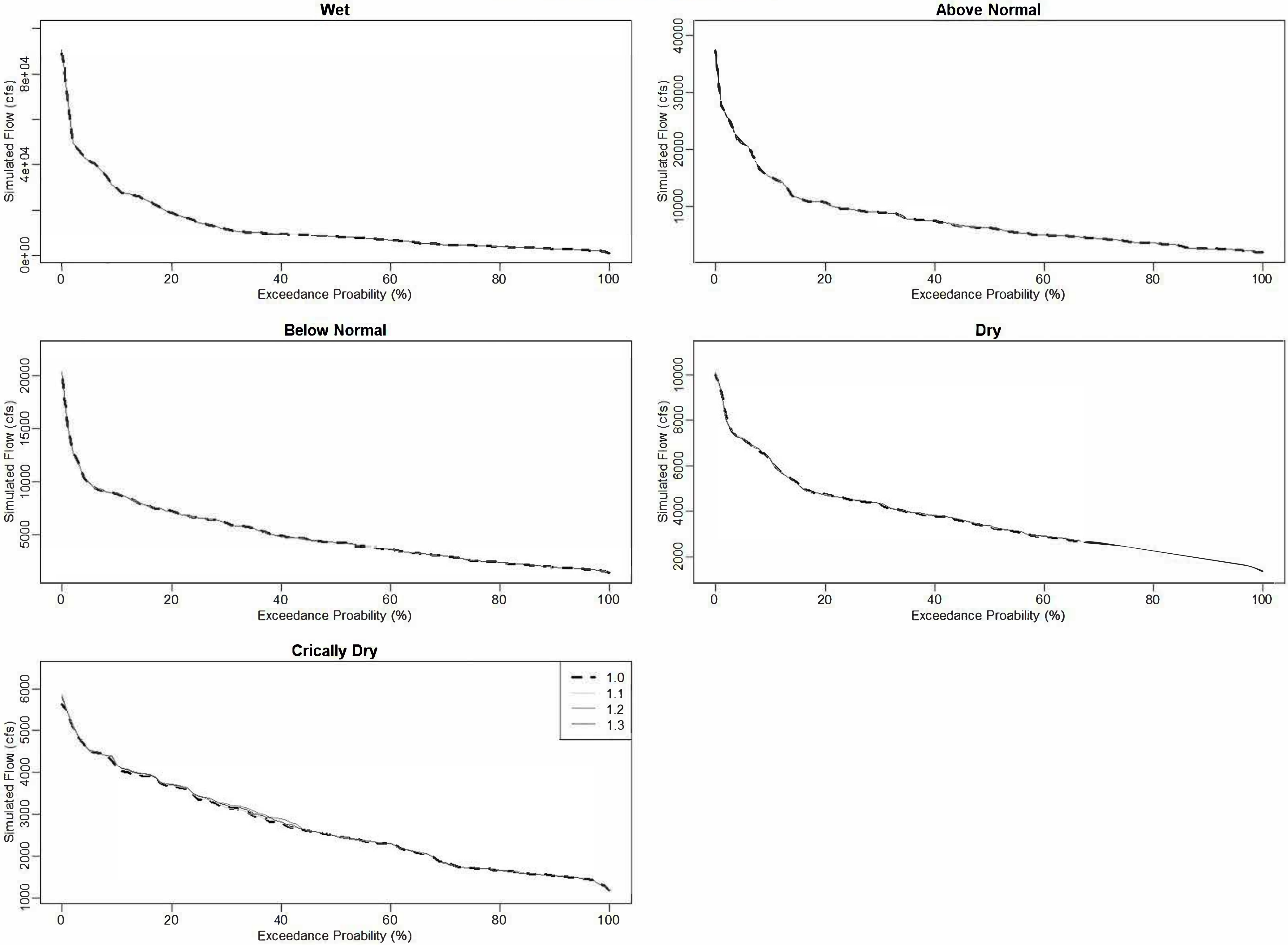


Sacramento River at Freeport (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
1.0
1.1
1.2
1.3

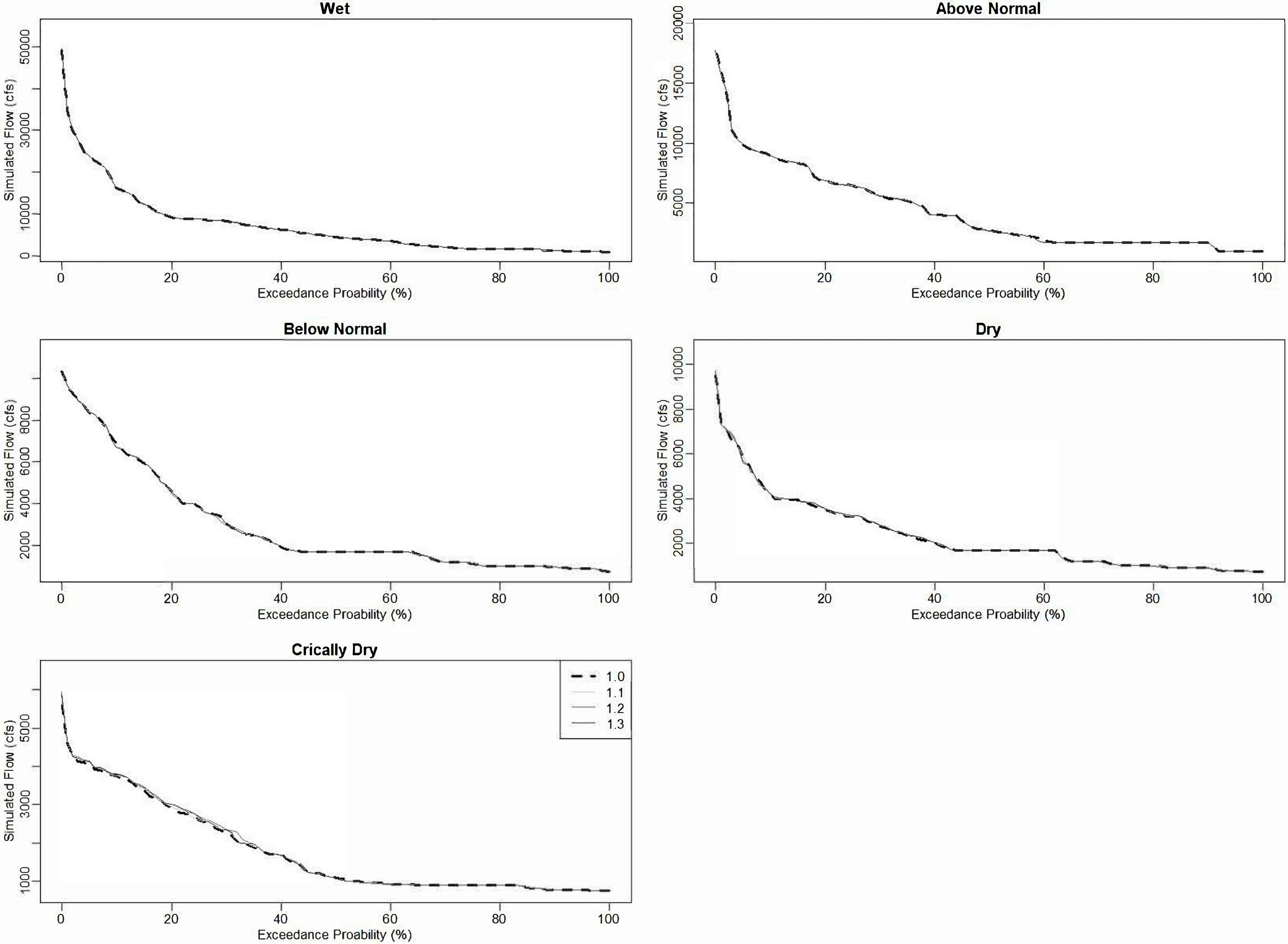


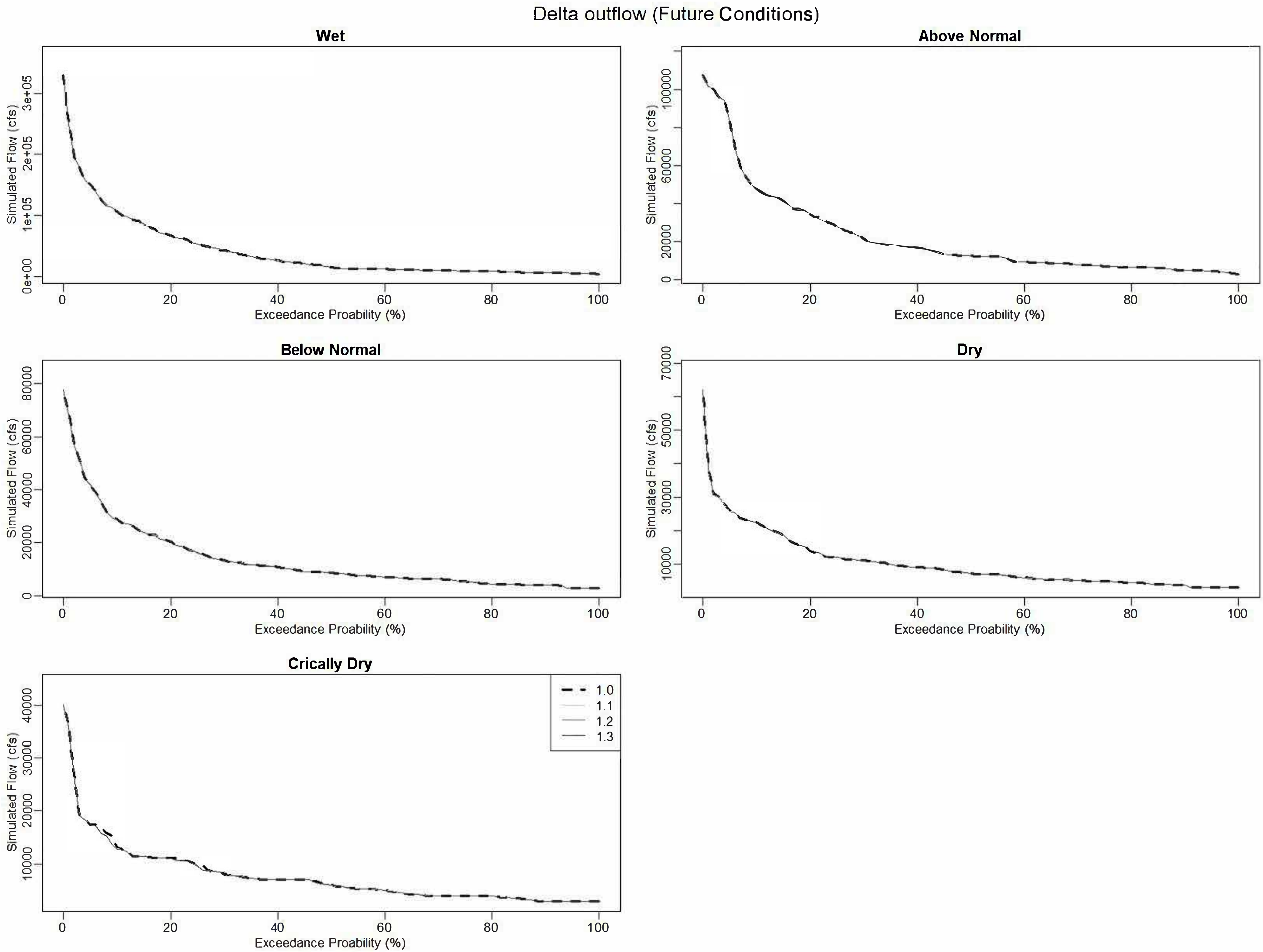
Trinity River below Clear Creek Tunnel (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
1.0
1.1
1.2
1.3

Feather River at Mouth (Future Conditions)

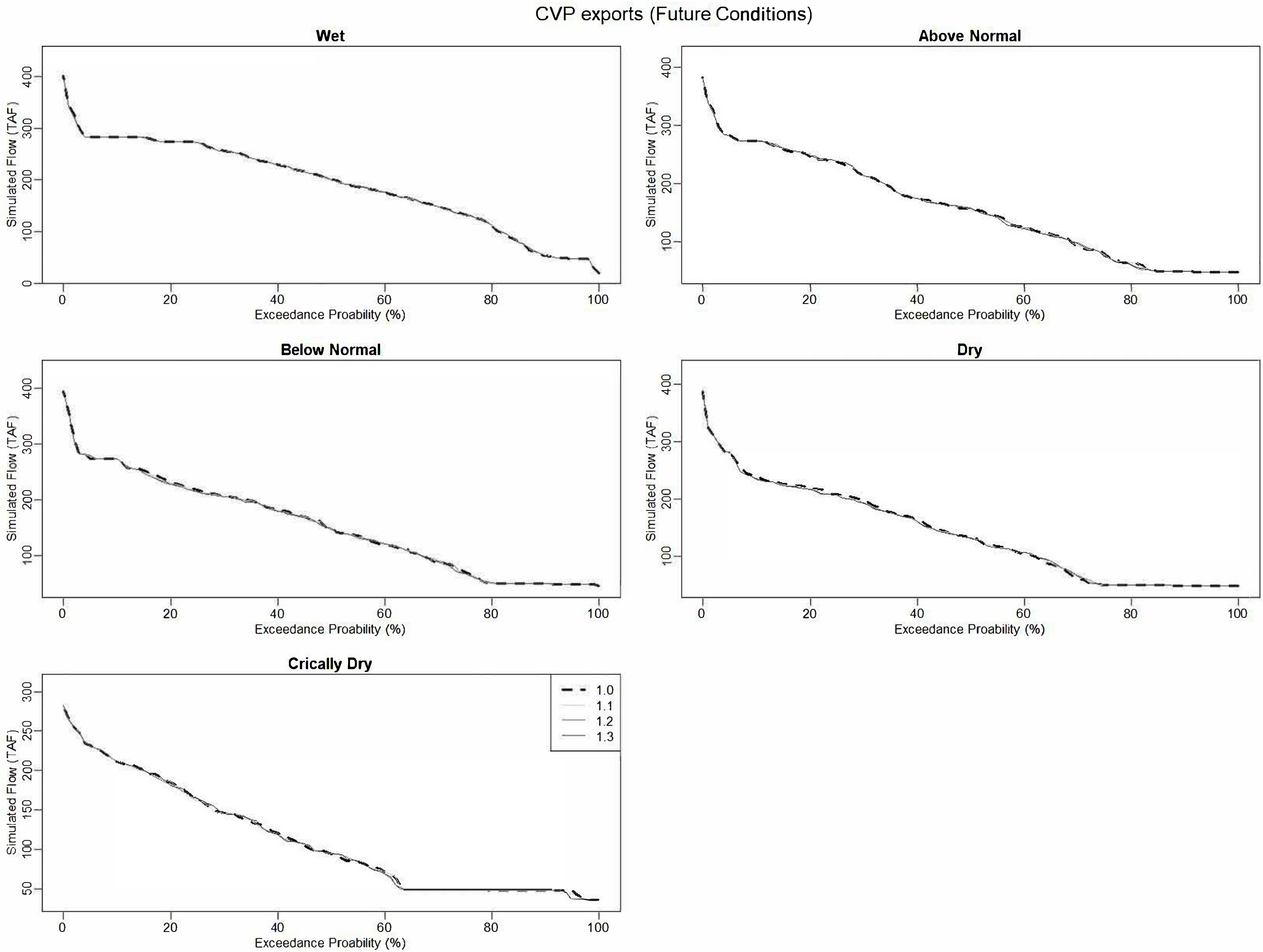


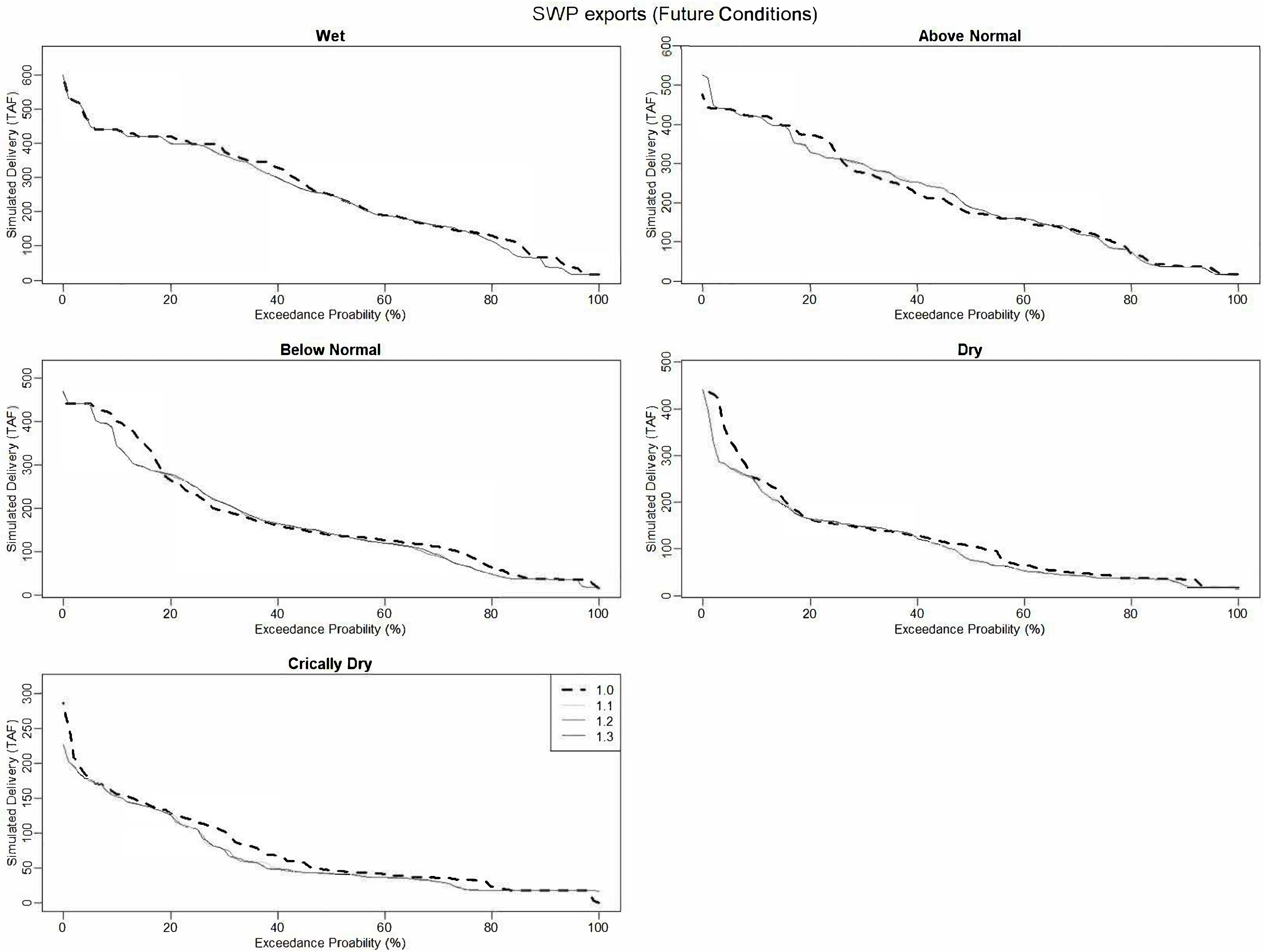
Feather River below Thermalito Afterbay (Future Conditions)





Delta outflow (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (cfs)
Exceedance Proability (%)
0e+00
1e+05
2e+05
3e+05
0
20000
40000
60000
80000
100000
10000
30000
50000
70000
20
40
60
80
100
1.0
1.1
1.2
1.3


CVP exports (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Flow (TAF)
Exceedance Proability (%)
1.0
1.1
1.2
1.3


SWP exports (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated Delivery (TAF)
Exceedance Proability (%)
1.0
1.1
1.2
1.3

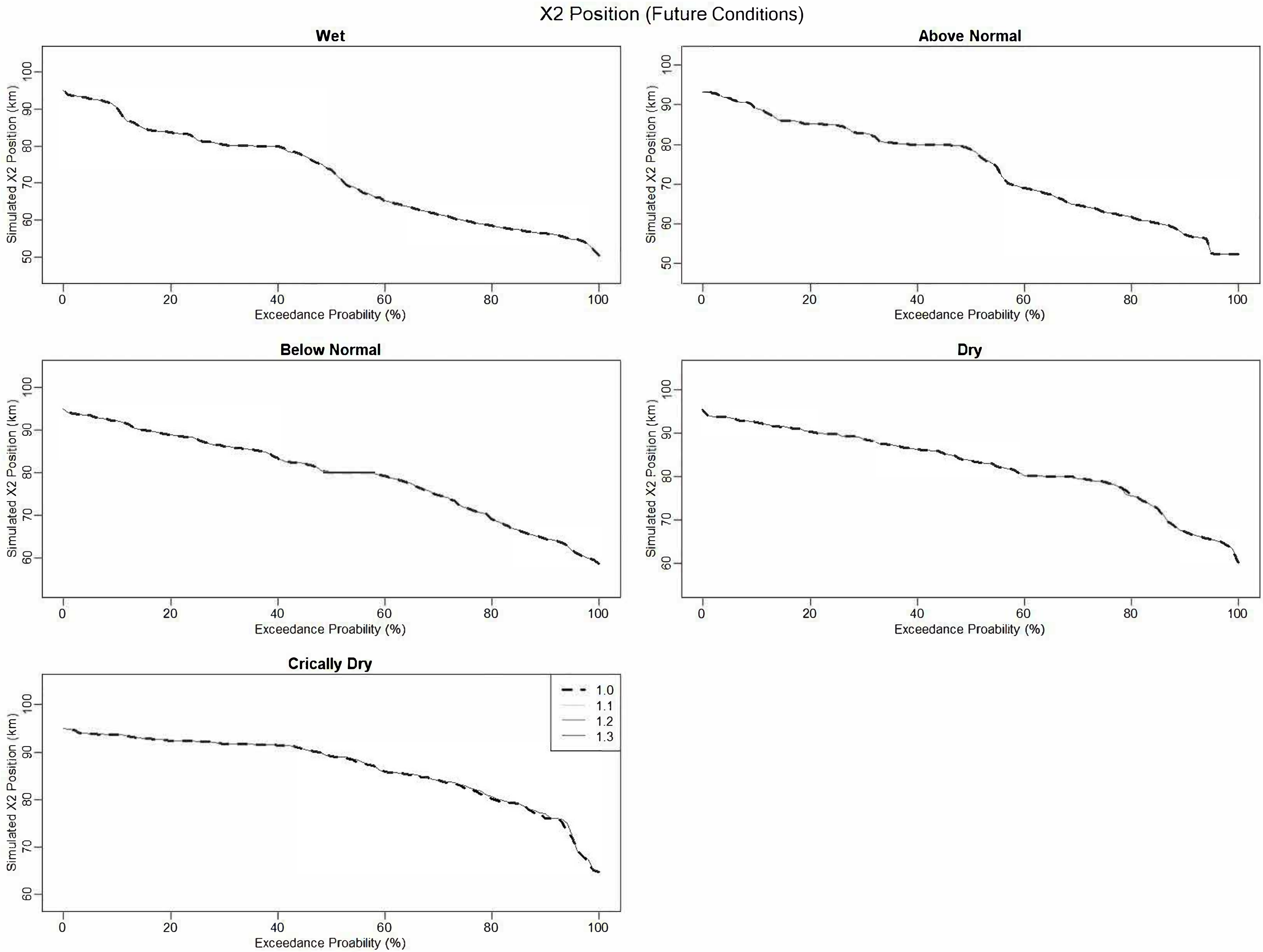

X2 Position (Future Conditions)
Wet
Above Normal
Below Normal
Dry
Crically Dry
Simulated X2 Position (km)
Exceedance Proability (%)
1.0
1.1
1.2
1.3

Exhibit C

Magnitude and Percent Change Exceedance Plots

This Exhibit presents additional exceedance probability plots showing exceedance probabilities of simulated model parameters for each model scenario, exceedance probabilities of the percent change between baseline and each proposed project model scenario, and exceedance probabilities of the magnitude change between baseline and each proposed project model scenario for the entire model simulation. The first set of plots presents results from the existing conditions simulations (Figure C.1 – C.18) followed by plots presenting results from the future conditions simulations (Figure C.19 – C.36).

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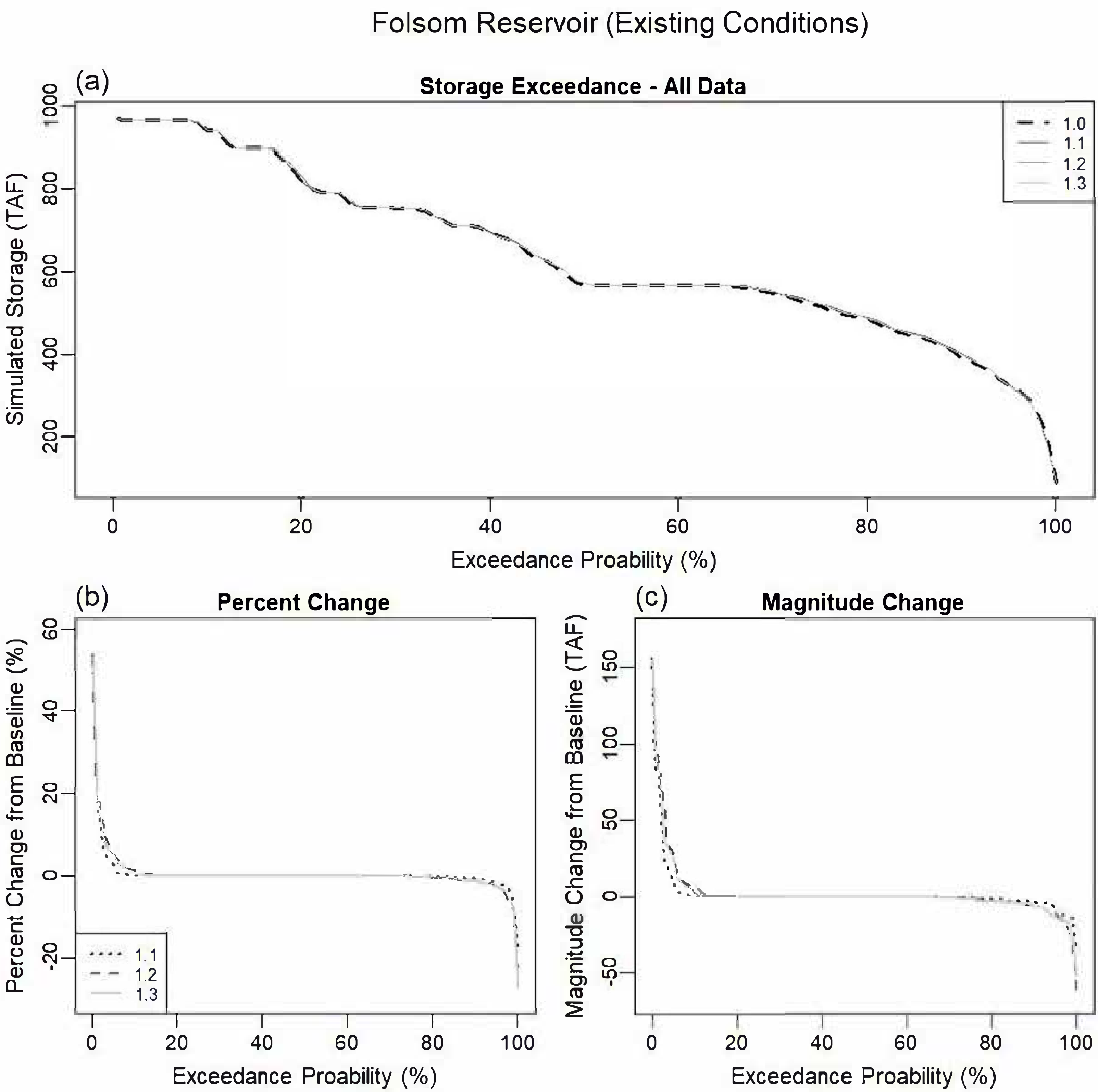
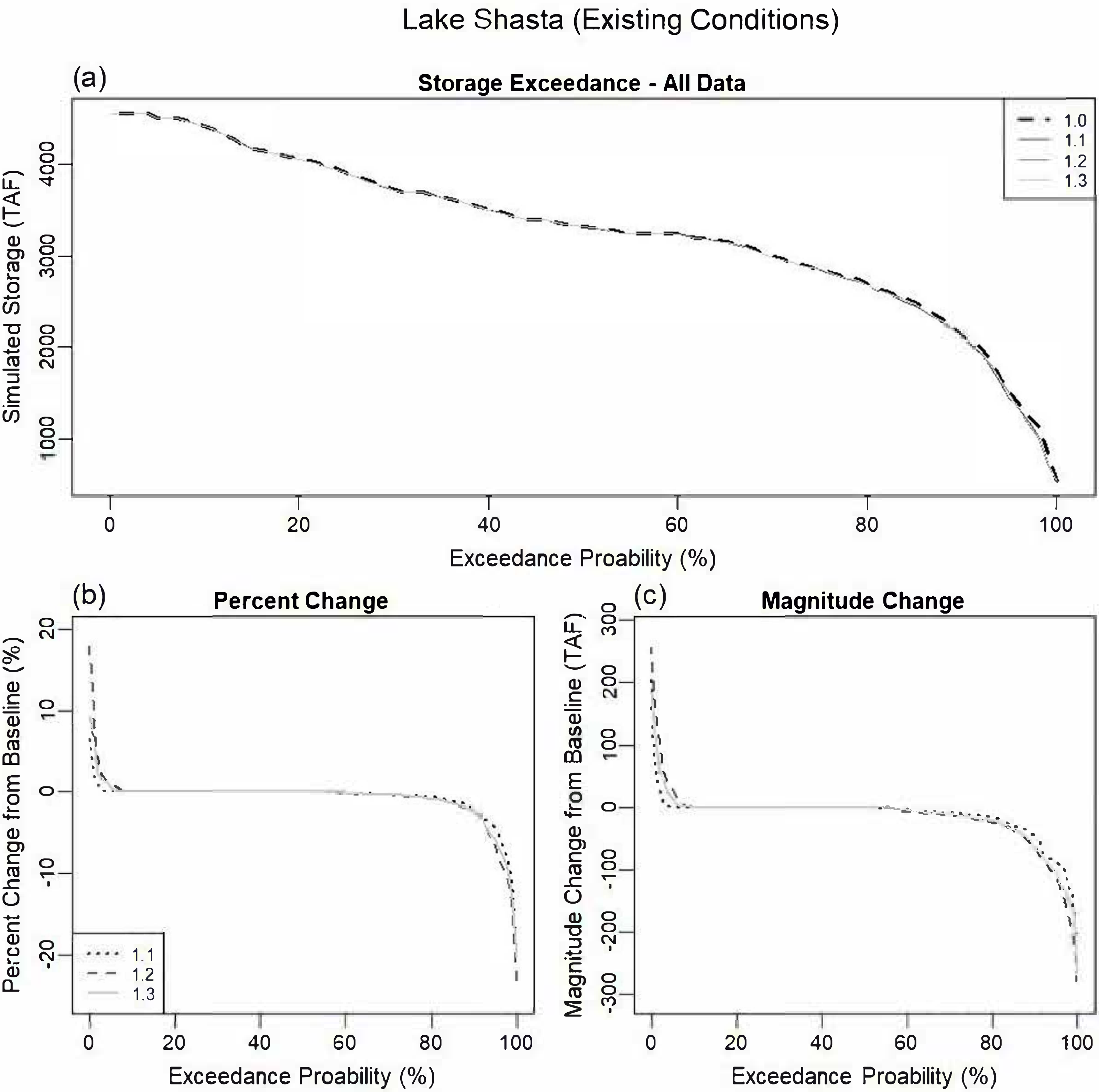
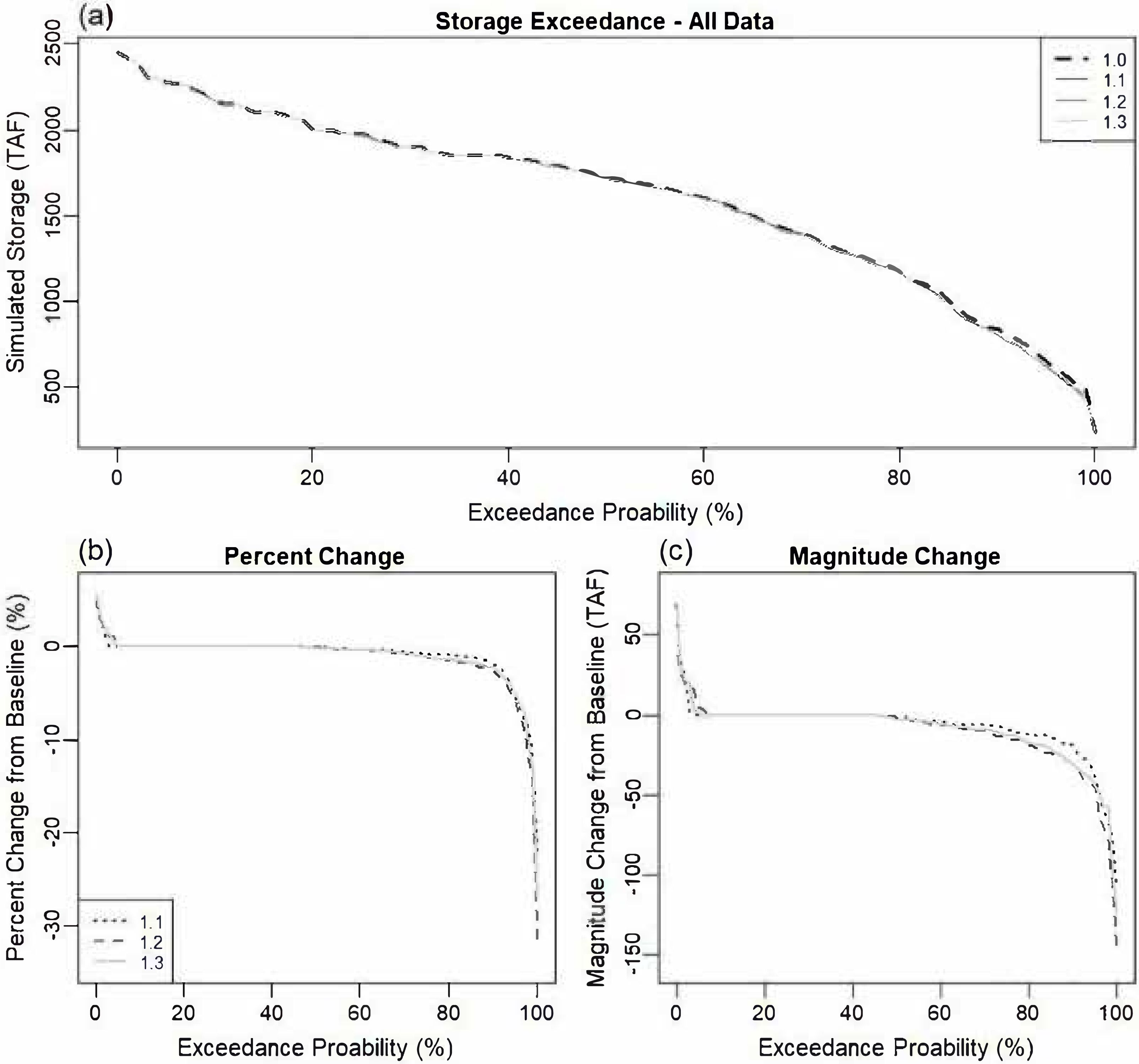


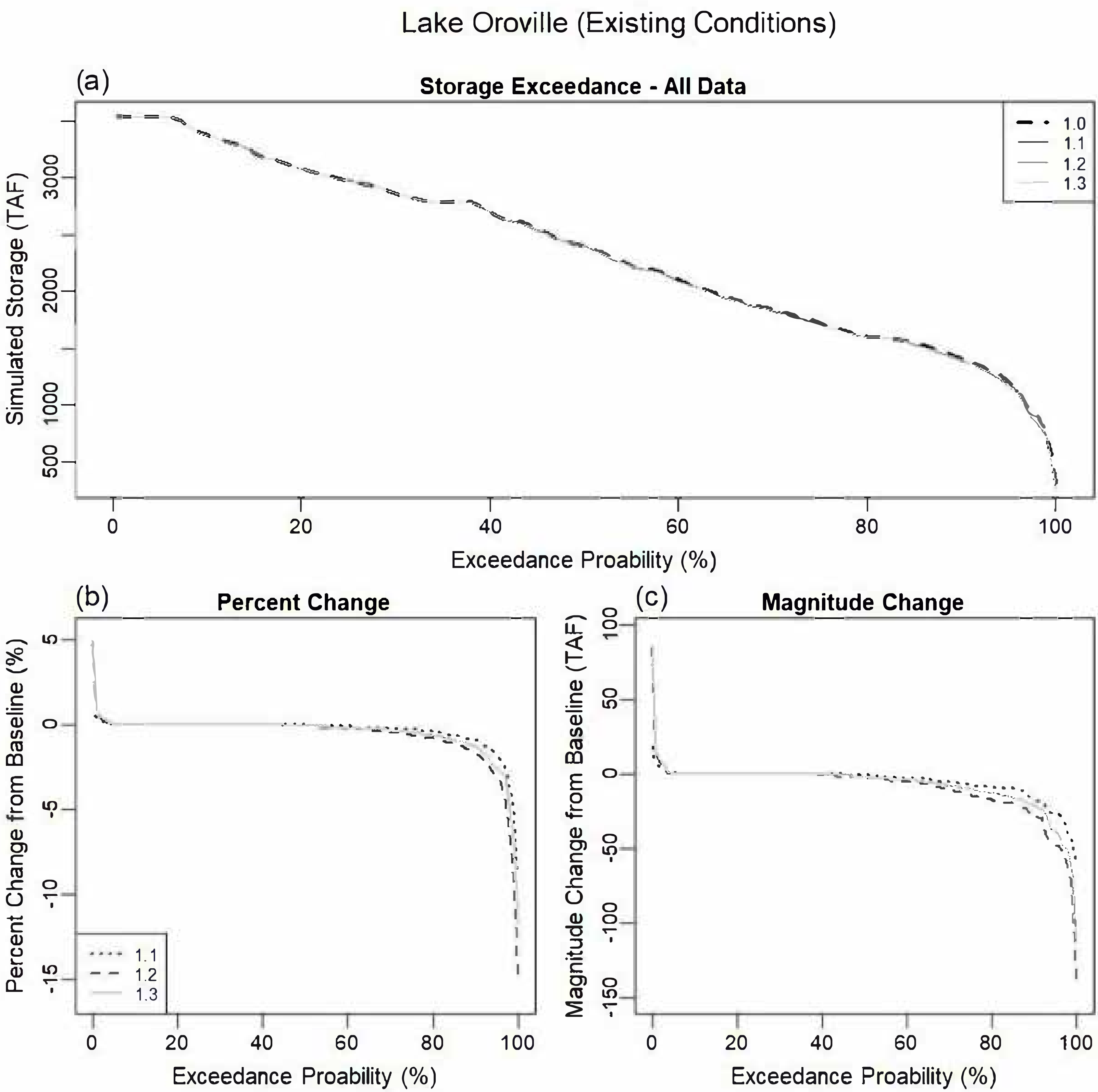
Folsom Reservoir (Existing Conditions)
(a)
Storage Exceedance - All Data
Simulated Storage (TAF)
Exceedance Proability (%)
1.0
1.1
1.2
1.3
(b)
Percent Change
Percent Change from Baseline (%)
Exceedance Proability (%)
1.1
1.2
1.3
(c)
Magnitude Change
Magnitude Change from Baseline (TAF)
Exceedance Proability (%)



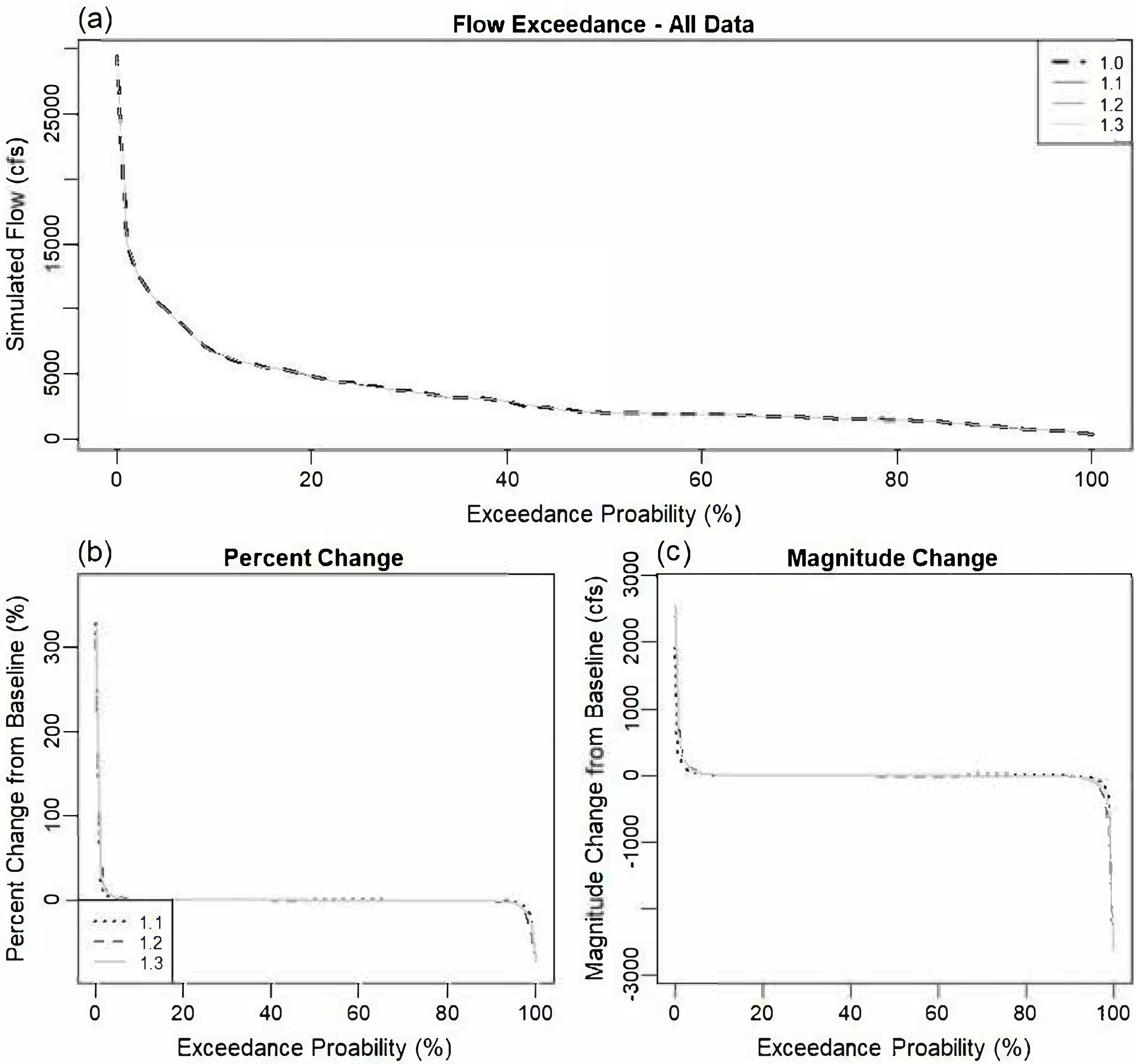
Lake Shasta (Existing Conditions)
(a)
Storage Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Storage (TAF)
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (TAF)
Exceedance Proability (%)

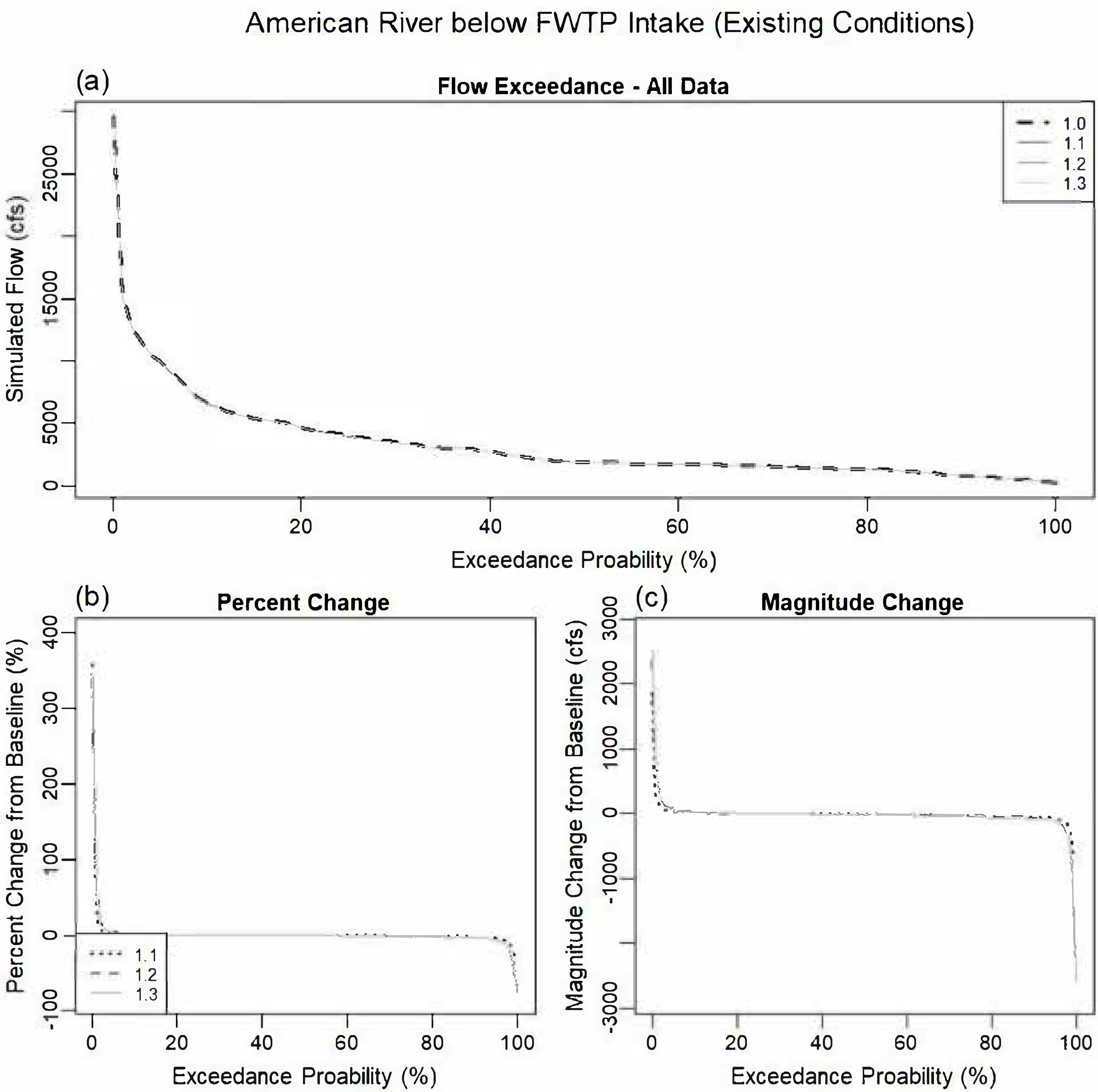
Clair Engle Reservoir (Existing Conditions)

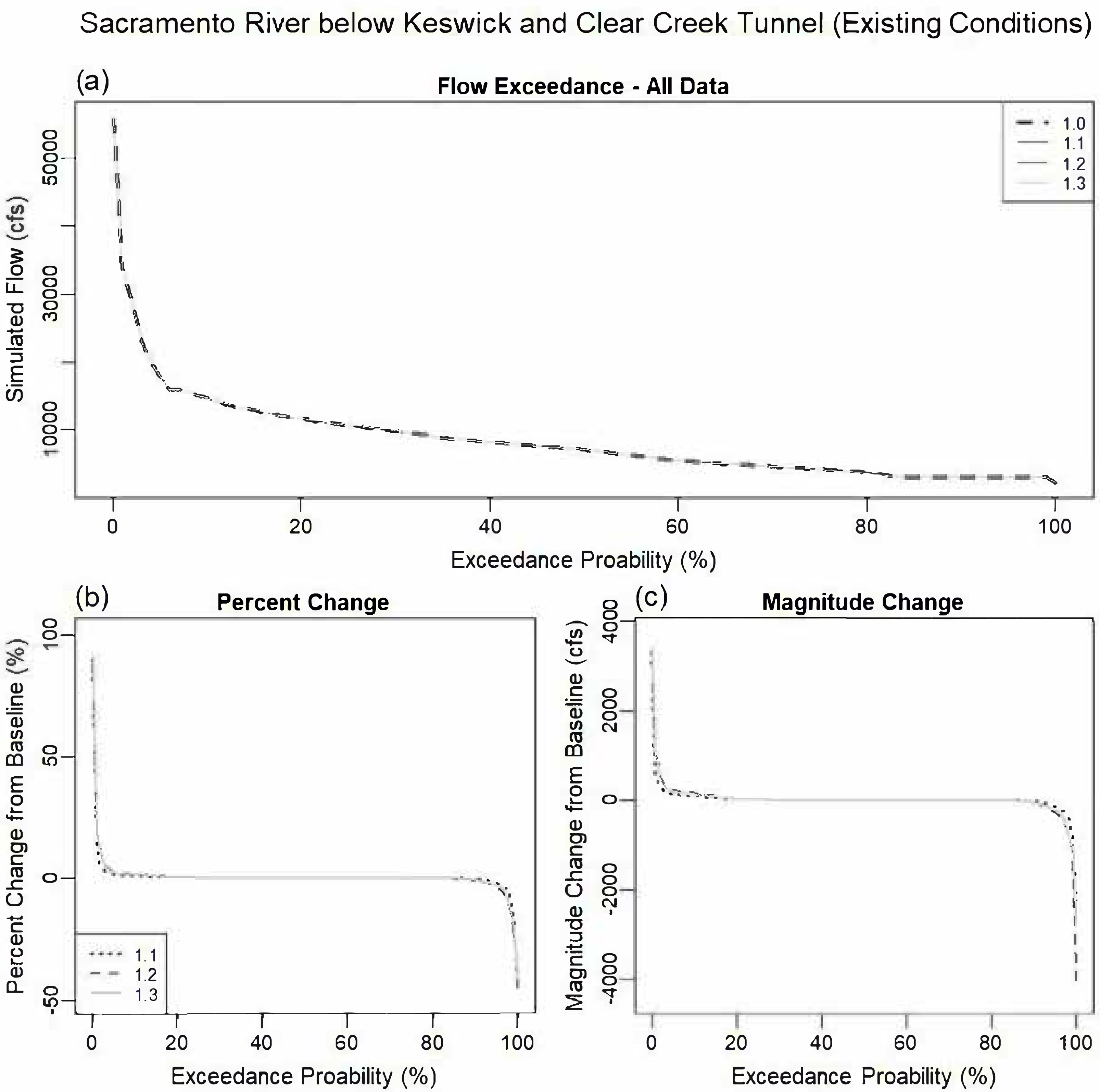



Lake Oroville (Existing Conditions)
(a)
Storage Exceedance - All Data
Simulated Storage (TAF)
Exceedance Proability (%)
1.0
1.1
1.2
1.3
(b)
Percent Change
Percent Change from Baseline (%)
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (TAF)
Exceedance Proability (%)

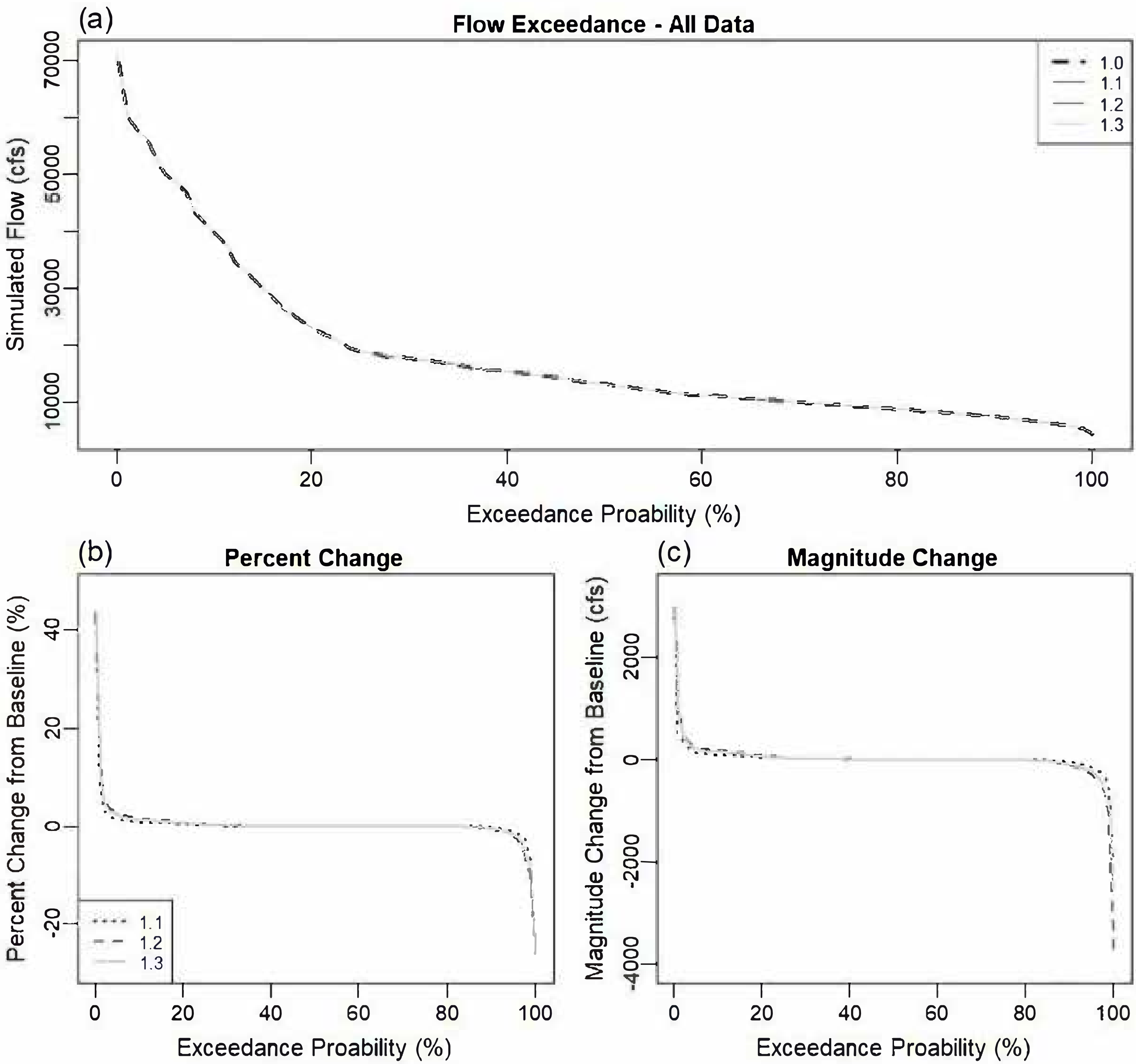
American River below Nimbus Dam (above FWTP Intake) (Existing conditions)



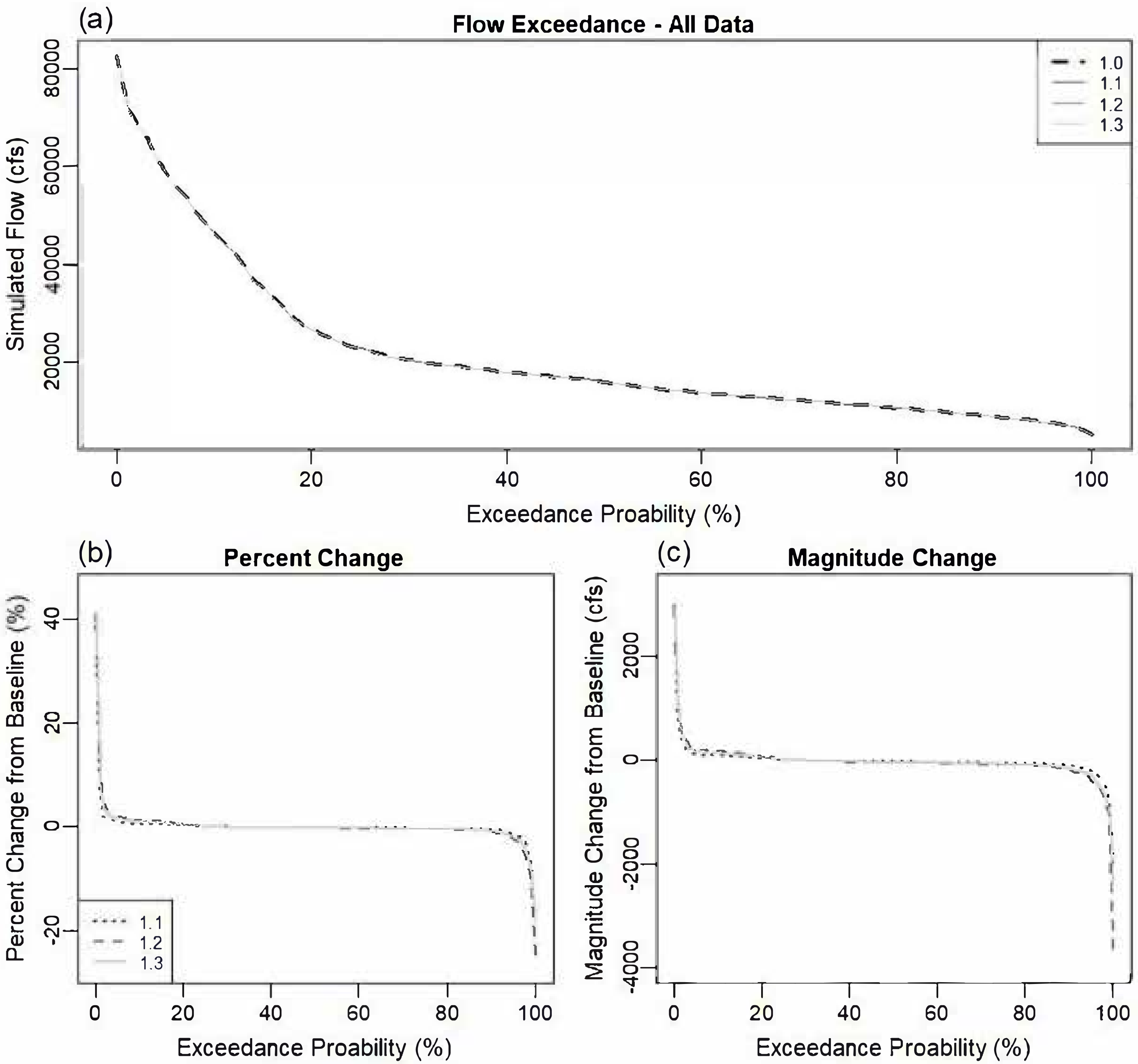

American River below FWTP Intake (Existing Conditions)
(a)
Flow Exceedance - All Data
Simulated Flow (cfs)
0
5000
15000
25000
0
20
40
60
80
100
Exceedance Proability (%)
1.0
1.1
1.2
1.3
(b)
Percent Change
Percent Change from Baseline (%)
-100
0
100
200
300
400
0
20
40
60
80
100
Exceedance Proability (%)
1.1
1.2
1.3
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
-3000
-1000
0
1000
2000
3000
0
20
40
60
80
100
Exceedance Proability (%)


Sacramento River below Keswick and Clear Creek Tunnel (Existing Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (cfs)
50000
30000
10000
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
100
50
0
-50
1.1
1.2
1.3
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
4000
2000
0
-2000
-4000
Exceedance Proability (%)

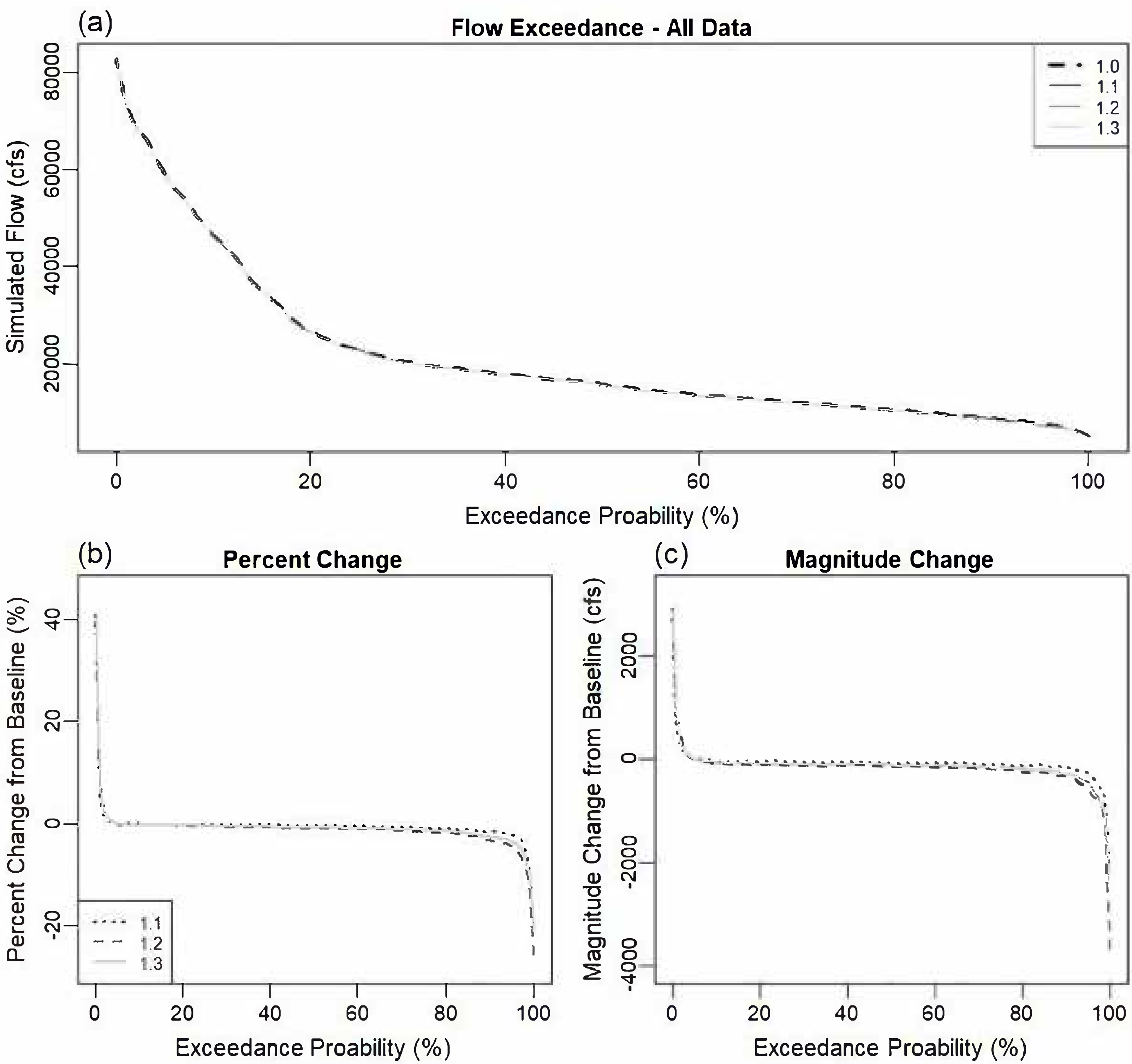
Sacramento River above American River (Existing Conditions)

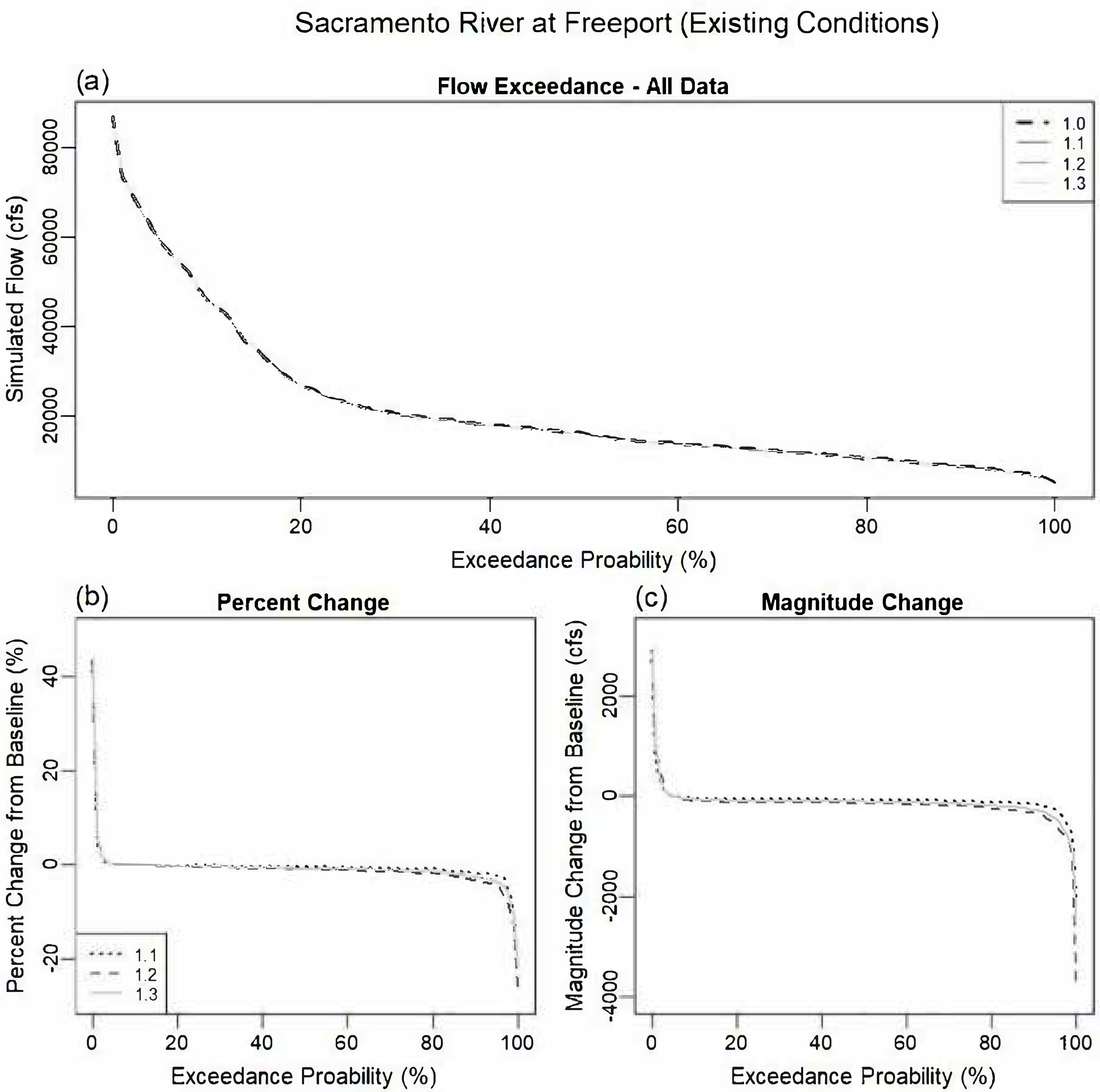


Sacramento River between American River and SRWTP Intakes (Existing Conditions)

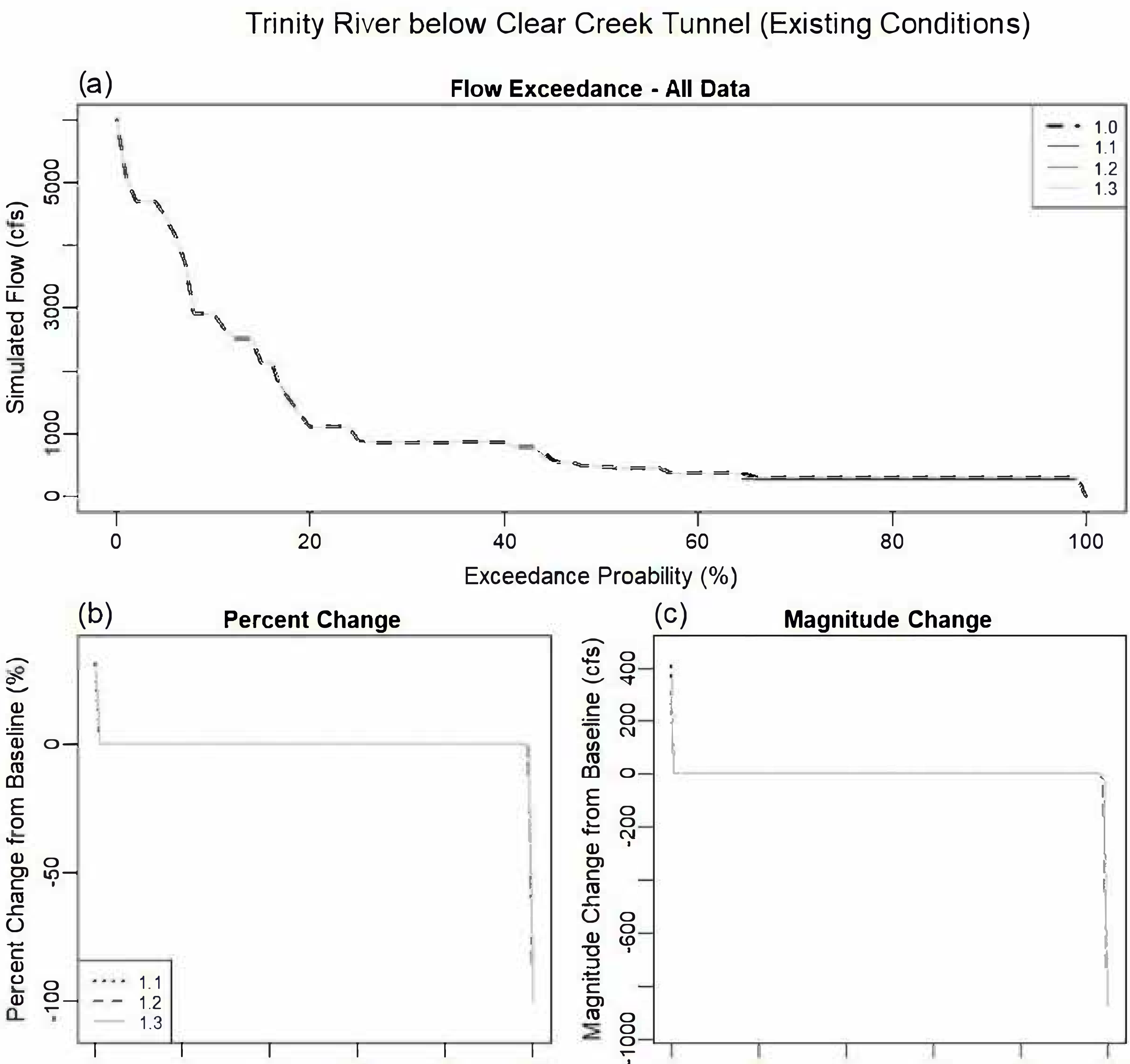


Sacramento River below SRWTP Intakes (Existing Conditions)

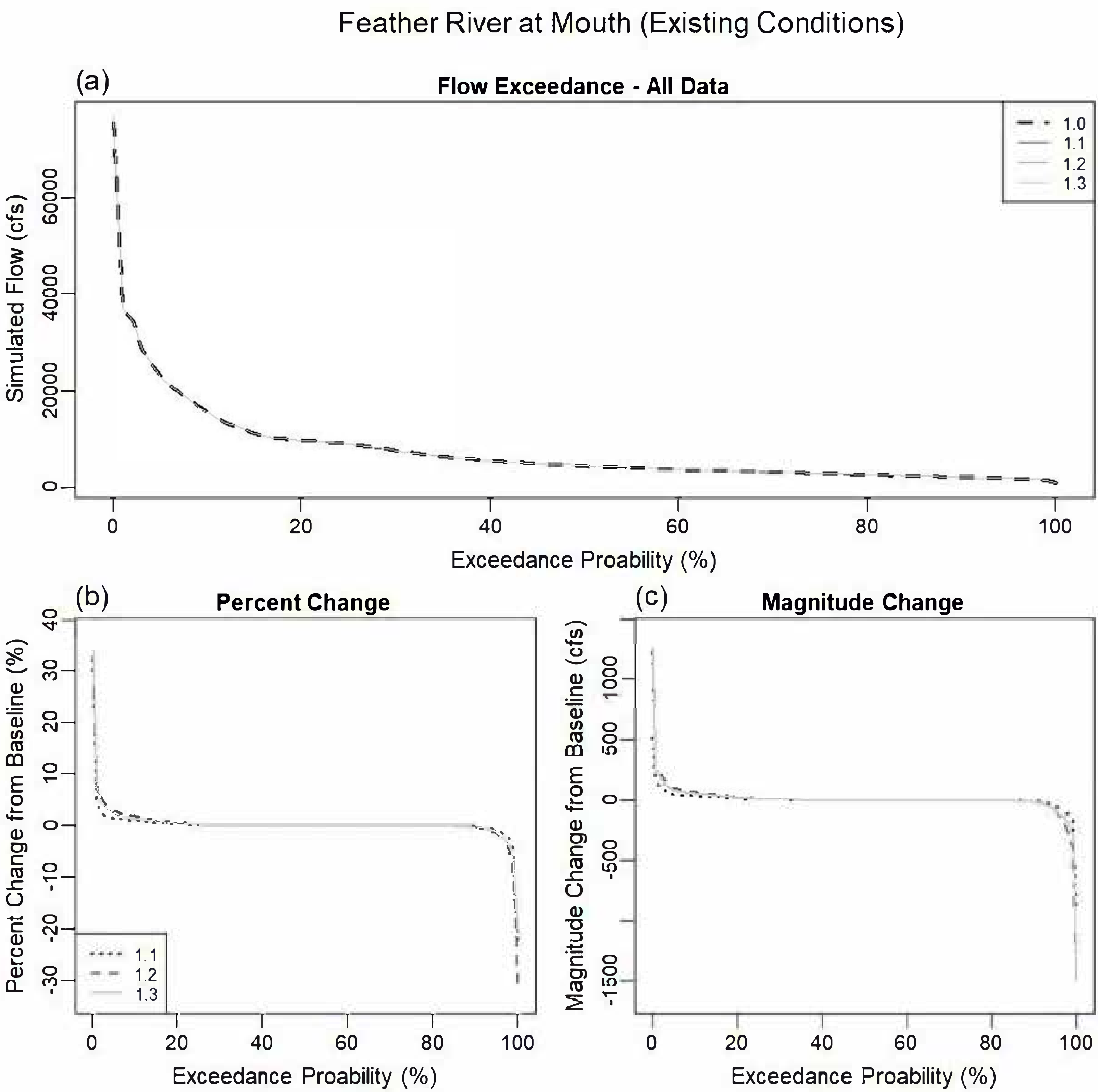




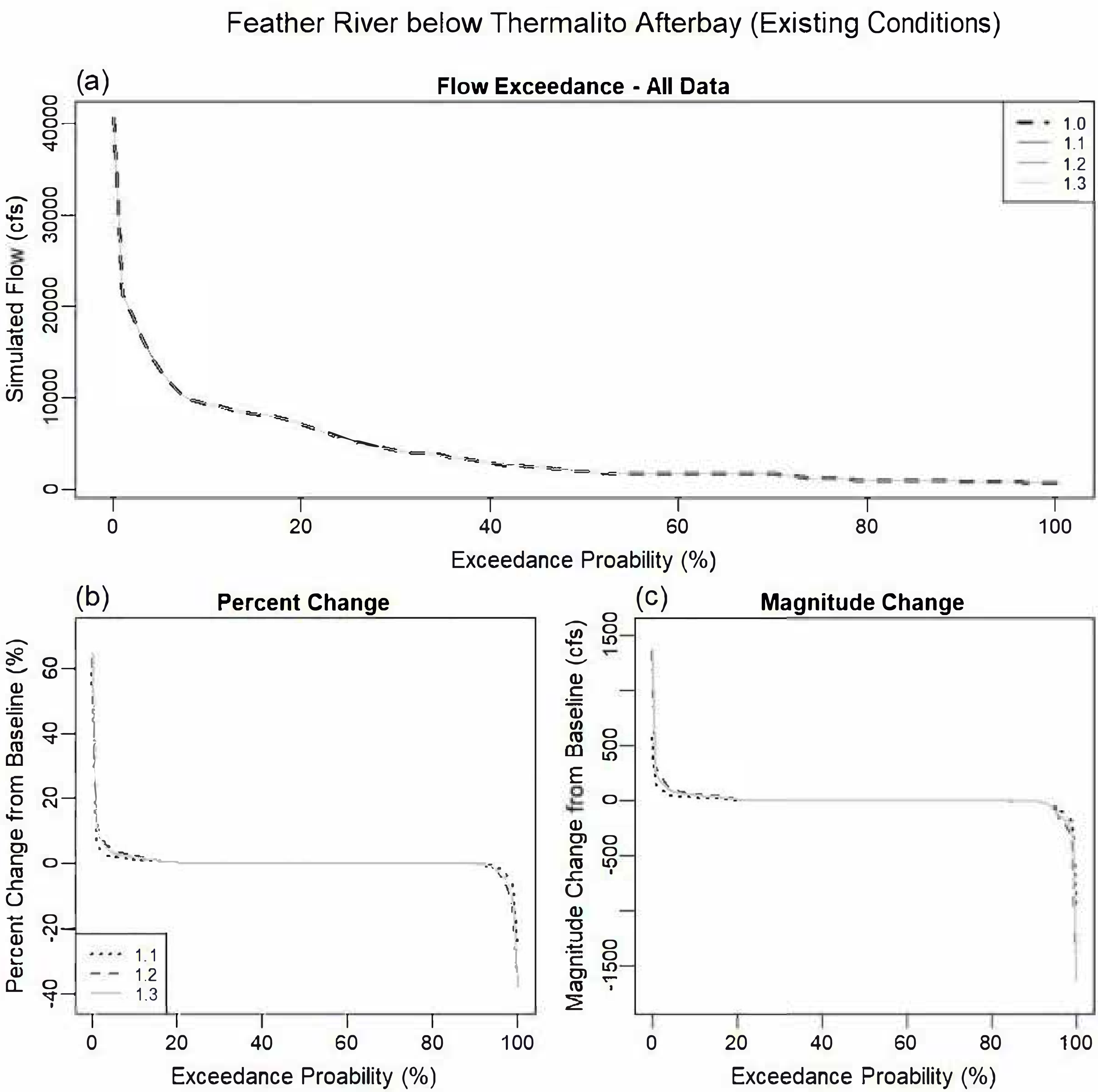
Sacramento River at Freeport (Existing Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (cfs)
80000
60000
40000
20000
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
40
20
0
-20
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
2000
0
-2000
-4000
0
20
40
60
80
100
Exceedance Proability (%)



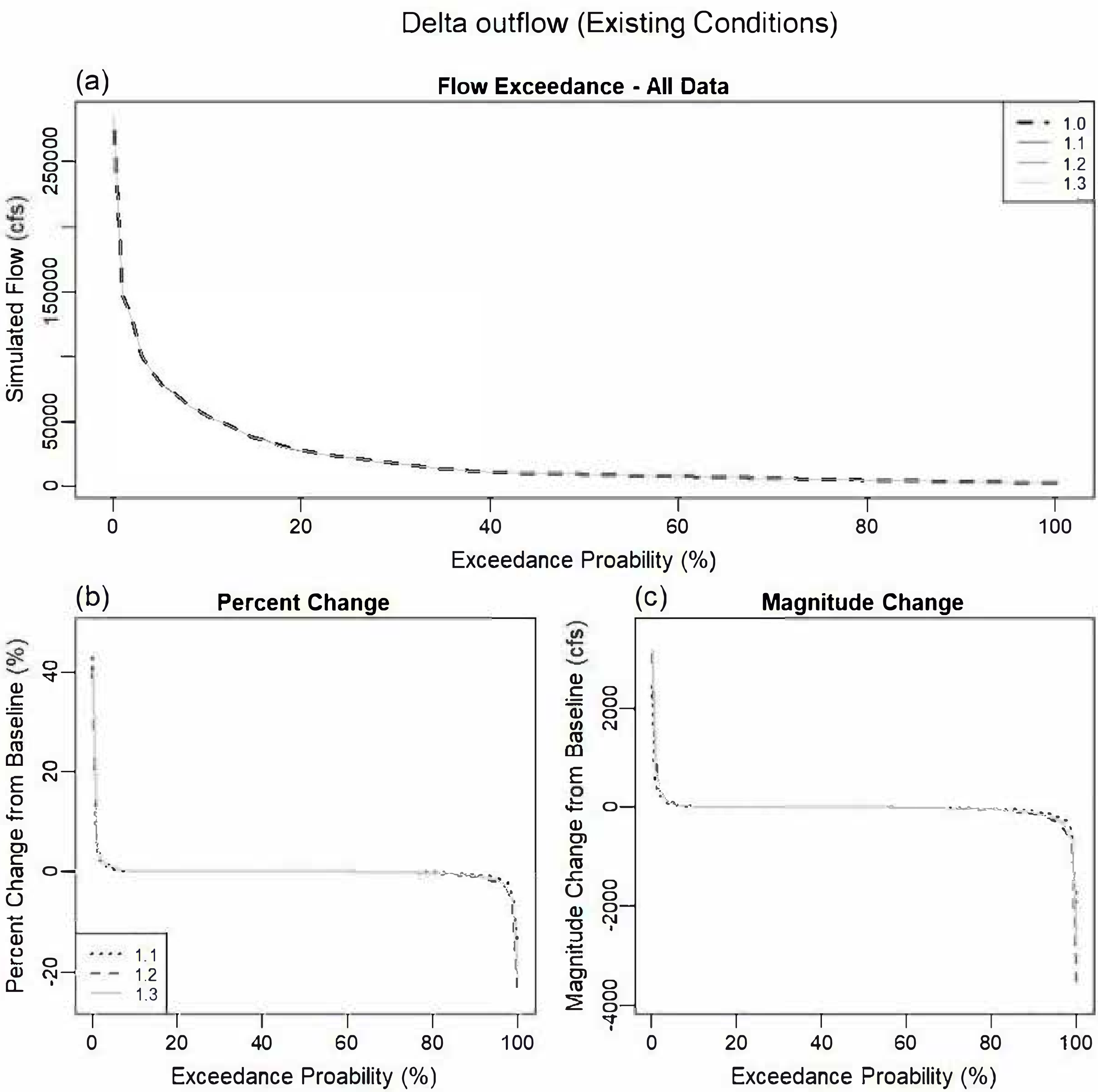
Trinity River below Clear Creek Tunnel (Existing Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (cfs)
0
1000
3000
5000
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
0
-50
-100
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
400
200
0
-200
-600
-1000
0
20
40
60
80
100
Exceedance Proability (%)



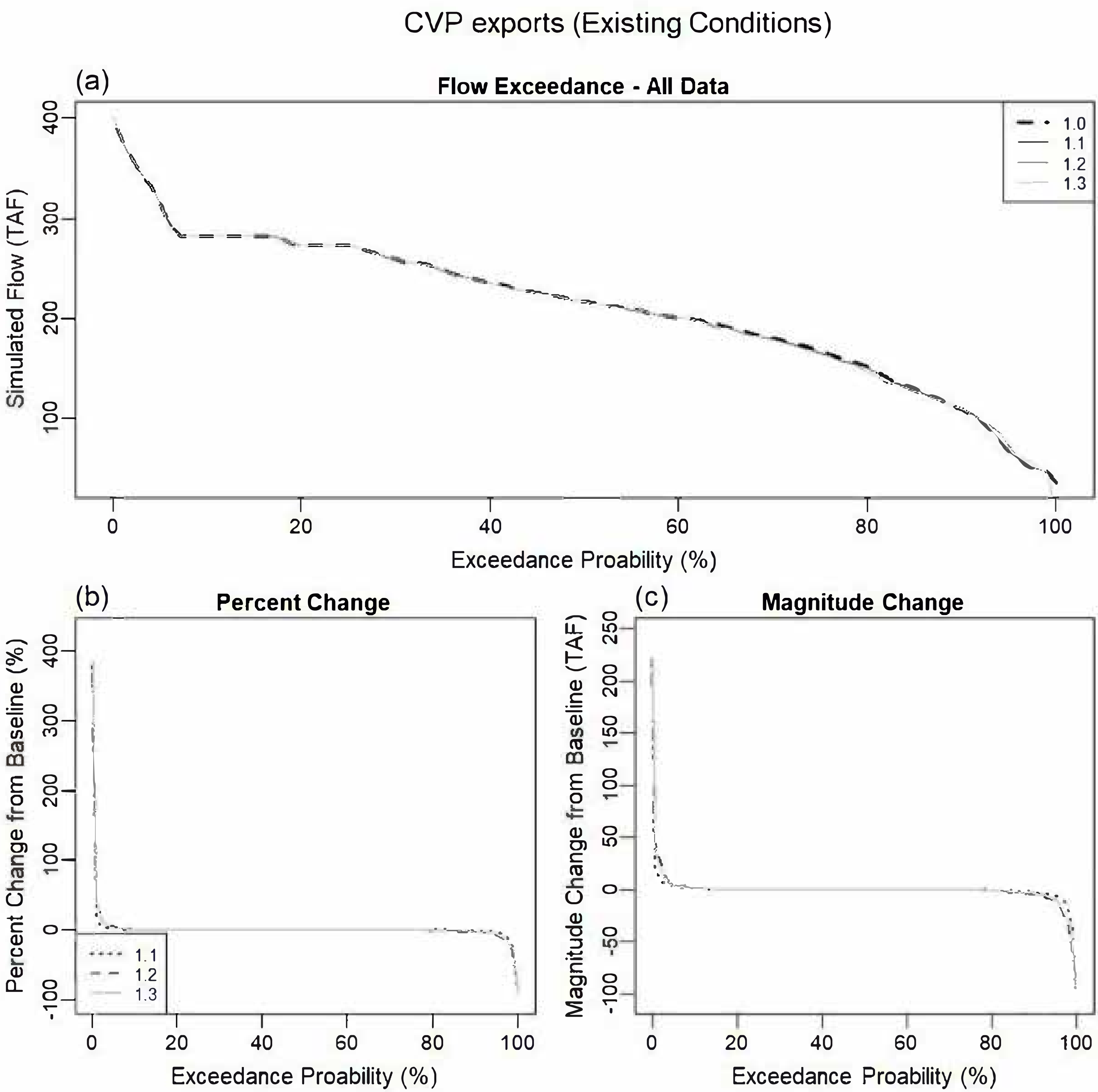
Feather River at Mouth (Existing Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (cfs)
0
20000
40000
60000
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
40
30
20
10
0
-10
-20
-30
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
1000
500
0
-500
-1500
0
20
40
60
80
100
Exceedance Proability (%)

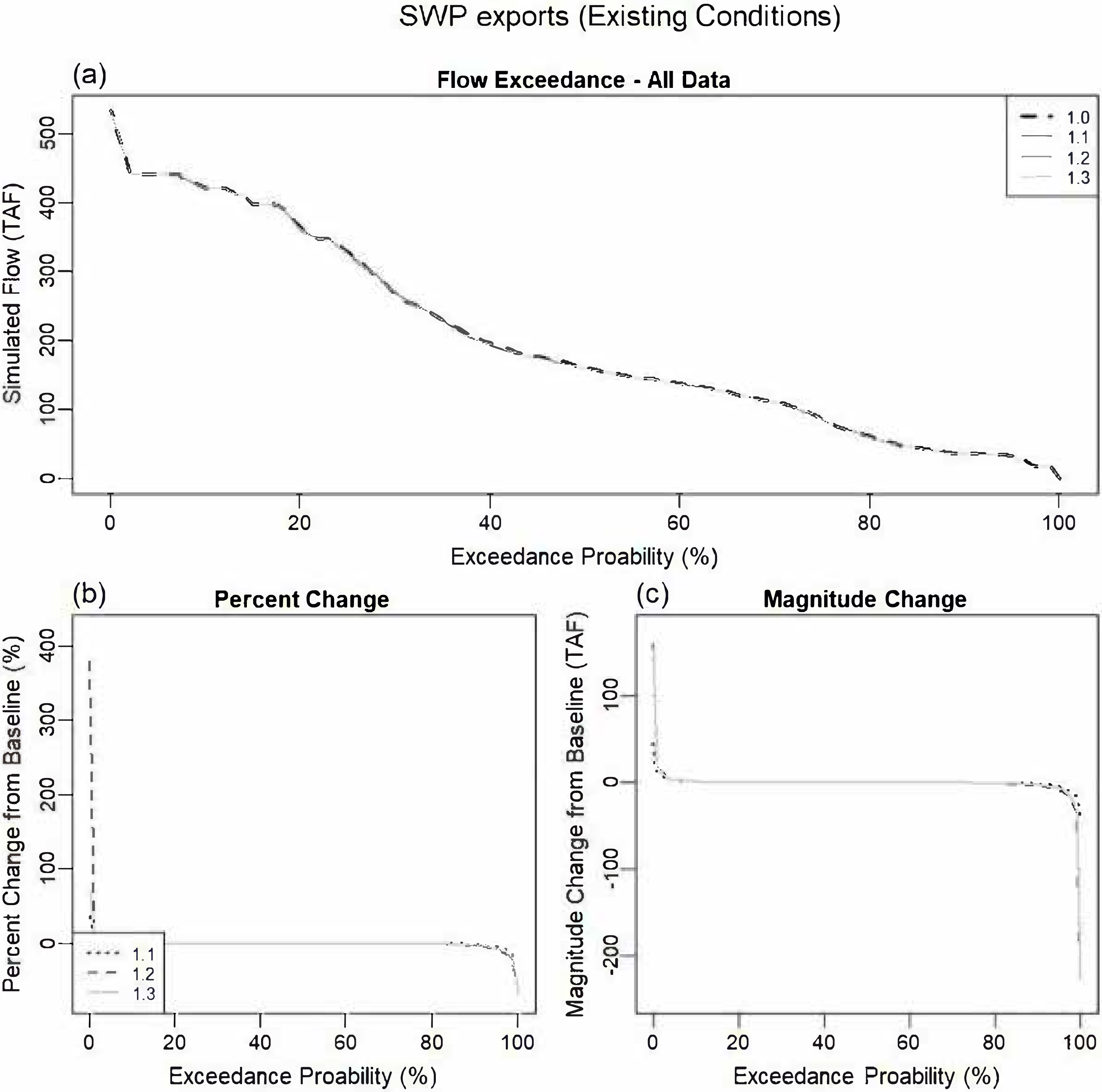


Feather River below Thermalito Afterbay (Existing Conditions)
(a)
Flow Exceedance - All Data
Simulated Flow (cfs)
Exceedance Proability (%)
1.0
1.1
1.2
1.3
(b)
Percent Change
Percent Change from Baseline (%)
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
Exceedance Proability (%)

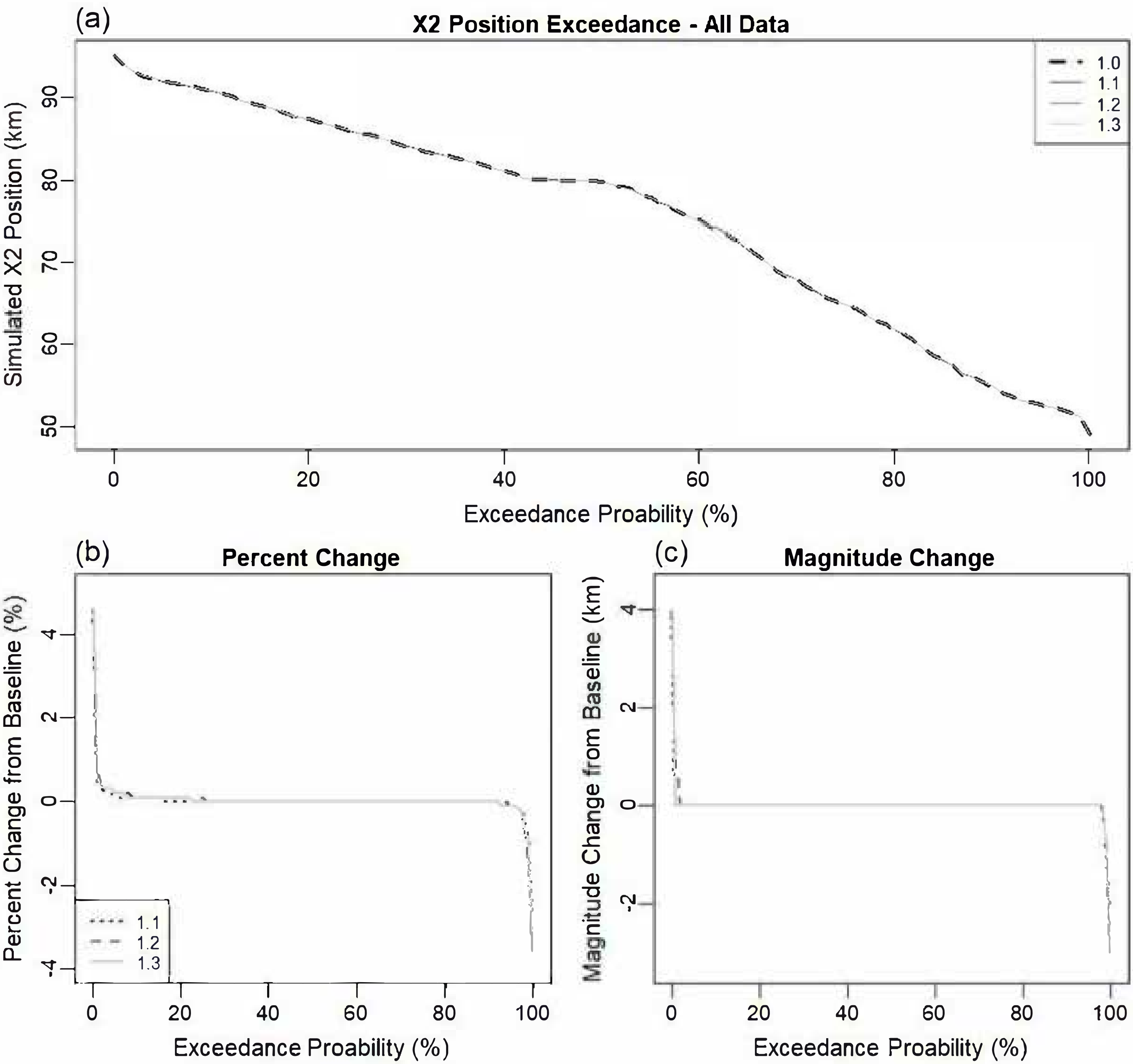


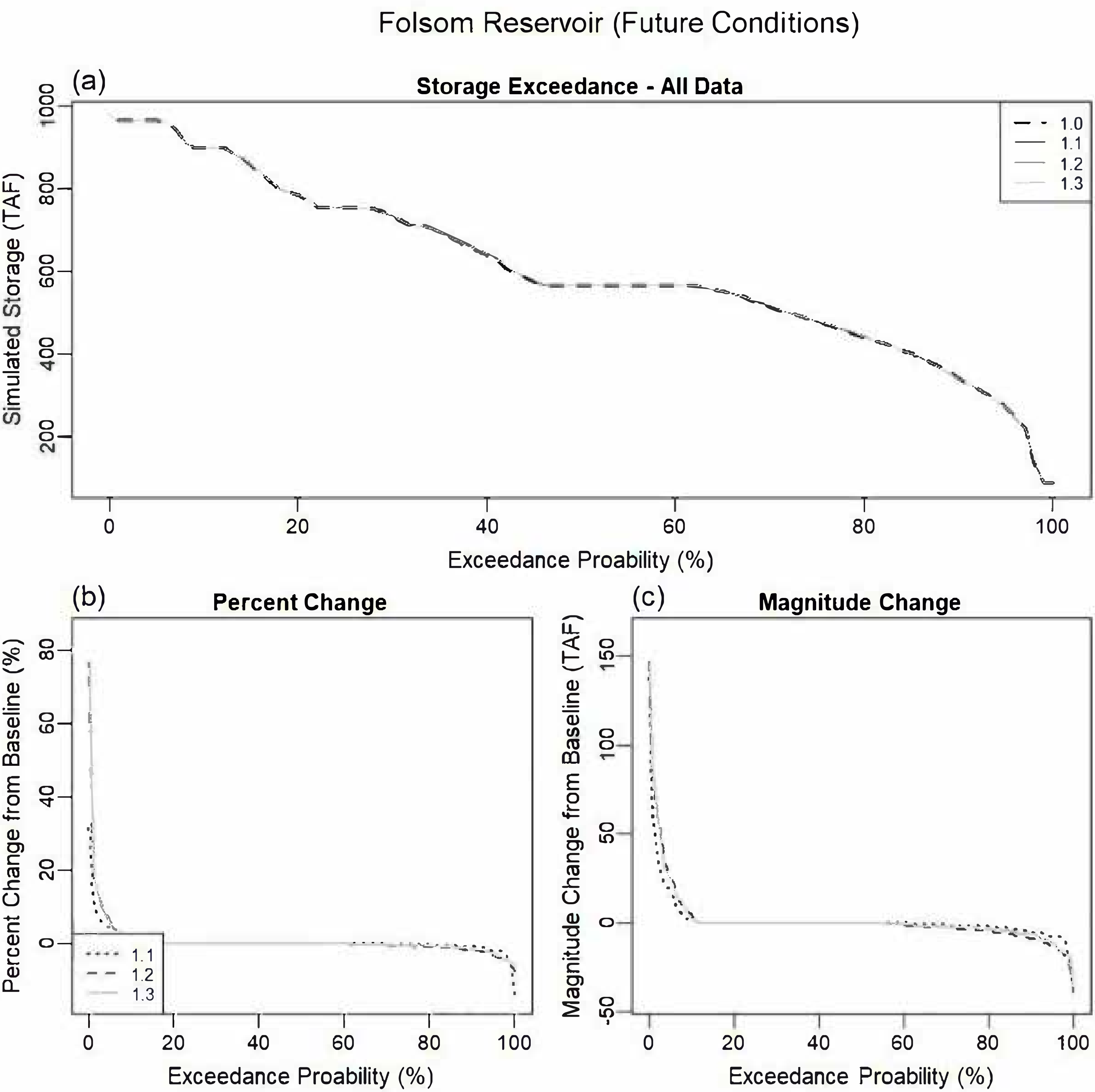
Delta outflow (Existing Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (cfs)
250000
150000
50000
0
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
40
20
0
-20
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
2000
0
-2000
-4000
0
20
40
60
80
100
Exceedance Proability (%)


CVP exports (Existing Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (TAF)
400
300
200
100
0
20
40
60
80
100
Exceedance Proabability (%)
(b)
Percent Change
Percent Change from Baseline (%)
400
300
200
100
0
-100
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proabability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (TAF)
250
200
150
100
50
0
-50
-100
0
20
40
60
80
100
Exceedance Proabability (%)

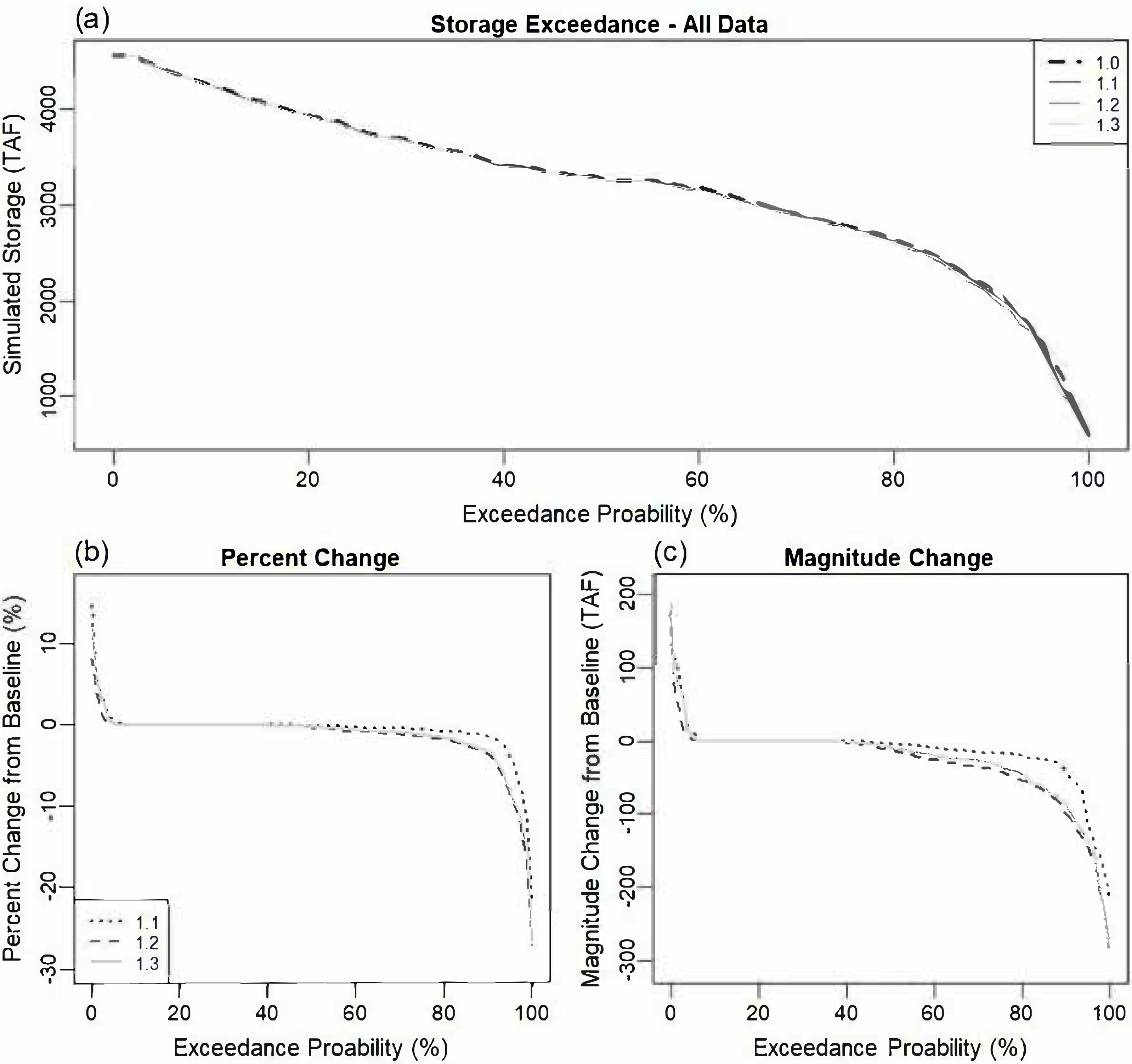

SWP exports (Existing Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (TAF)
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
1.1
1.2
1.3
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (TAF)
Exceedance Proability (%)

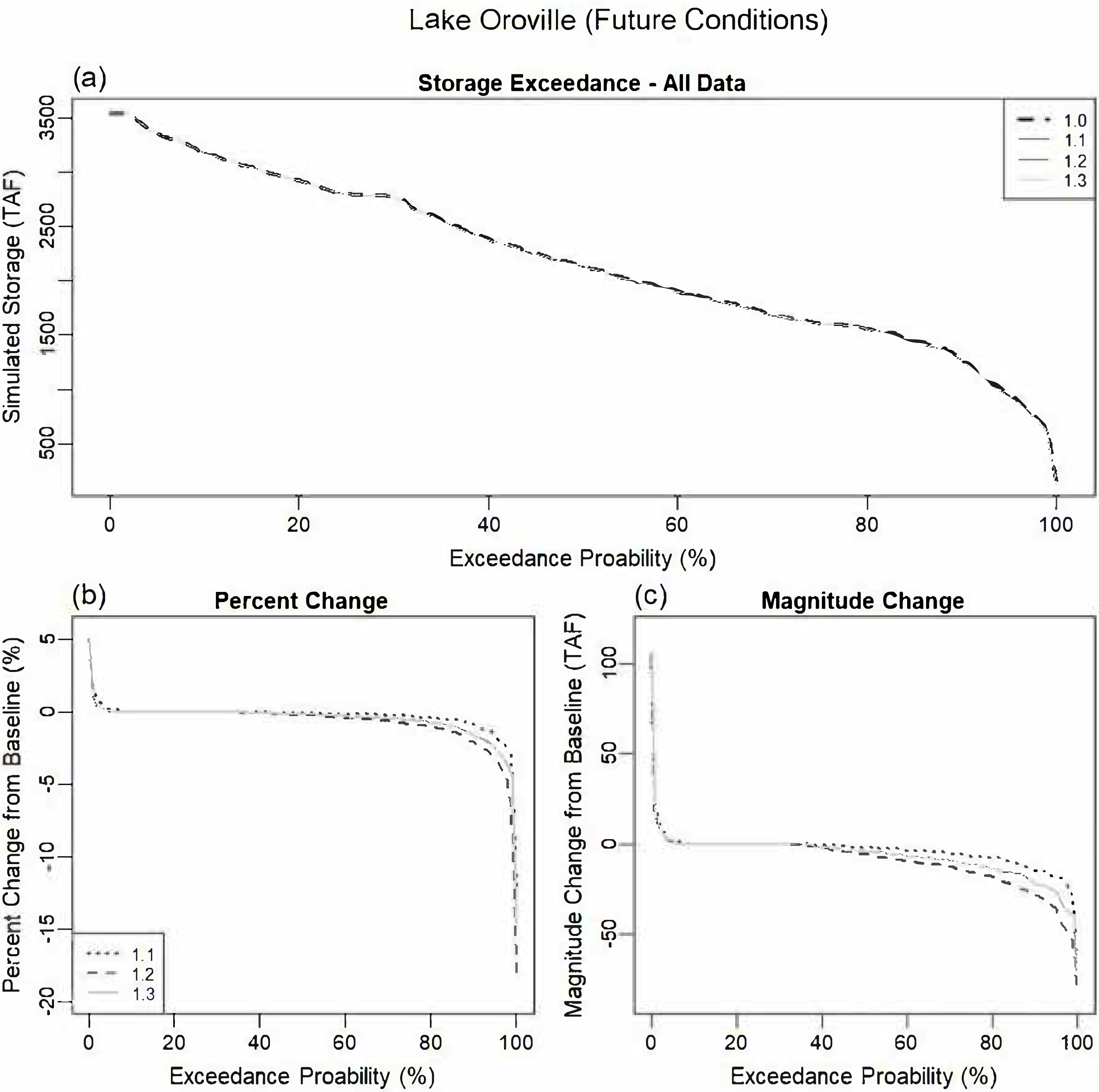
X2 Position (Existing Conditions)

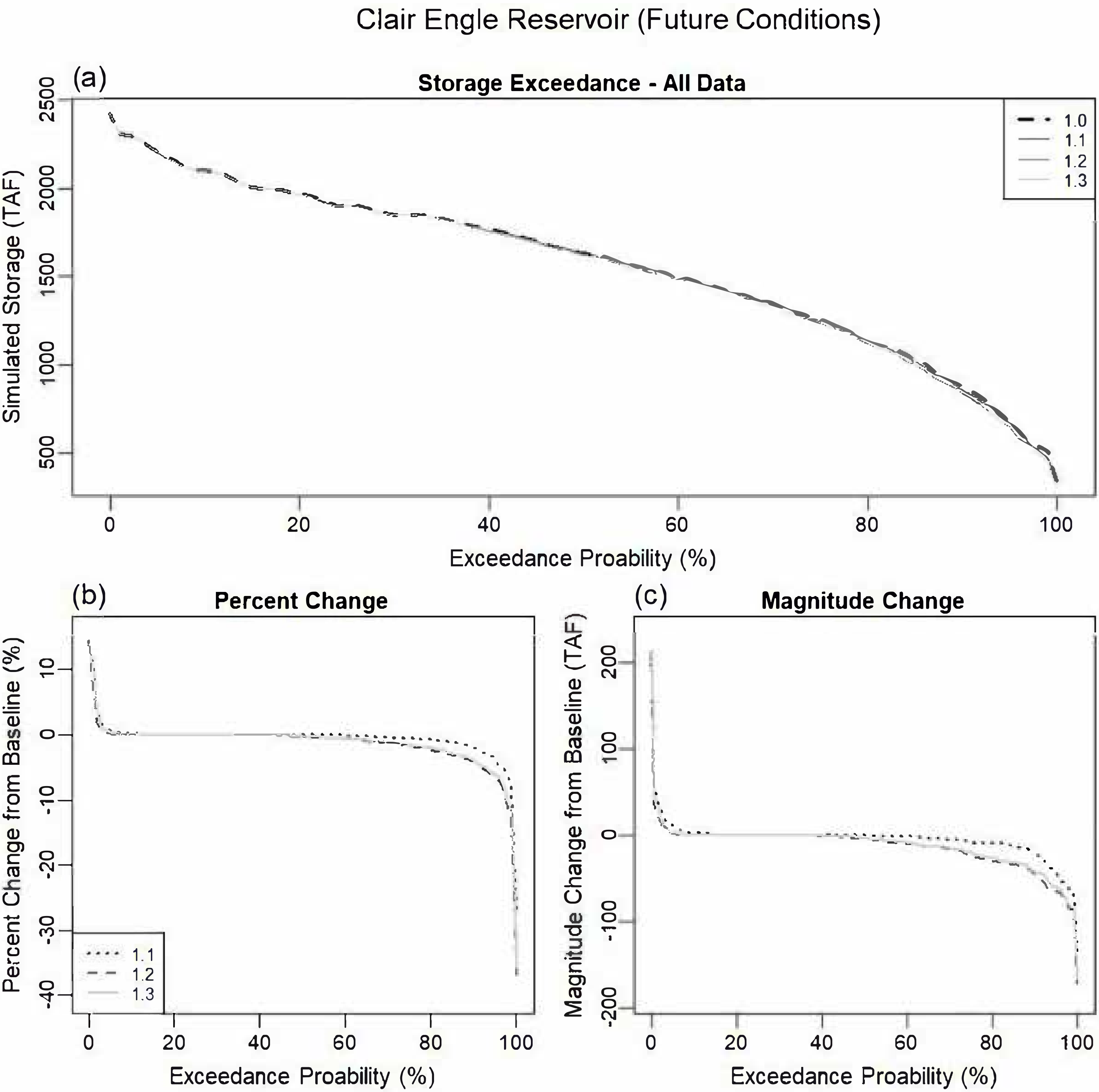



Folsom Reservoir (Future Conditions)
(a)
Storage Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Storage (TAF)
1000
800
600
400
200
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
80
60
40
20
0
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (TAF)
150
100
50
0
-50
0
20
40
60
80
100
Exceedance Proability (%)

Lake Shasta (Future Conditions)

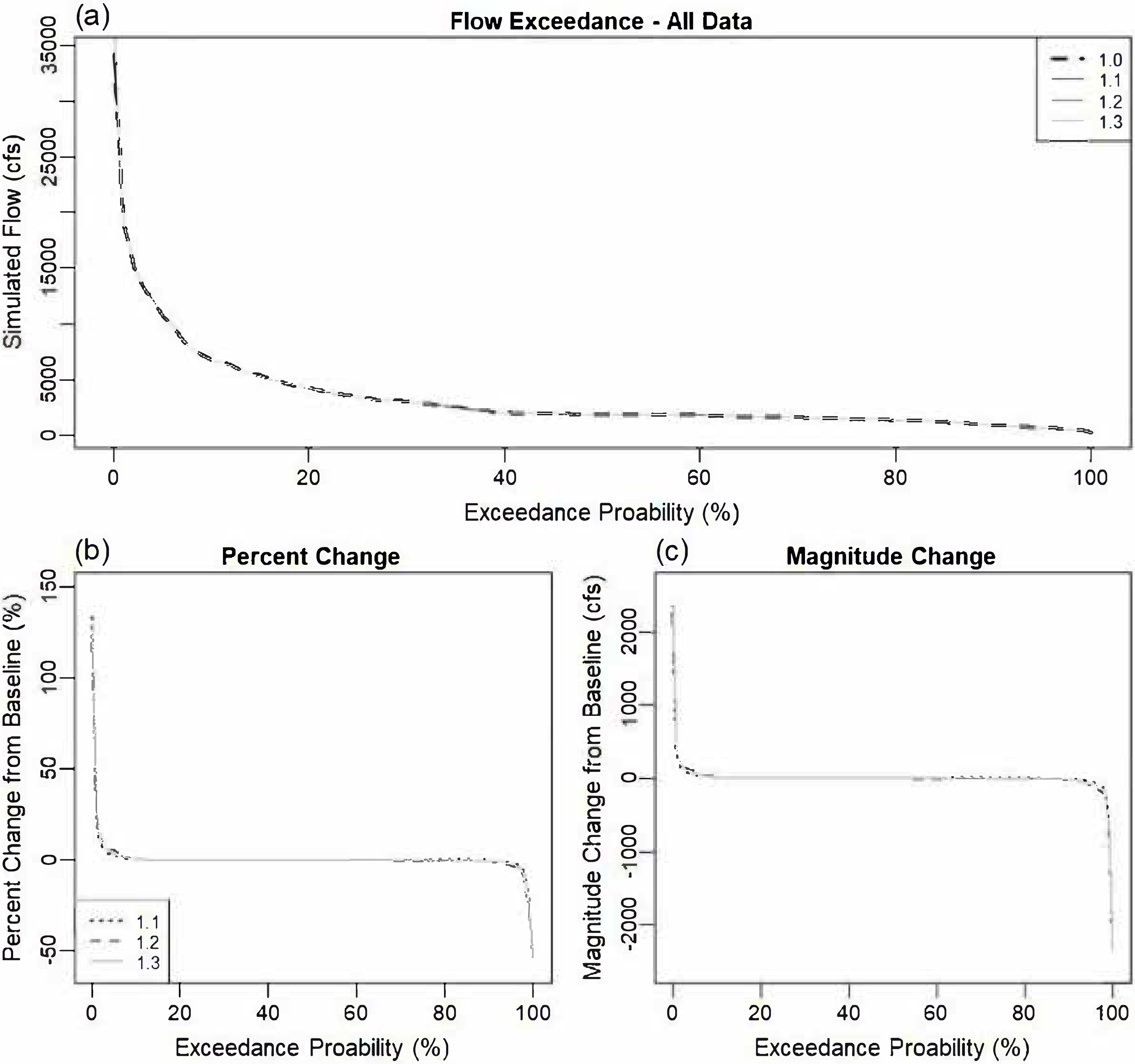


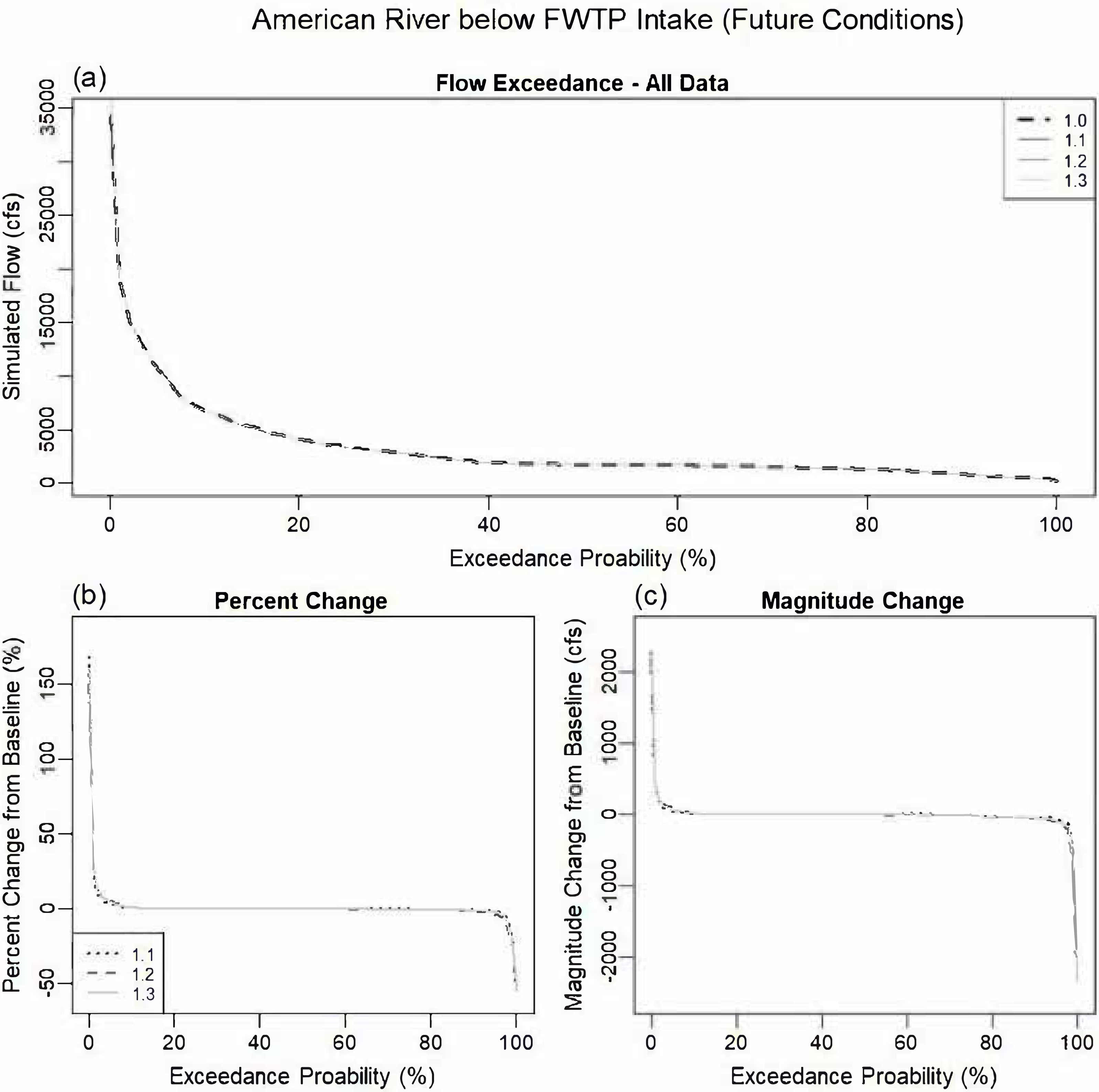

Lake Oroville (Future Conditions)
(a)
Storage Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Storage (TAF)
3500
2500
1500
500
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
5
0
-5
-10
-15
-20
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (TAF)
100
50
0
-50
0
20
40
60
80
100
Exceedance Proability (%)



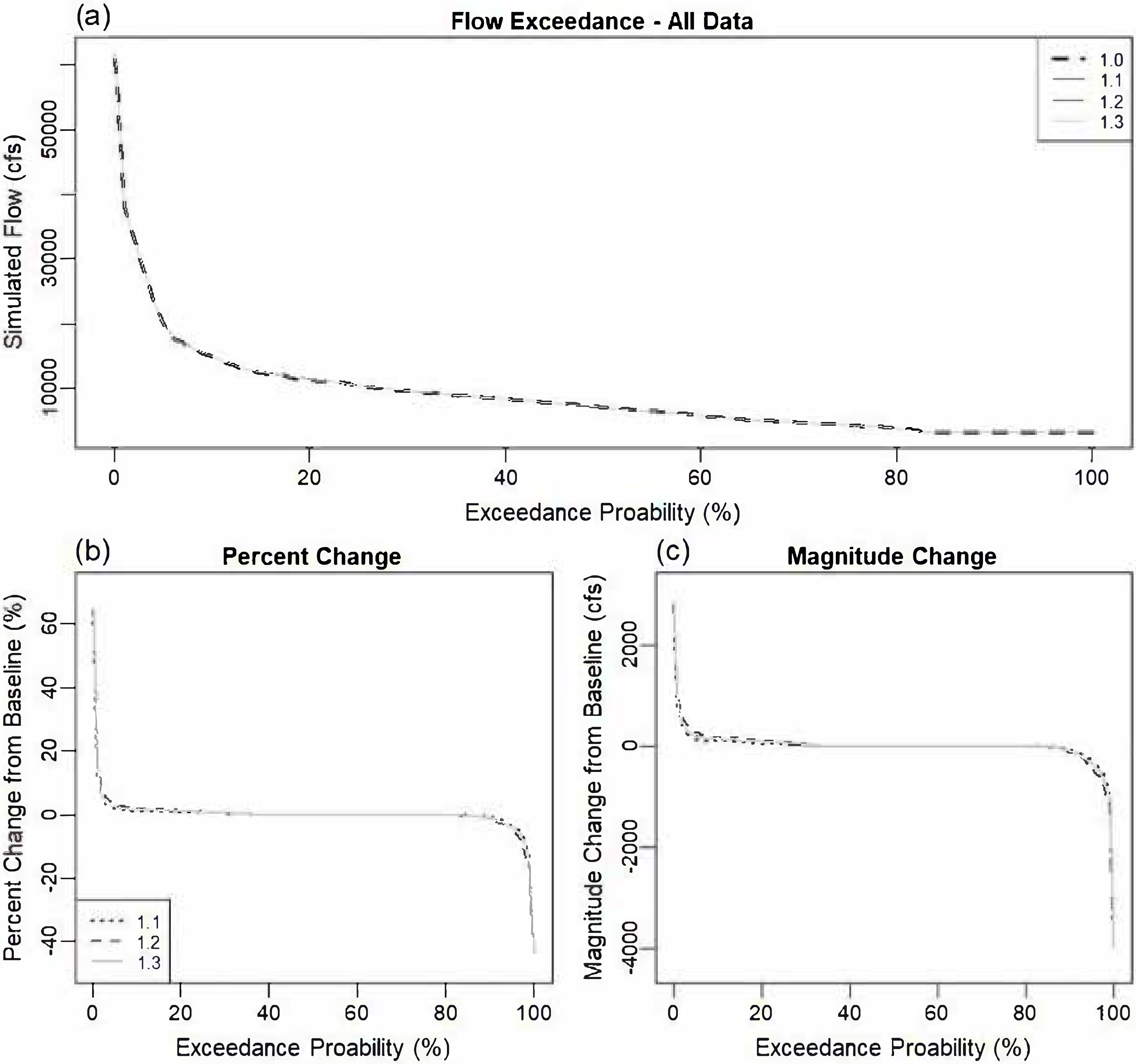
Clair Engle Reservoir (Future Conditions)
(a)
Storage Exceedance - All Data
Simulated Storage (TAF)
2500
2000
1500
1000
500
1.0
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
10
0
-10
-20
-30
-40
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (TAF)
200
100
0
-100
-200
0
20
40
60
80
100
Exceedance Proability (%)

American River below Nimbus Dam (above FWTP Intake) (Future Conditions)

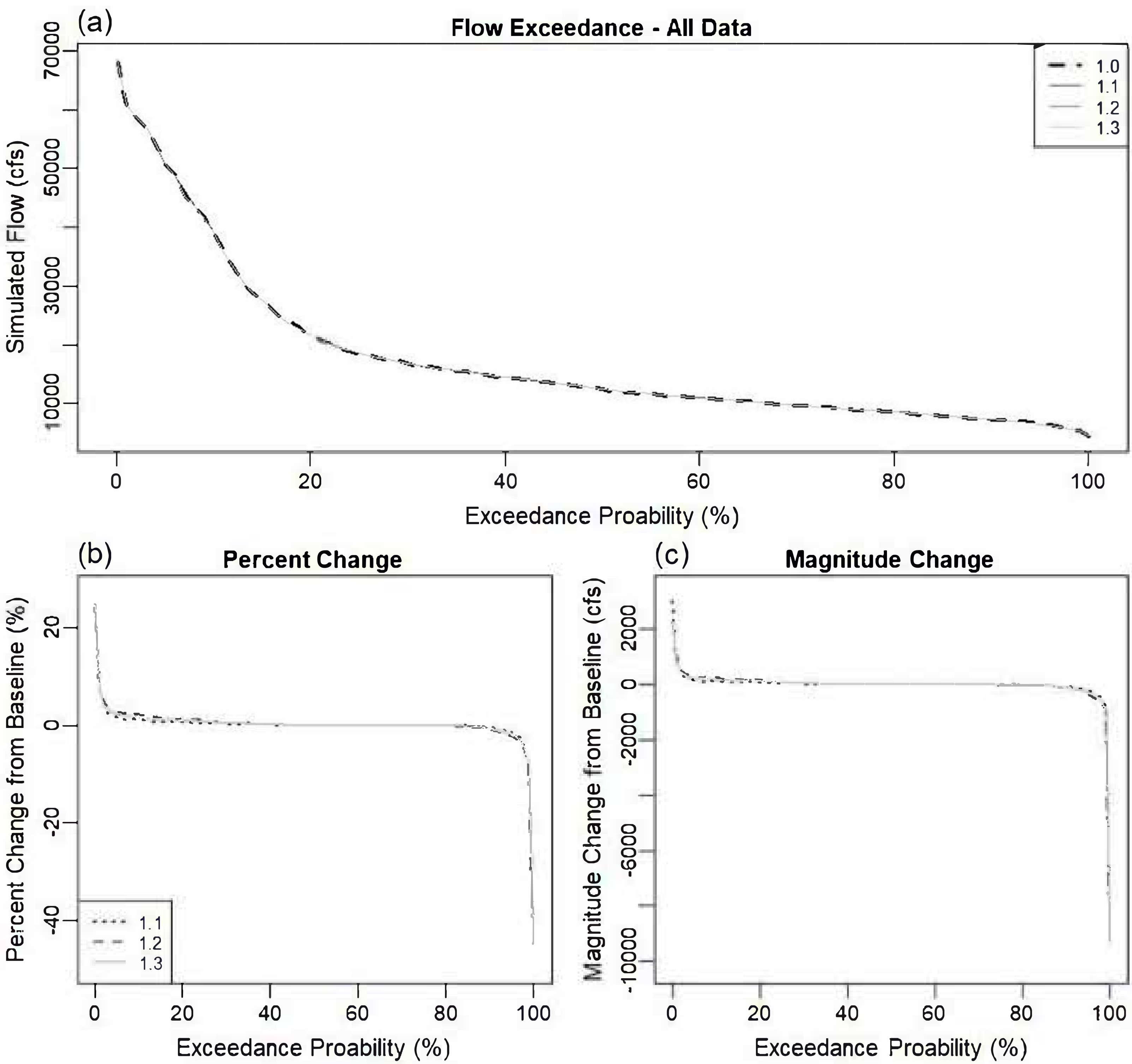



American River below FWTP Intake (Future Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (cfs)
0
5000
15000
25000
35000
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
-50
0
50
100
150
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
-2000
-1000
0
1000
2000
0
20
40
60
80
100
Exceedance Proability (%)

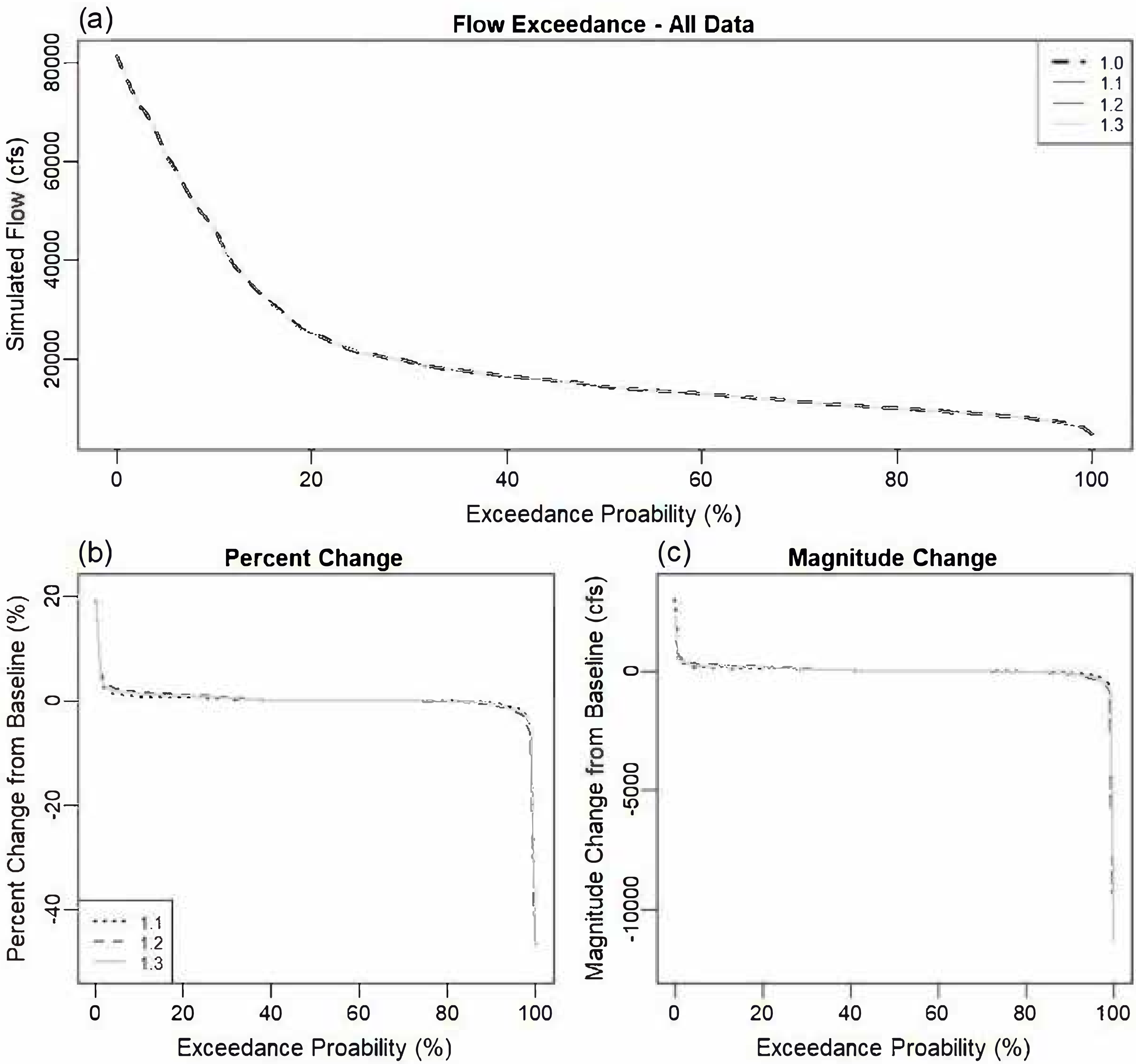
Sacramento River below Keswick and Clear Creek Tunnel (Future Conditions)



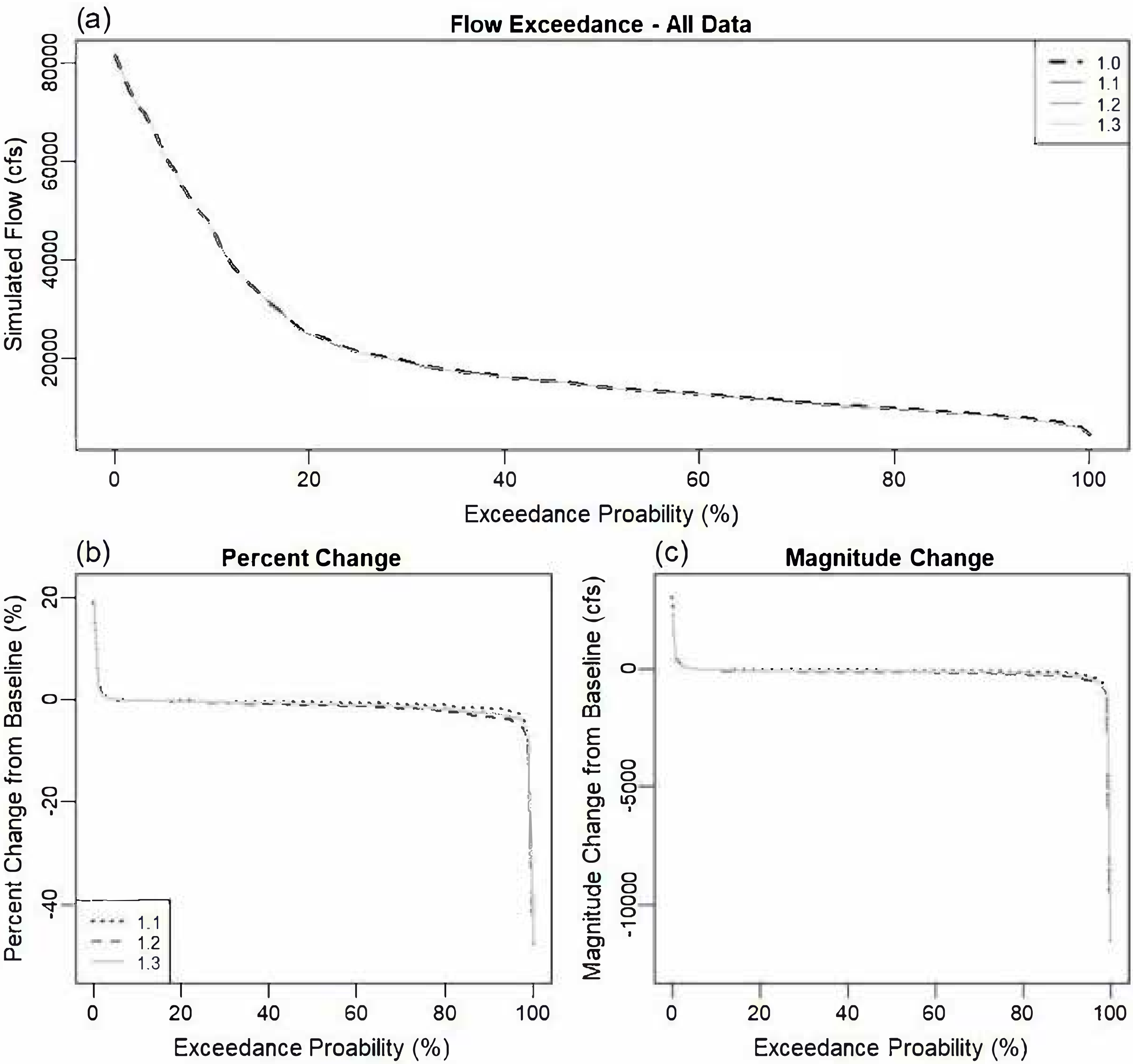
Sacramento River above American River (Future Conditions)

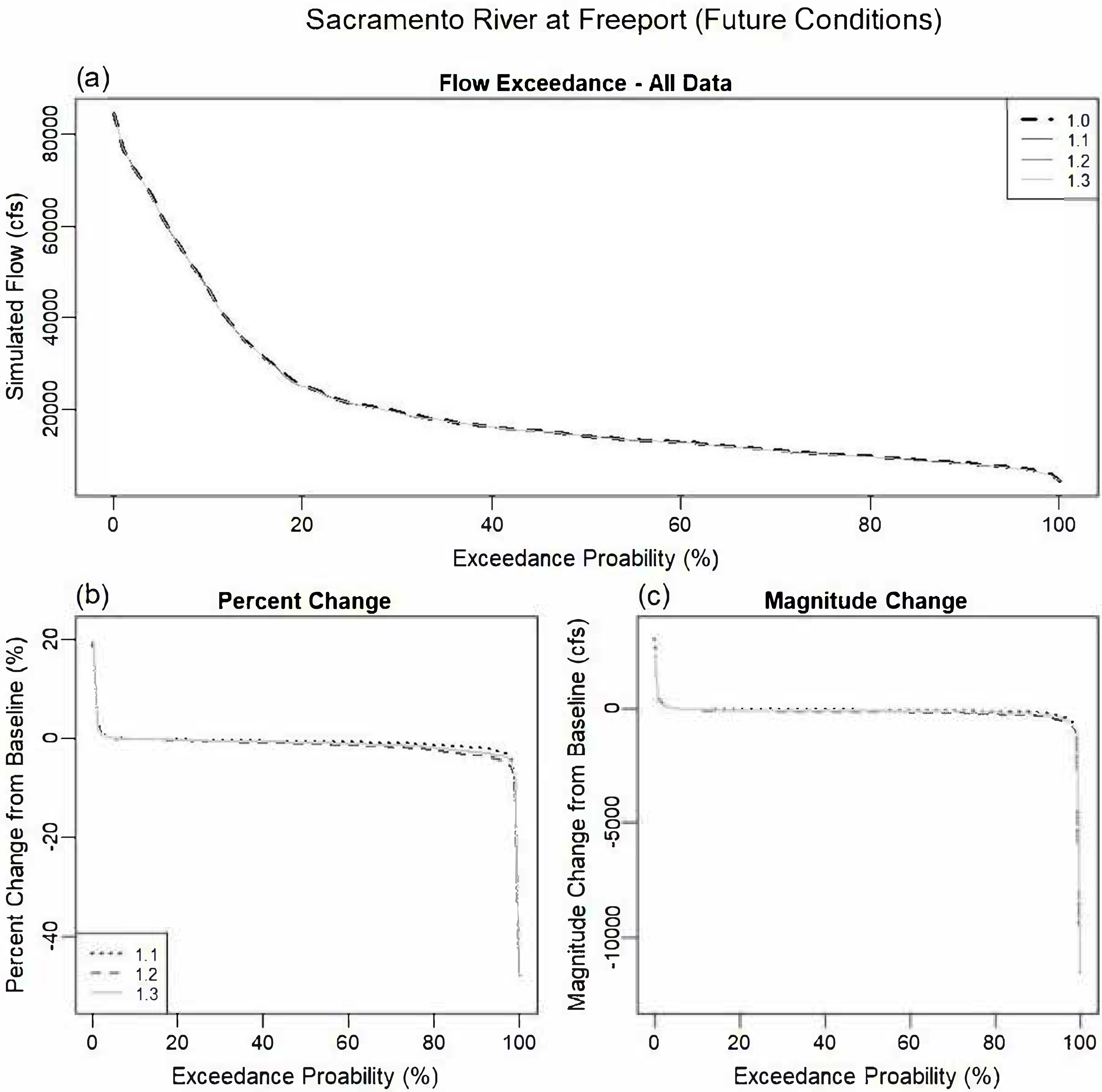


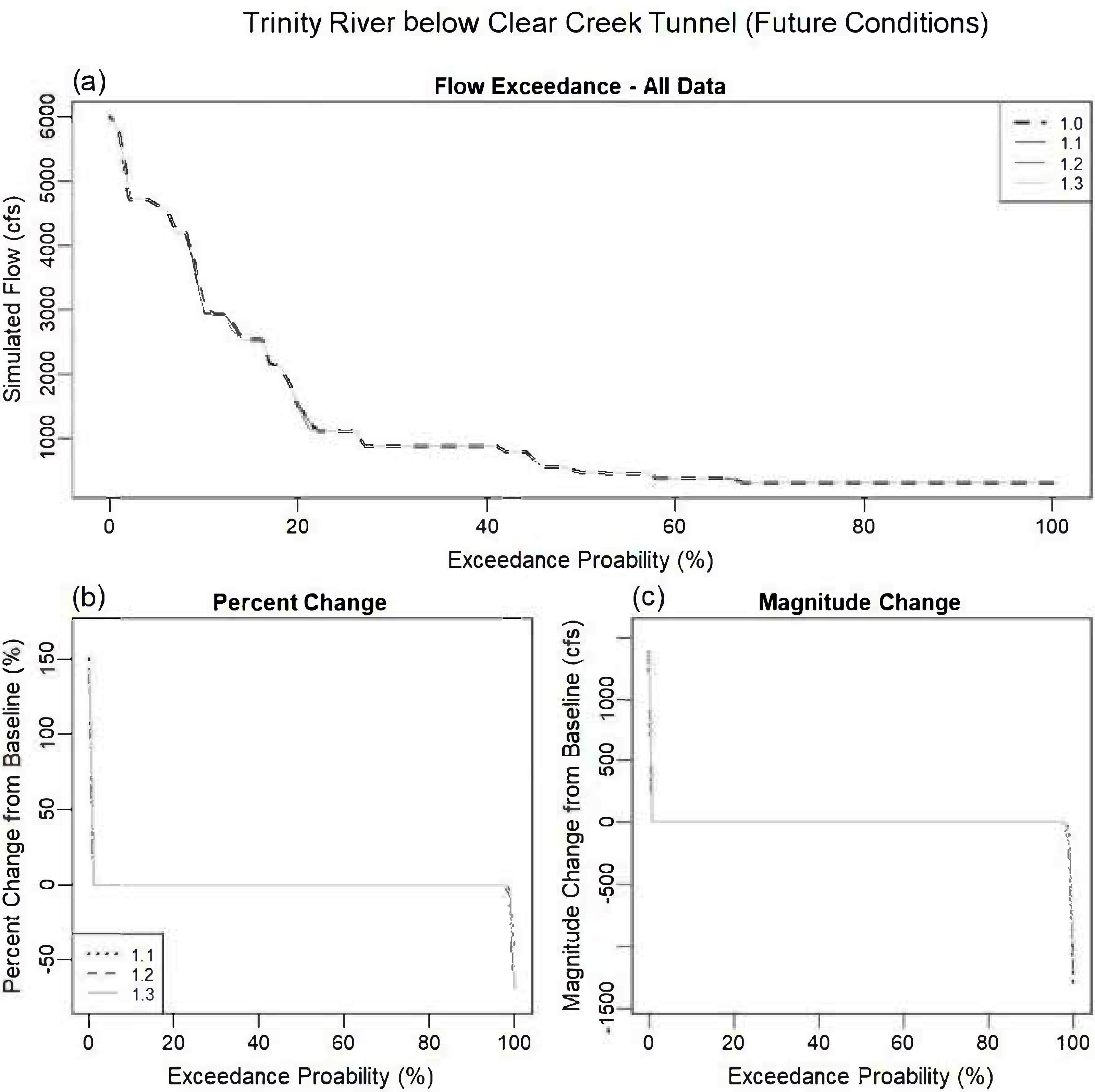
Sacramento River between American River and SRWTP Intakes (Future Conditions)

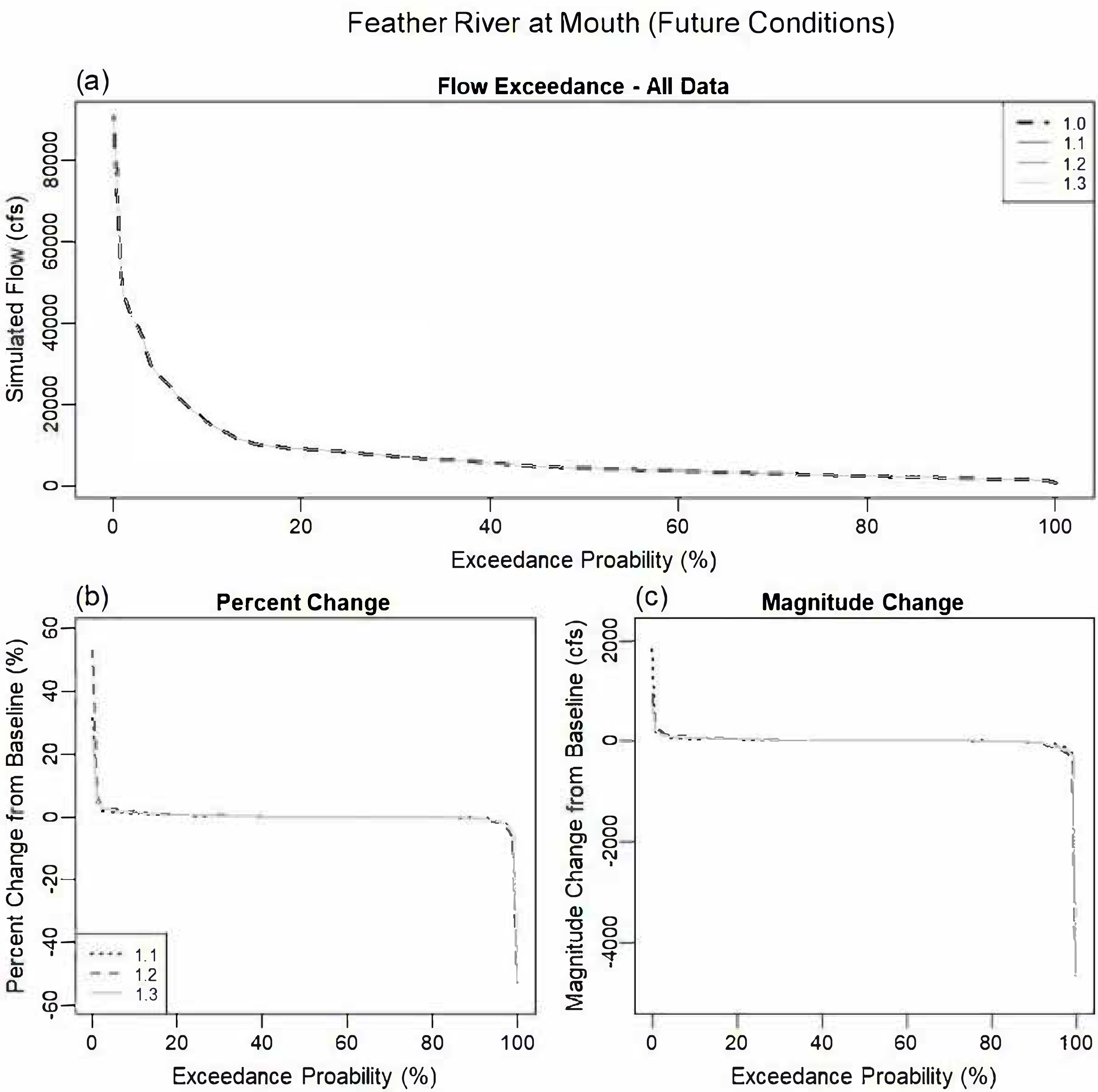


Sacramento River below SRWTP Intakes (Future Conditions)

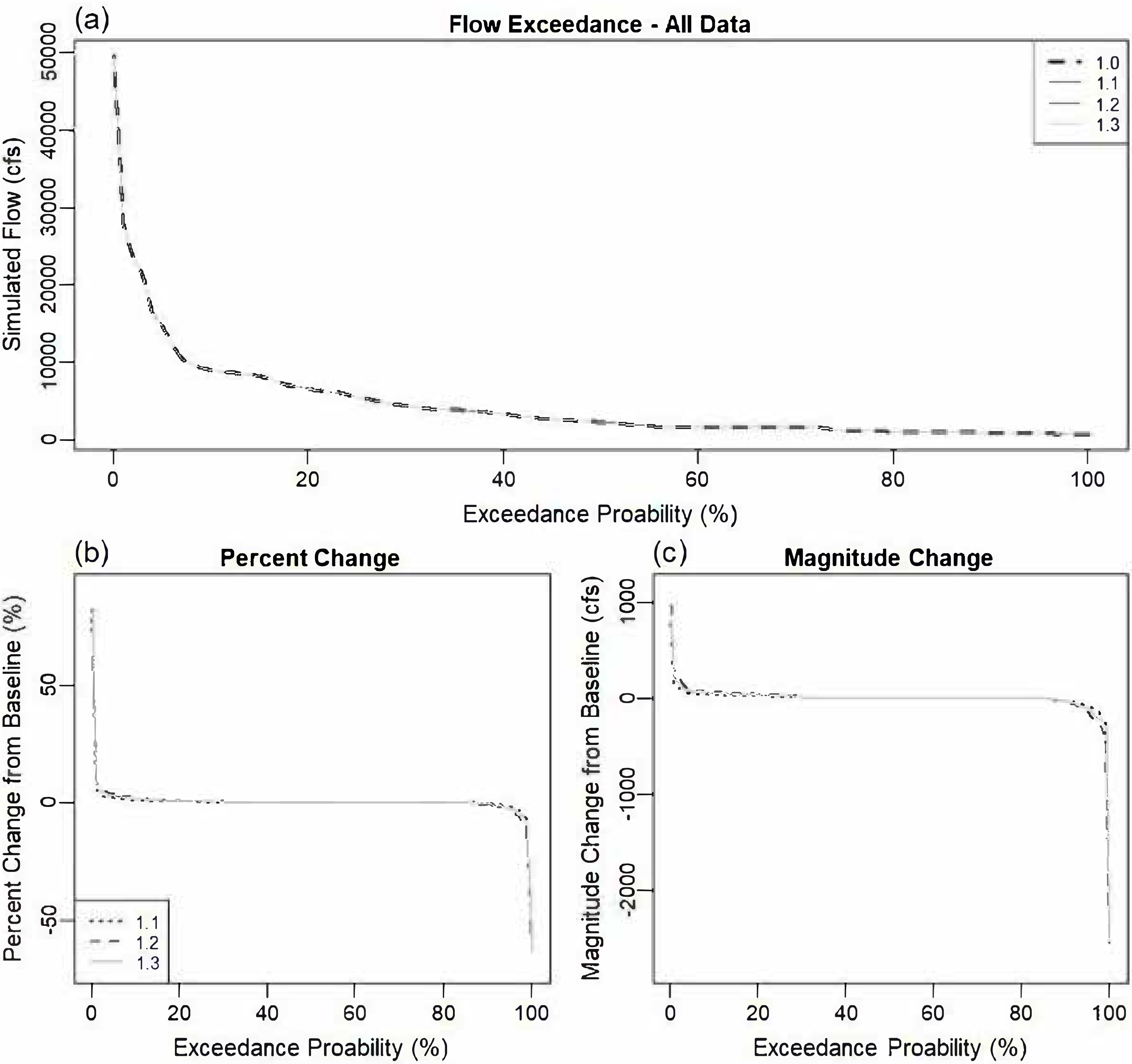


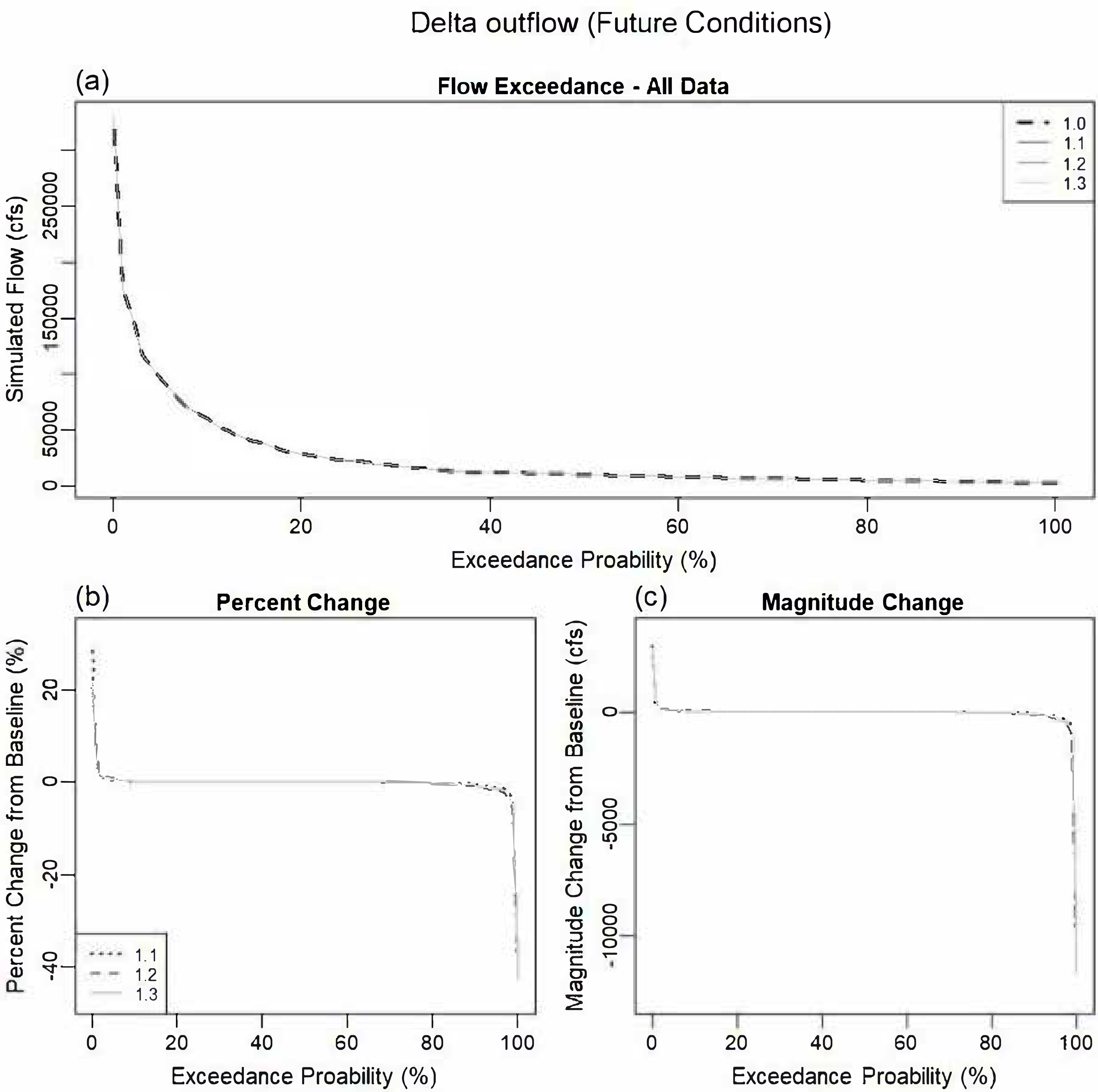

Sacramento River at Freeport (Future Conditions)
(a)
Flow Exceedance - All Data
Simulated Flow (cfs)
80000
60000
40000
20000
1.0
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
20
0
-20
-40
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
0
-5000
-10000
0
20
40
60
80
100
Exceedance Proability (%)


Trinity River below Clear Creek Tunnel (Future Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (cfs)
6000
5000
4000
3000
2000
1000
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
150
100
50
0
-50
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
1000
500
0
-500
-1500
0
20
40
60
80
100
Exceedance Proability (%)


Feather River at Mouth (Future Conditions)
(a)
Flow Exceedance - All Data
Simulated Flow (cfs)
80000
60000
40000
20000
0
0
20
40
60
80
100
Exceedance Proability (%)
1.0
1.1
1.2
1.3
(b)
Percent Change
Percent Change from Baseline (%)
60
40
20
0
-20
-40
-60
1.1
1.2
1.3
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
2000
0
-2000
-4000
Exceedance Proability (%)

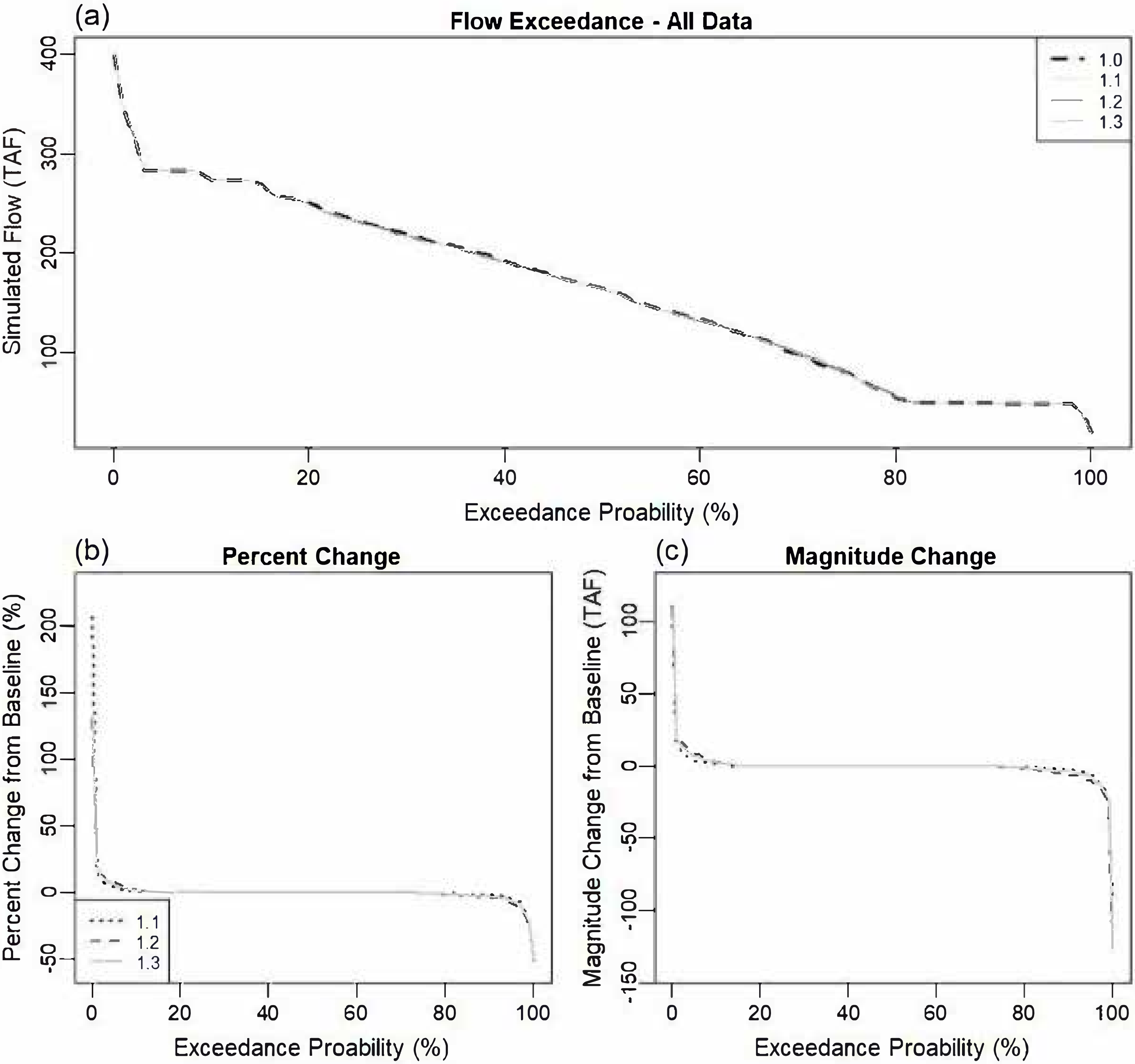
Feather River below Thermalito Afterbay (Future Conditions)



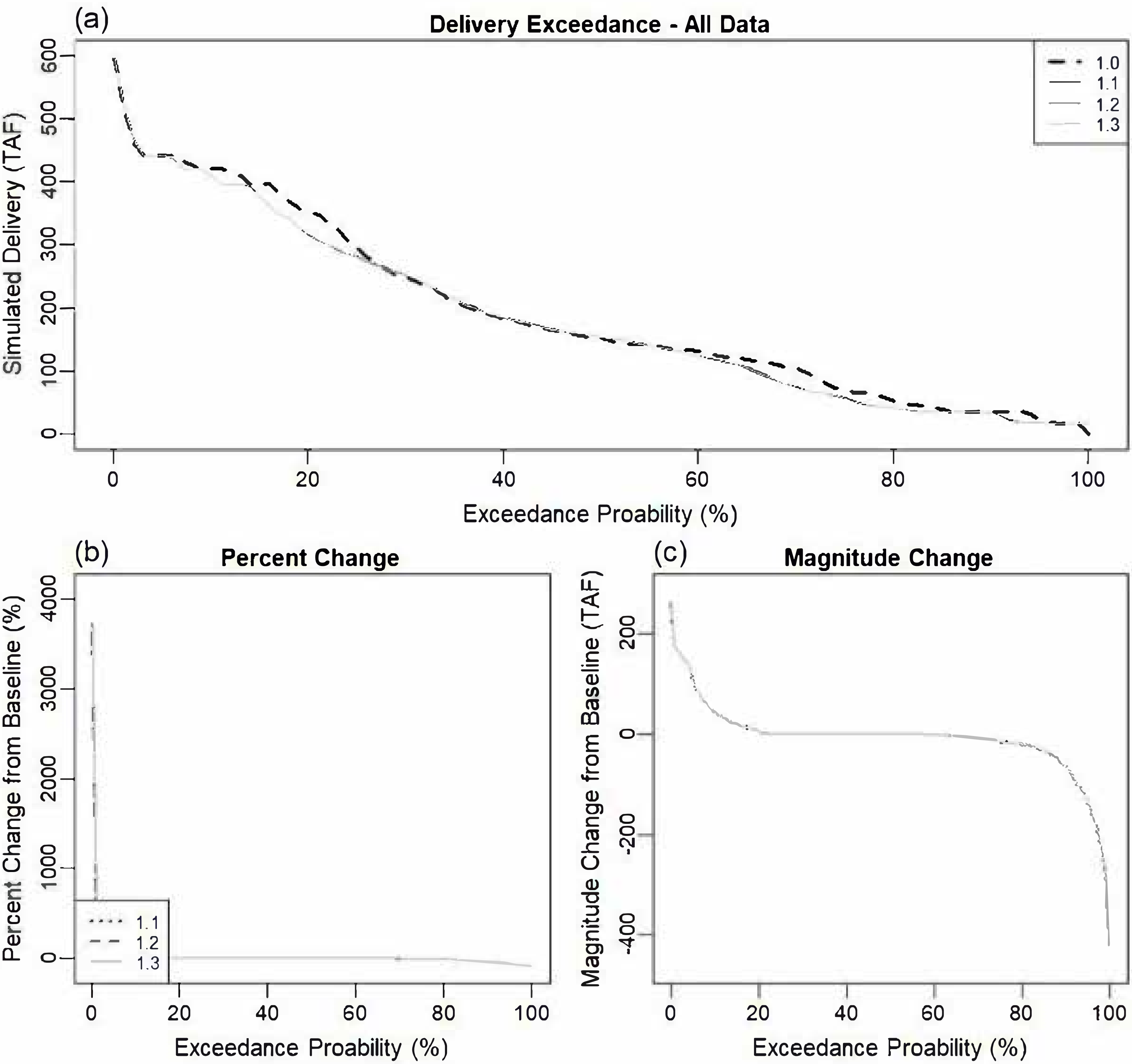


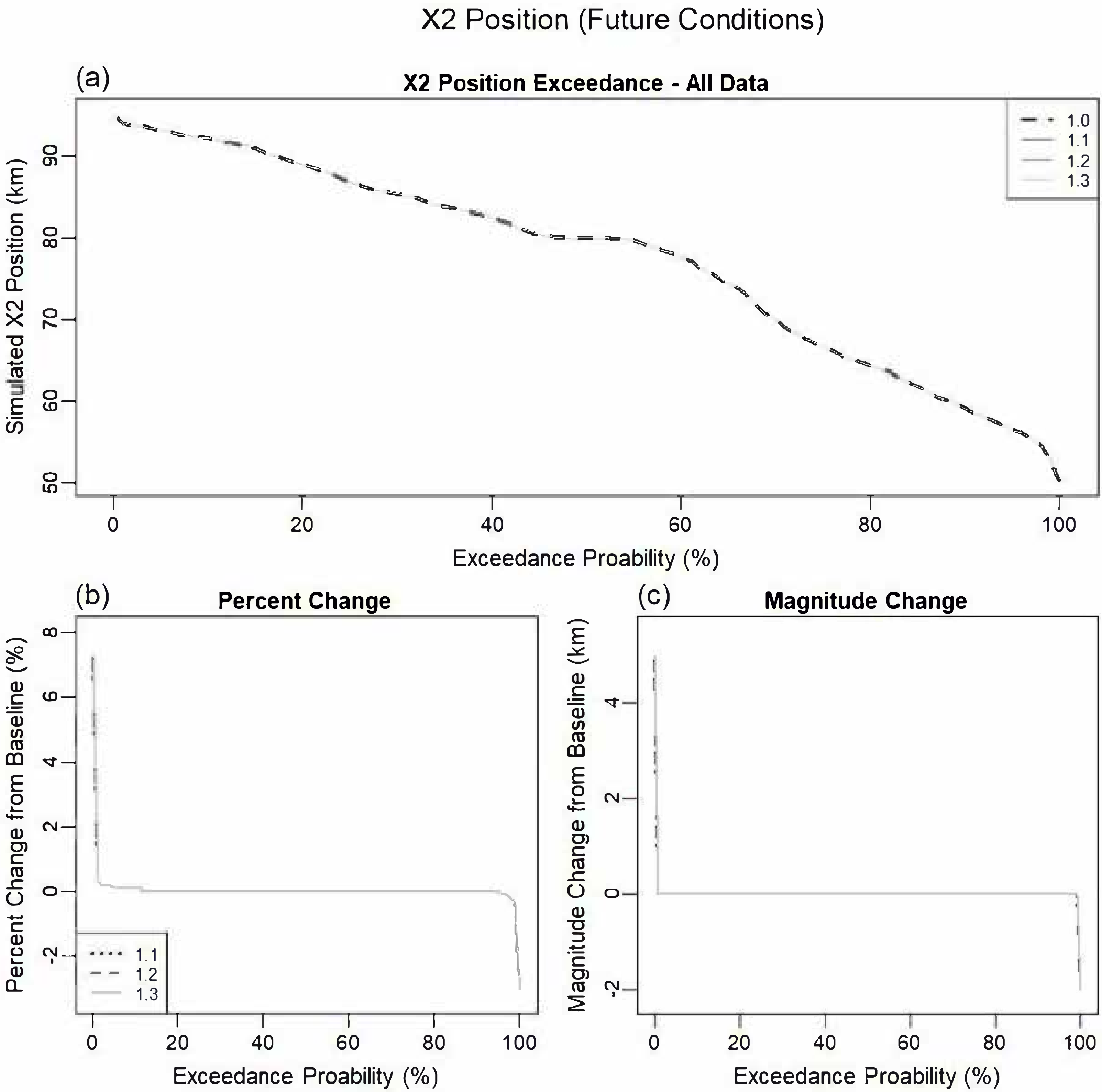
Delta outflow (Future Conditions)
(a)
Flow Exceedance - All Data
1.0
1.1
1.2
1.3
Simulated Flow (cfs)
0
50000
150000
250000
0
20
40
60
80
100
Exceedance Proability (%)
(b)
Percent Change
Percent Change from Baseline (%)
20
0
-20
-40
1.1
1.2
1.3
0
20
40
60
80
100
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (cfs)
0
-5000
-10000
0
20
40
60
80
100
Exceedance Proability (%)

CVP exports (Future Conditions)



SWP exports (Future Conditions)




X2 Position (Future Conditions)
(a)
X2 Position Exceedance - All Data
Simulated X2 Position (km)
Exceedance Proability (%)
1.0
1.1
1.2
1.3
(b)
Percent Change
Percent Change from Baseline (%)
Exceedance Proability (%)
(c)
Magnitude Change
Magnitude Change from Baseline (km)
Exceedance Proability (%)

Appendix F
Noise and Vibration

RCNM Outputs for Construction Noise

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 08/29/2024
Case Description: FWTP

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
College Town Apartments	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	70.0	0.0
Concrete Saw	No	20		89.6	70.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	86.7	79.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	86.7	79.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	86.7	82.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Sacramento State Hornet Commons	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	60.0	0.0
Concrete Saw	No	20		89.6	60.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	88.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	88.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	88.0	84.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
College Town Apartments	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20	89.6		240.0	0.0
Concrete Saw	No	20	89.6		240.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	76.0	69.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	76.0	69.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.0	72.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Sacramento State Hornet Commons	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	470.0	0.0
Concrete Saw	No	20		89.6	470.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	70.1	63.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	70.1	63.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	70.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
College Town Apartments on E.A. Fairbairn	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	120.0	0.0
Concrete Saw	No	20		89.6	120.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	82.0	75.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	82.0	75.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	82.0	78.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 08/29/2024
Case Description: FWTP (nighttime)

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
College Town Apartments	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		70.0	0.0
Gradall	No	40		83.4	70.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	81.1	77.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	80.5	76.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	81.1	79.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Sacramento State Hornet Commons	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		60.0	0.0
Gradall	No	40		83.4	60.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	82.4	78.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	81.8	77.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	82.4	81.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
College Town Apartments	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		240.0	0.0
Gradall	No	40		83.4	240.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Tractor	70.4	66.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	69.8	65.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	70.4	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Sacramento State Hornet Commons	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		470.0	0.0
Gradall	No	40		83.4	470.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Tractor	64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	63.9	60.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.5	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
College Town Apartments	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		120.0	0.0
Gradall	No	40		83.4	120.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	76.4	72.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	75.8	71.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	76.4	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 05/13/2024
Case Description: SRWTP

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Riverwalk Apartments	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	1840.0	0.0
Impact Pile Driver	Yes	20		101.3	1840.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	58.3	51.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	70.0	63.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	70.0	63.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Cannery Place Apartments	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	2200.0	0.0
Impact Pile Driver	Yes	20		101.3	2200.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	56.7	49.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	68.4	61.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	68.4	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
8th Street Residences	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	2500.0	0.0
Impact Pile Driver	Yes	20		101.3	2500.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	55.6	48.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	67.3	60.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.3	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Kaiser Permanente Medical Center	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	250.0	0.0
Impact Pile Driver	Yes	20		101.3	250.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	75.6	68.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	87.3	80.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	87.3	80.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 05/13/2024
Case Description: SRWTP (nighttime)

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Riverwalk Apartments	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		1840.0	0.0
Gradall	No	40		83.4	1840.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	52.7	48.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	52.1	48.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	52.7	51.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Cannery Place Apartments	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		2200.0	0.0
Gradall	No	40		83.4	2200.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	51.1	47.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	50.5	46.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	51.1	49.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
8th Street Residences	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		2500.0	0.0
Gradall	No	40		83.4	2500.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	50.0	46.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	49.4	45.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	50.0	48.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Kaiser Permanente Medical Center	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		250.0	0.0
Gradall	No	40		83.4	250.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	70.0	66.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	69.4	65.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	70.0	68.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Executive Inn and Suites	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		165.0	0.0
Gradall	No	40		83.4	165.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Tractor	73.6	69.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	73.0	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	73.6	72.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #6 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Motel 6 Sacramento	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		470.0	0.0
Gradall	No	40		83.4	470.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Tractor	64.5	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	63.9	60.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	64.5	63.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #7 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Quality Inn	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		650.0	0.0
Gradall	No	40		83.4	650.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	61.7	57.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	61.1	57.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	61.7	60.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #8 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Governors Inn Hotel Sacramento	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		385.0	0.0
Gradall	No	40		83.4	385.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	66.3	62.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	65.7	61.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	66.3	65.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #9 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Crossroad Inn	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		735.0	0.0
Gradall	No	40		83.4	735.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	60.7	56.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	60.1	56.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	60.7	59.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #10 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Kaiser Permanente Medical Center	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		100.0	0.0
Gradall	No	40		83.4	100.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Tractor	78.0	74.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	77.4	73.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	78.0	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 05/13/2024
Case Description: Sacramento River Intakes

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Kaiser Permanente Medical Center	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20	89.6		350.0	0.0
Impact Pile Driver	Yes	20	101.3		350.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	72.7	65.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Impact Pile Driver	84.4	77.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.4	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 05/13/2024
Case Description: Sacramento River Intakes (nighttime)

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Best Western Sandman Hotel	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	83.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Kaiser Permanente Medical Center	Residential	55.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Tractor	No	40	84.0		350.0	0.0
Tractor	No	40	84.0		350.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Tractor	67.1	63.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	67.1	63.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	67.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Vibration Modeling

Vibration propogation from Construction Equipment
FWTP and Existing Utility Upgrades

Formula from FTA, 2018 = PPVequip = PPVref x (25/D)^1.5
where
Receptor : Sacramento State Hornet Commons

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

Enter distance = 60 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.174822
	Vibratory Roller	0.056481
	Bulldozer (large)	0.023937
	Truck(loaded)	0.020441
	Jackhammer	0.009414
	Dozer (Small)	0.000807

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79
Dozer (Small)	53

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	92.59366
	Vibratory Roller	82.59366
	Bulldozer (large)	75.59366
	Truck(loaded)	74.59366
	Jackhammer	67.59366
	Dozer (Small)	41.59366

Formula from FTA, 2018 = PPVequip = PPVref x (25/D)^1.5
where
Receptor : College Town Apartments

		PPV@25ft
PPV refs @ 25 ft =	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

Enter distance = 120 Adjacent Buildings

Resultant PPV =	pile driver (impact)	0.061808969
	Vibratory Roller	0.019969052
	Bulldozer (large)	0.008463074
	Truck(loaded)	0.007226895
	Jackhammer	0.003328175
	Dozer (Small)	0.000285272

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79
Dozer (Small)	53

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =	pile driver (impact)	83.56276
	Vibratory Roller	73.56276
	Bulldozer (large)	66.56276
	Truck(loaded)	65.56276
	Jackhammer	58.56276
	Dozer (Small)	32.56276

Vibration propogation from Construction Equipment
SRWTP and Existing Utility Upgrades

Formula from FTA, 2018 = PPVequip = PPVref x (25/D)^1.5
where

Receptor :Kaiser Permanente Medical Center

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

Enter distance = 250 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.020555
	Vibratory Roller	0.006641
	Bulldozer (large)	0.002814
	Truck(loaded)	0.002403
	Jackhammer	0.001107
	Dozer (Small)	9.49E-05

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79
Dozer (Small)	53

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	74
	Vibratory Roller	64
	Bulldozer (large)	57
	Truck(loaded)	56
	Jackhammer	49
	Dozer (Small)	23

Formula from FTA, 2018 = PPVequip = PPVref x (25/D)^1.5
where

Receptor : Executive Inn Suites

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

Enter distance = 80 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.11355
	Vibratory Roller	0.036685
	Bulldozer (large)	0.015548
	Truck(loaded)	0.013277
	Jackhammer	0.006114
	Dozer (Small)	0.000524

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79
Dozer (Small)	53

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	88.8455
	Vibratory Roller	78.8455
	Bulldozer (large)	71.8455
	Truck(loaded)	70.8455
	Jackhammer	63.8455
	Dozer (Small)	37.8455

Vibration propogation from Construction Equipment
Sacramento River Intakes

Formula from FTA, 2018 = PPVequip = PPVref x (25/D)^1.5
where
Receptor : Riverwalk Apartments

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

Enter distance = 1200 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.001955
	Vibratory Roller	0.000631
	Bulldozer (large)	0.000268
	Truck(loaded)	0.000229
	Jackhammer	0.000105
	Dozer (Small)	9.02E-06

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79
Dozer (Small)	53

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	53.56276
	Vibratory Roller	43.56276
	Bulldozer (large)	36.56276
	Truck(loaded)	35.56276
	Jackhammer	28.56276
	Dozer (Small)	2.562763

Formula from FTA, 2018 = PPVequip = PPVref x (25/D)^1.5
where
Receptor : SMUD Museum of Science and Curiosity

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

Enter distance = 80 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.11355
	Vibratory Roller	0.036685
	Bulldozer (large)	0.015548
	Truck(loaded)	0.013277
	Jackhammer	0.006114
	Dozer (Small)	0.000524

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79
Dozer (Small)	53

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	88.8455
	Vibratory Roller	78.8455
	Bulldozer (large)	71.8455
	Truck(loaded)	70.8455
	Jackhammer	63.8455
	Dozer (Small)	37.8455

Formula from FTA, 2018 = PPVequip = PPVref x (25/D)^1.5
where
Receptor : SMUD Museum of Science and Curiosity and Best Western Sandman

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

Enter distance = 25 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79
Dozer (Small)	53

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	104
	Vibratory Roller	94
	Bulldozer (large)	87
	Truck(loaded)	86
	Jackhammer	79
	Dozer (Small)	53

Formula from FTA, 2018 = PPVequip = PPVref x (25/D)^1.5
where
Receptor : SMUD Museum of Science and Curiosity

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

Enter distance = 270 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.0183138
	Vibratory Roller	0.0059168
	Bulldozer (large)	0.0025076
	Truck(loaded)	0.0021413
	Jackhammer	0.0009861
	Dozer (Small)	8.453E-05

	Lv@25 ft
pile driver (impact)	104
Vibratory Roller	94
Bulldozer (large)	87
Truck(loaded)	86
Jackhammer	79
Dozer (Small)	53

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	72.99729
	Vibratory Roller	62.99729
	Bulldozer (large)	55.99729
	Truck(loaded)	54.99729
	Jackhammer	47.99729
	Dozer (Small)	21.99729

Vibration propogation from Construction Equipment

Potable Water Transmission Pipelines

Formula from FTA, 2018 = PPVequip = PPVref x (25/D)^1.5
where

Receptor: close as 25 feet from adjacent existing vibration sensitive receptors

PPV refs @ 25 ft =		PPV@25ft
	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

Enter distance = 25 Adjacent Buildings

Resultant PPV =		
	pile driver (impact)	0.65
	Vibratory Roller	0.21
	Bulldozer (large)	0.089
	Truck(loaded)	0.076
	Jackhammer	0.035
	Dozer (Small)	0.003

		Lv@25 ft
	pile driver (impact)	104
	Vibratory Roller	94
	Bulldozer (large)	87
	Truck(loaded)	86
	Jackhammer	79
	Dozer (Small)	53

Formula from FTA 2006 = Lv(D) = Lv(25 ft) – 30log(D/25)

Resultant Lv =		
	pile driver (impact)	104
	Vibratory Roller	94
	Bulldozer (large)	87
	Truck(loaded)	86
	Jackhammer	79
	Dozer (Small)	53